

FINAL REPORT

EVALUATING ENVIRONMENTAL AND ECONOMIC IMPACT FOR BEEF PRODUCTION IN ALBERTA USING LIFE CYCLE ANALYSIS

Prepared For:

ALBERTA AGRICULTURE AND RURAL DEVELOPMENT POLICY AND ENVIRONMENT ECONOMICS AND COMPETITIVENESS ECONOMICS BRANCH

Funded By:

GROWING FORWARD, A FEDERAL-PROVINCIAL-TERRITORIAL INITIATIVE

DISCLAIMER:

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EXECUTIVE SUMMARY

Alberta Agriculture and Rural Development (ARD) has engaged in a multiyear project to evaluate the environmental and economic impacts of beef production in Alberta using the Life Cycle Assessment (LCA) methodology. The LCA study addresses the significant environmental aspects and potential impacts generated throughout the life of the beef production system in Alberta.

The overall activities of this ARD project include:

- Technical analysis to quantitatively benchmark the carbon footprint and other environmental impacts of beef production in Alberta
- Economic analysis to examine the economics of adopting potential greenhouse gas (GHG) reducing practices related to beef production in Alberta

The results of the ARD project are intended to aid in product differentiation on environmental attributes, providing value-added products, market access, trade dispute resolution, nutrient and water use efficiency, production efficiency, competitiveness and potential carbon reduction offset credit project opportunities.

Conestoga-Rovers & Associates (CRA) and the Pembina Institute (Pembina) (Project Team) were retained to complete the technical analysis component of the project, which includes a first approximation of the carbon footprint intensity and other environmental impacts of beef production in Alberta. CRA is the lead entity in this study; Pembina has been subcontracted to provide CRA with guidance on LCA methodology and to aid in model development.

The objective of this assignment was to provide a first approximation of the carbon footprint intensity and other environmental impacts including water and nutrients, such as nitrogen and phosphorus, of the beef production industry in Alberta using the LCA approach.

The study has identified:

• First approximation of environmental impacts of beef production in Alberta

i

• First approximation of environmental impacts per functional unit

Note that this is a first approximation of the above impacts. The intent is to create a tool that allows for subsequent adjustment according to revised data, while also facilitating

the inclusion of new processes if necessary. While the model has been constructed to provide a comprehensive understanding of the Alberta beef production cycle, the authors recognize that future research is likely to provide more Alberta-specific data for use in the model. As such, the model has been formulated to allow for such inclusions as appropriate.

Boundaries of the beef production system include production of seed for specific components of the diet (barley, barley silage, alfalfa grass), cultivation of diet components, fertilizer production and application, feed storage, grains processing and, eventually processing of feed for such components of the diet, and cattle feeding strategy; production and transportation of minerals/supplements, plastics, and bedding for cattle; livestock related activities, including activities within and outside the farm (cattle management, cattle rearing, storage and management of manure, finishing, transportation; garbage management (plastics); and the production, transportation and usage of energy by beef operations.

The specific scope of the study was designed to start with production of cattle feed and end at the door of the meat packing plant/slaughterhouse.

The LCA has been based on two different finishing scenarios, namely the yearling-fed and calf-fed systems. The current interest in grain for fuel has increased costs and decreased returns for the more traditional calf-fed finishing systems, spurring interest in increased use of forages prior to finishing. The duration of each of the finishing strategies and differences in diet (forages versus concentrates) and resources required to feed the animals has been quantified for both systems. Neither organic nor grass-fed beef production in Alberta has been considered in this study.

For the purposes of this study, the functional unit has been defined as one kg shrunk weight (one kg of live cattle at the door of the slaughterhouse). This allows for the estimation of environmental impacts up to the slaughterhouse door, which has been defined as the project boundary.

The life cycle inventory (LCI) was performed using primary and secondary data only, using specific data for the Alberta livestock production system where available, and supplemented by generic data from the literature or databases as necessary. Sources of data include industry experts (producers, auction mart managers, Livestock Identification Services), government agencies (Alberta Agriculture and Rural Development, Statistics Canada), industry organizations and associations (CanFax [a division of the Canadian Cattlemen's Association], Alberta Plastics Recycling Association), and independent research groups (universities, consultants). In addition,

because of the complex nature of animal diet in the beef industry in Alberta, a ruminant nutritionist was retained to provide representative, balanced rations.

The Ecoinvent V2 database was chosen as the primary data source for quantification of the emission factors of the processes involved in the life cycle analysis. However, certain processes described in Ecoinvent are characteristic of geographic systems that differ from the Alberta context. Whenever necessary, the processes from Ecoinvent were adapted, as much as possible, to Alberta- and/or Canadian-specific conditions.

A variety of processes were described for the construction, operation and maintenance, and decommissioning components of the beef production cycle. The construction and decommissioning components were not included in the analysis. Some of the operations and maintenance items also removed from the inventory include: activities related to the production and transport of materials required for on-farm repairs and replacement; storage of seed in regional storehouses; treatment of harvested crop; vitamin and growth promotant production; and activities related to production and transportation of supplements and vaccinations/antibiotics.

The following environmental impact categories were considered in this study: global warming potential (GWP), eutrophication, acidification, and non-renewable energy resources. Modelling was undertaken according to the principles established by ISO 14040:2006 and 14044:2006. The GWP method as per Inter-governmental Panel on Climate Change (IPCC) 2007, with a time horizon of 100 years was used for quantification of the global warming impact category. IMPACT 2002+ was chosen as a life cycle impact assessment method for the aquatic acidification, aquatic eutrophication and non-renewable energy resources environmental impacts.

The life cycle of the project results in a carbon intensity of 14.5 kg CO₂e per kg of beef live (shrunk) weight for the entire calf crop, with a breakdown of 14.1 kg CO₂e per kg of beef live (shrunk) weight for the calf-fed system, and 14.8 kg CO₂e per kg of beef live (shrunk) weight for the yearling-fed system. Slaughterhouse emissions are not included as part of this analysis. It must be noted that this carbon intensity value is only a first approximation, based on provincial average estimates for all parameters, and based on both local and international estimation techniques. Therefore, comparison of this value to LCAs from other jurisdictions must include a confirmation that assumptions and boundaries are equivalent. Otherwise, any comparison with other jurisdictions may be invalid and misleading.

The largest components of the total emission figure include enteric emissions (51.1 percent of total), on-farm energy consumption activities (18.6 percent of total) and

nitrous oxide emissions from soil and manure management (16.3 percent of total). The next largest category is total forage and cereal activities at 8.8 percent of total. The results for both the calf-fed and yearling-fed systems are similar to the percentage breakdown of the total emissions.

Within these categories, the largest contributors include enteric emissions from cows, on-farm diesel fuel usage, and nitrous oxide emissions from manure management and cropping activities.

The total acidification impact per calf crop is quantified as $0.0230 \, \text{kg SO}_2$ eq per kg of beef live (shrunk) weight, with $0.0238 \, \text{kg SO}_2$ eq per kg of beef live (shrunk) weight for the calf-fed system and $0.0224 \, \text{kg SO}_2$ eq per kg of beef live (shrunk) weight for the yearling-fed system. The dominant categories of emissions contributing to this impact are related to on-farm energy consumption activities. The main contributor to acidification under energy consumption relates to the production of crude oil for diesel and gasoline formulation.

The total eutrophication impact is quantified as 0.00389 kg PO₄ eq per kg of beef live (shrunk) weight, with 0.00391 kg PO₄ eq per kg of beef live (shrunk) weight for the calf-fed system and 0.00388 kg PO₄ eq per kg of beef live (shrunk) weight for the yearling-fed system. The main contributors to the total (and each system) include total phosphorous emission from run-off (74.6 percent of total), on-farm energy consumption activities (16.6 percent of total), total forage and cereal activities (4.6 percent of total), and feedlot and pasture activities (3.9 percent of total).

The total non-renewable energy resources consumption impact is quantified as 242.8 MJ-eq per kg of beef live (shrunk) weight, with 244.8 MJ-eq per kg of beef live (shrunk) weight for the calf-fed system and 241.3 MJ-eq per kg of beef live (shrunk) weight for the yearling-fed system. On-farm energy consumption activities account for the highest fraction of the total (89.6 percent) followed by total forage and cereal activities (7.9 percent). In the on-farm energy consumption category, the majority of the impact category stems from production of crude, transportation, and combustion of diesel fuel.

A direct comparison to literature values from other LCAs is complicated by the use of differing project boundaries, functional units, precise description of assumptions utilized and modification in time of specific emissions equivalence factors (i.e., as per IPCC Fourth Assessment Report, a CO₂ equivalence factor of 25 is assigned for CH₄ for a 100-year GWP horizon). A standardized methodology for producing a beef production LCA is not available at this time. As this is only a first approximation of the beef production in Alberta, the final results of the study will change over time as further

refinement of the data is conducted and additional processes are identified and included.

A number of data gaps and additional refinements of information are warranted for further study, including cattle input numbers related to cow and bull culls, type and fate of international cattle inputs, and within-province movement of cattle; feedlot and pasture data relating to quantities of waste production and destination; energy usage data including specific information related to on-farm use of fuel and transportation distances for fuel movement; lack of a standard methodology for the calculation of soil organic carbon sequestration on pasture; and additional data regarding transportation of feed, supplements, fertilizers, bedding and mortalities. Of these data gaps, it is expected that the amount of on-farm energy consumption will likely have the greatest impact on the overall life cycle results.

CRA supports a third-party review of the data and assumptions as a means of validating the approach and methodology utilized; however, CRA notes that the numerical inputs to the model will change over time as additional data becomes available, and specifically as Alberta-specific data becomes available.

As this is a first approximation for the beef production in Alberta, it is recommended that additional study be conducted on a number of items in this study in order to increase the accuracy of the results and to address the data gaps. Also, further research for more Canadian-specific emission factor data may be warranted for the next iterations.

ACKNOWLEDGMENT

Alberta Agriculture and Rural Development (ARD) would like to thank the Project Steering Committee that comprises of members from ARD, Alberta Livestock and Meat Agency, Alberta Cattle Feeders' Association, Canadian Cattlemen's Association, and the beef industry. The Steering Committee provided valuable contributions of their time, expertise and industry contacts in developing the project Terms of Reference, data, information and advice in the implementation of the project. Special thank you to Karen Haugen-Kozyra who represented Climate Change Central on the initial steering committee.

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& ASSOCIATES FOR ALBERTA AGRICULTURE AND RURAL DEVELOPMENT, ENTITLED "LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION LITERATURE REVIEW", DATED

NOVEMBER 25, 2009

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NOMENCLATURE

AR4 Fourth Assessment Report

ARD Alberta Agriculture and Rural Development

BFB Bone-free beef

CFCs Chlorofluorocarbons

CH₄ Methane

CO Carbon monoxide CO₂ Carbon dioxide

CO₂e or CO₂eq Carbon dioxide equivalent CRA Conestoga Rovers & Associates

CW Carcass weight
CWE Carcass weight
DDG Dried distillers grains
DMI Dry matter intake

eq Equivalent

GEI Gross energy intake
GHG Greenhouse gas

GWP100 Global Warming Potential over 100 years

ha Hectare

HCFCs Hydrochlorofluorocarbons

IPCC Inter-governmental Panel on Climate Change

ISO International Standards Organisation

 $\begin{array}{ccc} K & Potassium \\ K_2O & Potash \\ kg & Kilogram \\ kt & Kilotonne \\ kWh & Kilowatt Hour \\ L/ha & Litres/Hectare \end{array}$

LCA Life Cycle Assessment LCI Life Cycle Inventory

LCIA Life Cycle Impact Assessment

m³ Cubic metre
MJ Megajoule
N Nitrogen
N2O Nitrous Oxide
Na2O Sodium Oxide

NH₃ Anhydrous Ammonia

NO₃ Nitrate

NO_x Nitrogen Oxide

NREL National Renewable Energy Laboratory

P₂O₅ Phosphate

Pembina The Pembina Institute

PO₄ Phosphate S Sulphur

NOMENCLATURE

SETAC Society of Environmental Toxicology and Chemistry
Shrunk Weight Weight delivery to the slaughterhouse

SO₂ Sulphur Dioxide

TJ Terajoule t tonnes W Watt

1.0 INTRODUCTION

1.1 <u>BACKGROUND</u>

Greenhouse gas (GHG) emissions resulting from agricultural practices have become increasingly important to global markets and consumers, particularly as global initiatives are formulated and promulgated for the reduction of GHG emissions to the atmosphere. The establishment of policies such as carbon emission caps and taxes, and the movement of some European jurisdictions toward carbon content labeling of food products, has allowed for the creation of markets for new environmental goods and services. A critical component of this market shift is the manner in which GHG and other environmental impacts associated with a particular activity or economic sector are quantified.

Life Cycle Analysis (LCA) has become an increasingly used tool in quantifying and improving the environmental performance of products and production systems. LCA studies attempt to address the environmental aspects and potential impacts throughout a product's life from raw material acquisition through production, use, and disposal (ISO 14040, 2006a; ISO 14040, 2006b). The quantification technique is intended to assess the spectrum of environmental impact associated with a product or activity. Given the wide range of processes involved in the life cycle of a product and the versatility of the LCA as an environmental assessment tool, LCA is widely used in product development and improvement, strategic planning, environmental performance indicator selection and marketing (ISO 14040, 2006a).

Based on the recent development of LCA methodologies, the use of LCA to assess agricultural and livestock food production is becoming more common. This trend is emphasized by the need for reliable and comprehensive environmental information, used by policy makers, producers and consumers for the selection of environmentally and economically sustainable agricultural products and practices. The LCA of food products yields information about the production system, identifies environmental impact hot-spots during the life-cycle of the product, and allows for short-term optimization plans and planning of long-term strategies (Ceuterick et al, 1998). The usefulness of an LCA study is dependant upon the process boundary and the activities selected for inclusion and exclusion from the LCA. Because of the choices made during boundary and activity selection, LCA studies of the same product may not be comparable, especially where there is no commonly accepted methodology for performing the LCA for that product.

Alberta Agriculture and Rural Development (ARD) has engaged in a multiyear project to evaluate the environmental and economic impacts of beef production in Alberta using LCA. The overall activities of this ARD project include:

- Technical analysis to quantitatively benchmark the carbon footprint and other environmental impacts of beef production in Alberta
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1.2 <u>SCOPE OF STUDY</u>

The objective of this assignment was to provide a first approximation of the carbon footprint intensity and other environmental impacts including water and nutrients, such as nitrogen and phosphorus, of the beef production industry in Alberta using the LCA approach.

The study has identified:

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use in the model. As such, the model has been formulated to allow for such inclusions as appropriate.

Boundaries of the beef production system include:

- Production of cattle feed, assessed from production of seeds for specific components
 of the diet (barley, barley silage, alfalfa grass), through cultivation, fertilizer
 production and application, feed storage, grains processing and, processing of feed
 for components of the diet, and cattle feeding strategy
- Production and transport of minerals/supplements, plastics, and bedding for cattle
- Livestock-related activities, including activities both on and off farm (cattle management, cattle rearing, storage and management of manure, finishing, transportation)
- Waste management (plastics)
- Production, transportation and usage of energy on beef farms

The specific scope of the study was designed to start with production of cattle feed and end at the door of the meat packing plant/slaughterhouse. This LCA is comprehensive, and will allow policy researchers and producers to identify environmental impacts of beef production systems in Alberta. Some elements of the LCA (such as energy requirements for the production of crude oil, diesel, and gasoline or transportation of these components) may be allocated to the oil and gas or the transportation sector in the future if warranted.

The LCA has been based on two different finishing scenarios, namely the yearling-fed and calf-fed systems. The current interest in grain for fuel has increased costs and decreased returns for the more traditional calf-fed finishing systems, spurring interest in increased use of forages prior to finishing. The duration of each of the finishing strategies and differences in diet (forages versus concentrates) and resources required to feed the animals has been quantified for both systems. Neither organic nor grass-fed beef production in Alberta has been considered in this study.

The technical study was discretized into the following components:

- Literature Review: review of beef LCA studies and databases, compilation of GHG parameters and processes, and definition of inputs and outputs for beef production.
- Data Collection: characterization of beef production scenarios, collection of primary producer and emission factor data, and definition of boundaries and methodologies.

- Benchmark Carbon Footprint: development of the first approximation of the GHG and environmental footprint of beef production in Alberta based on a final definition of the functional unit. This has been undertaken on the basis of a spreadsheet model.
- Preparation of Report: includes interpretation of the model results, definition of the environmental impacts, and identification of hotspots and data gaps.

In consultation with ARD and the Project Steering Committee, the following environmental impact categories were selected for study:

- Global warming potential
- Eutrophication
- Acidification
- Non-Renewable Energy Resources

A primary mandate in the completion of this work was to yield a tool that could be used by ARD to further refine the inputs and outputs of beef production, to modify the baseline date, and to incorporate other processes and factors as appropriate. To this end, the Project Team has developed a spreadsheet model that allows for future modifications of the LCA data.

2.0 SUMMARY OF EXISTING LITERATURE

There are many beef production LCAs that have been conducted in different jurisdictions worldwide. However, the assumption base, boundaries and methodologies have varied. Consequently, it is important to discuss the results of any study in the context of the work performed and assumptions used in each study. The literature review, prepared as the first phase of this work, is presented in Appendix A. Table 1 presents a summary of the other beef LCAs for comparison against the results of this study.

The general conclusions from the literature review are as follow:

- The enteric or gut methane (CH4) emissions from livestock and N2O emission from feed (crops) production are major contributors to global warming for beef production. Beef production in combination with milk production (surplus calves) can be carried out with fewer animals than solely in beef production systems, reducing the environmental burdens per product unit (Cederberg and Stadig, 2003).
- The increase in specialization of the dairy and the beef sectors make it difficult to reduce GHG emissions (Casey and Holden, 2006a). The advantages of less intensive and combined systems are obvious for (sub)tropical animal production systems, where a combination of milk and beef production is very frequent and livestock needs to be seen in the context of larger livelihood systems (Cederberg et al., 2009, Sumberg, 2002).
- Organic farming reduces pesticide use but requires more land and leads to higher global warming impacts than non-organic systems in United Kingdom conditions (Williams et al., 2006).
- The environmental impacts of beef finishing systems are dependent on the feeding length, feed production and type of feed, animal housing and manure storage (Ogino et al., 2002, 2004; Núñez et al., 2005, Williams et al., 2006; Nemecek, 2006). A shorter feeding length reduces the environmental impacts. The feeding stage is the most important factor for environmental impacts and the infrastructure is also relevant, especially for energy consumption and human toxicity (Erzinger et al., 2003; Núñez et al., 2005).

A broader conclusion is achieved through investigation of previous LCA studies of beef production worldwide. Generally, the level of data that is published regarding these studies makes it difficult to fully understand the boundaries and assumptions that were utilized. It is expected that a useful comparison of the results of the different studies can only be conducted if the original models, and not just the summary papers, are made

available and analyzed. The model presented in this report encompasses dozens of different processes and assumptions; variations in these items between studies can significantly affect the meaningfulness of any comparison. For this reason, CRA does not believe that a rigorous comparison is possible at this time, and that commentary on the carbon intensity and environmental impacts associated with different beef production systems has limited value.

The overlying issues with comparison lie in the transparency of the information and also the lack of a standardized methodology for conducting beef LCAs. While ISO standards exist to prescribe the general framework of an LCA, no specific direction exists to guide the selection of project boundaries, assumptions and emission factors related to beef LCAs. Given the relative complexity of any one beef production cycle, such a methodology is likely required before meaningful comparisons can be made between different systems.

3.0 QUANTIFICATION METHODOLOGY

The current LCA study assessed the beef production system in Alberta, by quantifying the environmental impacts in terms of emissions and resource use. The fundamental principle was to follow the product, defined as the calf-crop, through its entire life cycle. The approach of the LCA method was based on the guideline principles established by:

- The Society of Environmental Toxicology and Chemistry (SETAC)
- Environmental management standards from the International Standards Organization (ISO) 14000 series: 14040:2006 and 14044:2006

The boundaries of the system were delineated to include the life cycle stages of beef production in Alberta and selected impact categories, identified according to expert opinion and experience.

The extensive literature review performed for the current study, as discussed in Section 2.0, included:

- Beef production LCA studies from different systems, in various geographical locations
- Alberta-specific information about management of crops, fertilizers, livestock, operation and maintenance activities at feedlots, and dynamics of cattle production operations

The structure of the current LCA of beef production study, within a multi-tiered approach, is intended to offer an enhanced level of transparency that will allow further review of the study findings.

The following sub-sections present a summary of the LCA methodology implemented for the current Alberta beef study.

3.1 GOAL DEFINITION AND SCOPING

The current study describes the beef production system in Alberta from "cradle-to-gate", starting with production of energy, crop inputs, and cattle feed, and ending with the delivery of live shrunk animals to the door of the slaughterhouse.

The primary goal of the study was to quantify the GHG emissions generated during all stages of beef production. Additionally, the environmental emissions were quantified in select environmental impact categories, including aquatic acidification, aquatic eutrophication and use of non-renewable energy resources. Two production scenarios are considered: calf-fed and yearling fed.

The findings of the current LCA study are designed to:

- Enhance the understanding of the relative environmental impacts associated with the processes involved in producing beef animals for slaughter in Alberta.
- Establish baseline information for the beef production system, with emphasis on the calf-fed and yearling-fed systems. The baseline consists of energy and resource requirements and environmental impacts from the processes within the beef production system. The baseline represents information that is used to analyze the effect of changing practices that are undertaken as a result of natural market factors or that are part of a concerted mitigation effort.
- Reveal the relative environmental burdens between alternative processes of beef production, namely between the calf-fed system and the yearling-fed systems.
- Identify the hot-spots of the two beef production systems and consider potential mitigation strategies.
- Rank the relative contribution of individual processes within the life cycle of beef production. The LCA results provide data regarding the individual contribution of each process identified during the life cycle of beef production to the footprint of the entire system. This information can be used to focus mitigation activities designed to reduce the overall environmental impacts.
- Allocate emissions associated with beef production.
- Identify the data gaps, by revealing areas in which data for particular processes are lacking, uncertain or of questionable quality. The Life Cycle Inventory (LCI) (a quantification of emissions generated by all processes considered within the boundaries of the beef production system), followed by the evaluation of the environmental impacts during a Life Cycle Impact Assessment (LCIA), aids in identifying the areas where data is missing or questionable.
- Provide information to the decision makers on the tradeoffs of alternative processes, products and materials involved in the life cycle of beef production in Alberta.
- Guide further improvement of the final product towards a net reduction of resource requirements and environmental emissions.

The boundaries of the current study describe the beef production system from "cradle-to-gate", including processes associated with the beef production system, such as production of cattle feed, feed transport, cattle feeding strategy, and livestock-related activities (cattle management, storage and management of manure, finishing, transportation, garbage, etc.). The biological activity of the animal and the treatment of cattle manure are also included in the system boundary. The life cycle ends at the door of the meat packing plant.

Prior to the LCI step, the following logistical procedures were defined:

- Documenting Assumptions all assumptions are presented with the results of the LCA study. All additional assumptions and limitations to the initial scope necessary to complete the study with the available resources are documented. Documenting assumptions is crucial in order to place the study results in the correct context and to allow for appropriate interpretation of the findings.
- Quality Assurance Procedures Pembina provided CRA with guidance on LCA methodology, data validation and model development.
- Reporting Requirements the final report explicitly defines the beef production system and its boundaries. The basis for comparison between the two scenarios and all assumptions are presented. The presentation of results is consistent with the purpose of the study, to complete a first approximation of the carbon footprint and other environmental impacts associated with beef production in Alberta.

3.2 <u>LIFE CYCLE INVENTORY</u>

The LCI of the current study quantifies the energy and raw materials requirements, the atmospheric and waterborne emissions, solid wastes and any other releases associated with beef production in Alberta. All relevant data were collected and organized to evaluate the environmental impacts and to assess potential mitigation measures. The data level of accuracy and detail is reflected in the results of the LCA study.

The LCI was completed within the framework established by the following documents:

- ISO 14040, Environmental management Life cycle assessment Principles and framework
- ISO 14044: Environmental management Life cycle assessment Requirements and guidelines
- National Inventory Report 1990–2007: Greenhouse Gas Sources and Sinks in Canada

- 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4: Agriculture, Forestry and Land Use
- IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories
- IPCC Working Group III Fourth Assessment Report, Chapter 8 Agriculture
- Life Cycle Assessment Inventory Guidelines and Principles EPA 1993
- Guidelines for Assessing the Quality of Life Cycle Inventory Analysis, 1995

The LCI within the LCA study was performed using primary and secondary data (specific data for the Alberta livestock production, where available, and generic data from the literature or databases). Generic data is required where Alberta-specific information is not available; however, using generic data where required allows for an initial approximation of the given processes, and is a more reasonable approach than removing potentially significant processes. Additionally, construction of the model to include these processes allows for inclusion of Alberta-specific data as it becomes available.

The data used in the LCI of the beef production system was acquired using two approaches:

- Top-down Approach based on national statistics representative of the livestock industry with focus on beef cattle. The statistics also accounted for other types of cattle in the livestock industry, where the other cattle types are interlinked with the beef industry. When available statistics did not allow enough detail to obtain the required data or the data was too aggregated or missing, additional information was acquired from advisory services, experts, research reports and agricultural practitioners.
- Bottom-up Approach based on data representation of processes in the beef production system. Data for separate processes is aggregated and linked until the entire beef production system is modelled. Processes such as feed consumption, feed production, and fertilizer use were analyzed in detail, based on first-hand information from livestock producers and experts in Alberta.

The integration of the approaches has the benefit of installing a self-checking mechanism into the model, in that there is an inherent mutual verification of the data collected using each approach. Because both approaches model the same reality, in principle they should arrive at the same result. Bottom-up data tends to be more specific and has a greater resolution than top-down data. However, since the bottom-up approach relies

on the LCA developer's knowledge and understanding of the system under consideration, it can be prone to data gaps.

In contrast, top-down data tends to lack resolution, and therefore, in most cases, cannot serve as stand-alone data. Most top-down data is also indirectly derived from bottom-up data, and may be subject to the same data omissions. However, because top-down data is integrated at the national level, it tends to have a higher degree of completeness because of the many options for verification of national data.

Activity maps (Figure 1a and Figure 1b) were developed to describe the processes from the beef production system. The boundaries of the system, determined during the goal and scope, contain all the processes, defined as individual units. The unit processes inside the boundaries of the system were linked together to form a complete life cycle picture of the required inputs and outputs (materials and energy) to the beef production system. The complexity of the activity map was designed to support greater accuracy and utility of the results of the LCA study.

To provide a framework for data collection and model development, the entire beef production system was classified into a series of subsystems (refer to activity maps, Figure 1a and Figure 1b), as follows:

- A. Construction
- B. Operation and Maintenance:
 - Forage and cereal sub-activities
 - Energy consumption activities
 - Operation and maintenance activities
 - Cereal activities
 - Forage activities
 - Feedlot and Pasture activities
 - Livestock activities

C. Decommissioning

The inventory analysis consists of a list containing the quantities of emissions to the environment and the amount of energy and materials consumed in beef production in Alberta. The LCI data from each process in the activity map quantifies emissions to environmental media (air, water, land).

While the structure of the entire system and subsystems within the boundaries of the study remained unchanged, the unit processes were grouped, where necessary, to replace the lack of specific data for individual processes with more complex data from processes already defined in existing databases. For example, for the four processes in Forage and Cereal sub-activities, identified as B6 Transport seed to processing centre, B10 Process seed, B12 Store seed and B13 Transport seed to the regional storehouse, were grouped as a single process defined in Ecoinvent as "seed, at regional storehouse: The seed produced at the farm is transported to the processing centre, treated [pre-cleaning, cleaning, eventually drying, chemical dressing (for integrated production) and bag filling], stored and afterwards transported to the regional storage centre".

Each unit process and respective subsystem requires inputs such as materials and energy, and information regarding the transportation of the products produced, and has outputs such as the products, co-products, atmospheric emissions, waterborne wastes, and solid waste. For each subsystem and process, the actual activities that take place were described, complemented by inventory data based on materials, energy sources and types of environmental releases. The environmental releases to air, water and soil were quantified by type of pollutant. Formal data quality indicators (DQI) such as accuracy, precision, representativeness and co-products were identified.

All transportation from one process location to another was included. Transportation was quantified in terms of distance and weight transported, and identified by the mode of transportation used. Transportation data was reported in kilometers (km) of distance, converted into units of tonne-kilometre (tkm), which is an expression involving both the weight and the distance of shipment. Transportation of cattle and all related materials within the boundaries of the study (feed components, fertilizers, pesticide, manure, crude, diesel, gasoline, natural gas, harvested crop, garbage, mortalities, bedding, mineral, vitamins etc) occurs by truck, rail, pipeline, and barge (i.e., barge in the case of transportation of certain vitamins, from overseas.

Based on the processes involved in the life cycle of beef production in Alberta, the LCI consisted of the following steps:

- Development of the data collection plan
- Collection of data

Additionally, the emissions from the biological activity of the cattle and soil cropping/management were assessed, based on specific quantification methodologies, developed from IPCC 2006 and adapted to the specific conditions in Alberta (Little et al, Holos, 2008).

Development of the data collection plan

The development of the LCI data collection plan was based on the following:

<u>Identification of data quality goals</u>: Site-specific data for raw materials, energy inputs, water consumption, air emissions, water effluents and waste generation were used where available. Where the level of detail of site-specific data did not support its use, data values from similar processes were utilized.

Identification of data quality indicators:

- Precision: An indication of the precision of the data is useful to know the range of uncertainty in the data, where available (i.e., Is the variability of the data provided?).
- Completeness: For life cycle data sets, it is important to know whether the data is sufficient for reaching the conclusions in accordance with the goal and scope definition (i.e., Is the data relevant and accurate for the LCA being completed?).
- Representativeness: A qualitative assessment of the data should indicate the degree to which the data set reflects the requirement of the data in the LCA (i.e., Does the data adequately represent the geographic area, time period and/or the technology coverage of the LCA?).
- Consistency: A qualitative assessment of the LCA study should indicate whether the
 methodology used for the activities within the life cycle are treated consistently in
 the study.
- Reproducibility: A qualitative assessment should indicate that a third party should be able to reproduce the results based on what is provided in the report.

<u>Identification of data sources</u>: A combination of several data sources was used to meet the LCI data requirements, such as: livestock industry data reports, Alberta and Canada government reports, journal publications, proceedings from conferences, reference books, trade association expertise, related and previous beef production life cycle studies, expert opinion, and public and commercially available databases. Assumptions were made when data could not be obtained. See Appendix B for a list of the sources of information used in the study.

Collection of data

Data collection involved a combination of research, direct communication with experts, and access to public and commercially available LCI packages. The Ecoinvent V2 database was used primarily as non-site specific, generic data, qualitatively descriptive

of the processes presented in the activity maps. The processes described and quantified in Ecoinvent were used as proxy and adapted to specific conditions for the current project where possible.

All material requirements were initially included, as described in the activity maps. The material requirements were included in the initial stage of data collection, no matter how minor, as it is important to initially define the entire structure of the system for data collection. This way, a comprehensive overview of the system is allowed, pending the definition of reasonable boundaries.

Further refinement of data collection, by exclusion of certain processes, was implemented with explanations of the threshold of exclusion and justification for exclusion according to:

- Within the defined scope of the beef production LCA study, inputs of less than 1 percent or that were otherwise determined by expert opinion to be negligible within the life cycle, were excluded. The one percent rule historically has been useful in limiting the extent of analysis in inventories where the environmental consequences of quantitatively minor materials are not considered (USEPA, 2006). Caution was exercised when applying the one percent rule and only processes/materials that would not generate any significant environmentally impacts were excluded.
- The inputs related to capital equipment construction and replacements were excluded. The exclusion of these inputs within the boundaries of the study was based on the fact that construction activities have life spans greater than ten to twenty years. As the amount of land in Alberta used for beef production has reached its maximum (ARD, 2009a), no significant expansion/construction of cow-calf operations and feedlots is expected to occur in the very near future. All decommissioning phase activities have also been excluded from the analysis for the same reasons.

Energy requirements, combustion values and energy sources were also included in the data collection. Energy was incorporated within the processes defined in the activity maps depending on availability of data:

- The actual energy forms of the inputs, i.e., kilowatt-hours (kWh) of electricity or cubic feet (ft³) of natural gas.
- The specific quantities of fuels used to generate the energy needed in the assessed processes.

The energy used in fuel combustion is only part of the total energy associated with the use of fuel. The amount of energy expended to acquire the fuel was accounted for, through energy required to extract fuel raw materials (drilling for oil and gas), process raw materials into usable fuels (oil processing into diesel or gasoline, natural gas sweetening) and transportation to the end user. Data on emissions from the production and use of energy reflect the actual production and use of energy in Alberta.

To date, there is no standardized requirement to report carbon dioxide (CO₂) equivalent emissions. While the majority of reports reviewed cover the main contributors to global warming potential (GWP), such as CO₂, carbon monoxide (CO), methane (CH₄), and nitrous oxide (N₂O), other emissions such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) are often omitted. This practice has resulted in a vast number of databases that contain only a limited number of emission factors that can be used for quantification of the related environmental impacts. When site-specific data within the boundaries of the analyzed system are required, the selection of data from the available databases becomes a challenging exercise. While Canadian, Albertan, American or North-American databases may contain the data required to quantify some of the impacts associated with a given process, they often do not provide sufficient data to quantify the other impact categories using LCIA methodologies.

Given this situation, two options were presented for the current LCA study:

First option: to include only the summary data available in more site-specific databases. The advantage of this option is the usage of geographically-specific data; the disadvantage is that a full data set is not available, leading to the exclusion of certain emissions/parameters that could be crucial within the overall quantification of an environmental impact. An example is the comparison between the NREL (National Renewable Energy Laboratory) database (North-American specific) and the Ecoinvent database (European specific). NREL reports a limited number of GHG emissions for a selected process, while Ecoinvent offers a wide range of comprehensive GHG emissions, which support the level of detail required for quantification of the GWP under the IPCC 2007 LCIA methodology. Exclusion of certain emission factors (such as CFCs and HCFCs) based on very low quantified emissions could be misleading, as those emissions may have a significant weight within the GWP category.

Second option: to report all data, whether uniformly available or not, by considering the most comprehensive databases available. This second option was used for the current study. However, it is recognized that an attempt to be comprehensive does not necessarily capture site- or region-specific needs. In an attempt to reconcile the need for

reliable and comprehensive data with site-specific requirements, the processes, and consequently the emissions from Ecoinvent, were adjusted to reflect, as best as possible, the geographical and technological specificity of the current study.

The data collection was organized within a spreadsheet tailored to meet the needs of the current study. The activity maps framed the computational structure of the spreadsheet, where the relationships between the individual processes of the beef production system were numerically defined. Each process was interlinked within the spreadsheet in such a way that inadvertent omissions or double counting does not occur.

3.3 <u>LIFE CYCLE IMPACT ASSESSMENT</u>

The LCIA phase of the LCA represents the evaluation of the environmental impacts created by the environmental releases and resource consumption identified during the LCI. The LCIA attempts to establish a linkage between the product/process and corresponding environmental impacts.

The LCIA models used for the current study are suitable for relative comparison of the environmental impacts for different components of the beef production system as they are mid-point assessment methodologies. However, the assessment does not allow for evaluation of absolute risk or actual damage to human health and environment, as in the case of end-point LCIA methodologies. As a general rule, midpoint methods assess environmental effects based on the concentration of substances in the environment, while endpoint methods quantify issues of societal concern, such as such as human life span or incidence of illness, denominated at "damage level". The choice of a mid-point approach was based on several positive factors, such as minimizing assumptions, reflection of a higher level of societal concerns, and enhanced comprehension compared to the end-point models (Barre et al, 2003).

The key steps of the LCIA assessment performed during the current study consist of selection and definition of environmental impact categories, classification, and characterization, as described below:

- a) <u>Selection and definition of environmental impact categories</u> usually, the selection and definition of the significant impact categories is based on the ISO 14044 (2006) standards. A broader list of such impact categories consists of:
 - Ecological Impacts
 - Global warming
 - Depletion of stratospheric ozone

- Acidification
- Eutrophication
- Photochemical smog
- Ecotoxicological impacts (terrestrial and aquatic toxicity)
- Human Health Impacts
 - Toxicological impacts
 - Non-toxicological impacts
 - Impacts in work environment
- Resources Impacts
 - Energy and Material
 - Land
 - Water

In the current study, the initial focus of the LCIA was to identify the significant environmental impacts that occur during the entire life cycle of beef production. To date, no scientific consensus has been reached regarding which impact categories should be considered when assessing the environmental impacts associated with beef production, and often there are limitations with respect to data and equivalence factors that render the exercise of limited value. A review of the available LCA studies of beef production shows that:

- In spite of the methodological differences, the greenhouse gas emission is unanimously selected as a relevant impact category. Several studies focused exclusively on the assessment of GHG gases (Casey and Holden, 2006a,b; Cederberg et al., 2009a,b)
- Several studies focused on global warming, acidification, eutrophication and energy consumption impacts (Ogino et al., 2004, 2007)
- Eutrophication and acidification are two of the impact categories broadly selected and quantified for the LCA studies of meat production (Chassot et al., 2005, Ogino et al., 2007, Ogino et al., 2004)
- One study used a specific LCIA methodology, TEAMTM (Chassot et al, 2005), where
 a broader selection of environmental impacts categories was assessed: global
 warming, eutrophication, acidification, photochemical smog, human toxicity, aquatic
 toxicity, and terrestrial toxicity

Based on previous practice, the contribution of the beef production system in Alberta to the following environmental impacts were examined:

- Global Warming
- Acidification
- Eutrophication
- Non-Renewable Resources Consumption
- b) Classification assigning the LCI results to the selected environmental impact categories.

Table 2 presents the classification of the LCI emissions into relevant environmental impact categories selected for the current study.

The purpose of classification is to organize and combine the LCI results (inputs and outputs as emissions) into the impact categories previously defined (for example, classifying carbon dioxide emissions to global warming potential).

The emissions from the processes described in the activity maps (Figures 1a and 1b) of beef production in Alberta were inventoried and grouped according to the environmental impact categories selected.

The emissions factors were selected and aggregated in accordance with the IPCC 2007 100 year GWP Method and IMPACT 2002+ methods. The emission factors were also grouped into environmental categories and subcategories. Such classification addresses, besides the category of the environmental impact (to air, water, soil), more elaborate concepts given the susceptibility of certain emissions to have a higher impact in environments with different geographic, social and ecological characteristics (high population density, low population density, etc).

c) Characterization – modelling the LCI results within impact categories using science-based conversion factors (for example, modelling the potential impact of carbon dioxide and methane on global warming potential). The characterization provides a direct way to compare the LCI results within each impact category, by translating different inventory inputs into directly comparable impact indicators.

The impact indicators were characterized using the following formula:

 \sum (Inventory data x characterization factor) = Impact indicator

In the case of the current study:

- All greenhouse gases grouped into the GWP category were expressed in terms of CO2 equivalents by multiplying the relevant LCI data results by a CO2 characterization factor
- Environmental releases grouped into the eutrophication category were expressed in terms of PO4 equivalents by multiplying the relevant LCI data results by a PO4 characterization factor
- Environmental releases grouped into the acidification category were expressed in terms of SO2 equivalents by multiplying the relevant LCI data results by a SO2 characterization factor
- Environmental usage of resources grouped into the non-renewable resources category were expressed in terms of MJ equivalents by multiplying the relevant LCI data results by a MJ characterization factor

Classification of the LCI results into environmental impact categories and assigning equivalence factors were performed based on the following LCIA methodologies:

- The GWP was quantified on a time horizon of 100 years, in agreement with the guidelines of the United Nations Framework Convention on Climate Change, Kyoto, 1997 (United Nations, 1998). The Global Warming impact category was quantified based on the IPCC Fourth Assessment Report (AR4) (IPCC 2007) indexes.
- Based on previous examples and the generic versatility of its methodology, IMPACT 2002+ was chosen as an LCIA method for the Aquatic Acidification, Aquatic Eutrophication, and Non-renewable Energy Resources Consumption environmental impacts.

It is recognized that Canadian LCA practitioners currently use European or American methodologies when conducting comprehensive impact assessments, despite the fact that these methods may not be specifically constructed for use in Canadian studies. Due to the lack of suitable models currently available, work is being undertaken to develop a Canadian LCIA methodology by adapting existing LCIA models to the Canadian context (Toffoletto et al., 2007). As Canada or Alberta-specific factors are not yet developed, generic GWP IPCC 2007 and IMPACT 2002+ terms were used. However, the LCA model was designed to accommodate any further changes of the emission parameters and equivalence factors, as the opportunity for Canadian specific factors will arise in the future.

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Additional steps, such as the ones presented below, were excluded from the current LCA study:

- d) Normalization expressing potential impacts in ways that can be compared among impact categories
- e) Grouping assigning impact categories into sets by sorting or ranking the environmental indicators
- f) Weighting assigning a weight or relative value to different environmental impact categories, based on their perceived importance

ISO 14044 (2006) specifies the first three steps (a, b, and c) as being mandatory for LCIA, while the other ones (d, e, and f) are optional. Given the ISO specifications, the procedural concerns and subjectivity issues especially related to the use of weighting, the current study addressed the first three steps of an LCIA: selection of impact categories, classification, and characterization. The exclusion of normalization, grouping and weighting is meant to increase the reliability of the results of the LCA study.

Emissions associated with the biological activity of the cattle and the soil cropping were included in the LCI data used for the quantification of GWP as follows:

- Cattle Enteric Fermentation Emissions, as methane converted to CO2 equivalents
- Cattle Methane Emissions from Manure, as methane converted to CO2 equivalents
- Direct N2O Emissions From Manure Management, as N2O converted to CO2 equivalents
- Indirect N2O Emissions From Manure Management, as N2O converted to CO2 equivalents
- Direct CO2 Emissions From Managed Soils, as CO2
- Soil Carbon Change in Soil From Land Use, as CO2
- Total N2O Emissions from Cropping and Land Use, as N2O converted to CO2 equivalents

Emissions associated with the total phosphorus emissions generated by surface run-off from cropped land (Nemecek & Kagi, 2007), expressed as PO₄ equivalents, were included in the LCI data used for the quantification of aquatic eutrophication.

The LCIA concluded with the documentation of the results. Once the environmental impacts were calculated, the results were documented with the help of tabular outputs. The presentation of the results supports the LCA as defined in the goal and scope – to

quantify the GWP, aquatic acidification, aquatic eutrophication and consumption of non-renewable energy resources as environmental impacts associated with beef production in Alberta.

4.0 PROJECT DEFINITION AND DATA

4.1 **PROJECT BOUNDARIES**

Boundaries of this study describe the beef production system from feed production to the door of the slaughterhouse, and include the following activities:

- Production of cattle feed (grain, forage, pasture, supplements)
- Feed transport
- Cattle feeding strategy
- Livestock related activities (cattle management, storage of manure, finishing, transport, litter management)
- Biological activity of the animal
- Treatment/disposal of cattle waste

Activity maps were created to illustrate the various processes and activities involved in beef production in Alberta. Two finishing scenarios were identified, namely the calf-fed and yearling-fed systems. The activity maps are presented on Figures 1a and 1b.

Various data points were selected and utilized as appropriate to develop the overall study. During consultation with ARD, the year 2001 was chosen to represent a baseline in this first approximation of the LCA for Alberta beef production, as 2002 was the year that Alberta initiated the Taking Action on Climate Change Strategy. Alberta's developing carbon offset market uses 2001 census data to represent the baseline conditions from which management changes are evaluated. It was decided that, where possible, the baseline date for data input to the model would be 2001 to be consistent with this practice. However, data from other periods was used where data from 2001 was not available. The spreadsheet model has been developed to allow for modification of the baseline and other data, as required. Table 3 presents a general description of the various categories of information and the year from which the data was obtained.

4.2 PROCESSES

As previously indicated, beef production in Alberta is principally divided between two production models, the calf-fed and yearling-fed systems. These two models account for roughly 99 percent of the beef produced in Alberta (ARD, 2009a). Alternative production models such as organic and grass-fed account for only one percent of Alberta beef (ARD, 2009a) and were therefore not included in this study. The calf-fed

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and yearling-fed calves have been tracked from birth until slaughter, which has been considered as a calf crop. All calculations have been conducted on the basis of one calf crop.

Both the calf-fed and yearling-fed models begin with the cow-calf pair on pasture. For this project, it has been assumed that calving occurs only in the spring. The cow-calf pair remains together on pasture until weaning in the fall. For this project, calves were assumed to be born in May and were assumed to be weaned at six months of age. Note that the timelines below were based on information provided by the ruminant nutritionist consulted for this project.

In the calf-fed model, calves are sold to a backgrounding/finishing feedlot after weaning, usually via an auction mart, where they are transitioned from a forage diet to a grain diet over three months (96 days). At nine months of age, the calves are put on a high grain diet until slaughter at 17 months (i.e., 8 months or 262 days on feed).

The yearling-fed model diverges from the calf-fed model after weaning. After weaning, yearling-fed calves are sold to backgrounding feedlots where they are fed high-forage, low grain diets for five months (144 days). After backgrounding, the calves are put back on pasture for four months (120 days) before entering a finishing feedlot for an additional five months (164 days). It was assumed that yearling-fed calves are slaughtered at 20 months of age.

The life cycle of beef production in Alberta can be separated into three distinct phases: construction, operation and maintenance, and decommissioning. Calf-raising constitutes a sub-activity of the operation and maintenance phase. Figures 1a and 1b present the activities for each phase of the beef production life cycle in Alberta.

4.2.1 CONSTRUCTION PHASE

The construction phase of the life cycle of beef production in Alberta is comprised of activities required to construct yards, buildings and other structures, and roads; this includes fuel, equipment, and machinery related to these activities. Example activities include developing water wells, converting native grasslands to pasture or crop, and constructing feedlots, barns, and offices. The activities included in this phase typically have life spans greater than ten to twenty years.

4.2.2 OPERATION AND MAINTENANCE PHASE

The operation and maintenance phase of the life cycle of beef production in Alberta is comprised of activities required on regular or semi-regular basis for the production of beef prior to slaughter. The operation and maintenance phase includes the following activities:

- Forage and Cereal Production: activities required to grow, harvest, and process forage and cereal crops used for cattle feed and bedding.
- Energy Generation: activities required to power buildings and equipment.
- Infrastructure Operation and Maintenance: activities required to operate and maintain buildings, lanes/roads, feedlots, and paddocks and pastures.
- Feedlot and Pasture Activities: activities required for animal care including manure management, providing feed and water, medical care, producing and feeding supplements and antibiotics, and mortality management.
- Livestock: activities required for animal management including transport to and from winter/summer pasture, auction, breeding and calving, backgrounding, and finishing feedlot. The livestock sub-activities also include those activities conducted by the dairy industry directly related to beef production.

The livestock activity is further subdivided into the following sub-activities:

- Cow: activities related to breeding, maintaining, and culling cows.
- Bull: activities related to breeding, maintaining, and culling bulls.
- Calf: activities related to the calf-fed and yearling-fed production models of raising calves.
- Dairy: activities limited to culling dairy cows and bulls, production of steers, and the transportation of dairy animals to various segments of the beef industry. Once dairy animals enter the beef industry, they are treated as the equivalent class of beef animals.

4.2.3 <u>DECOMMISSIONING PHASE</u>

The decommissioning phase of the life cycle of beef production in Alberta is comprised of activities required at the end of a feedlot, building, or pasture's useful life. These activities include demolition, waste disposal (recycle, reuse, landfill, incineration), and site rehabilitation.

4.2.4 PROCESSES NOT INCLUDED IN ANALYSIS

Several activities were determined to be insignificant for full consideration in the model. The activities in Figures 1a and 1b that have not been included in the analysis and the justification for the exclusion are as follows:

Construction Phase Activities

All construction activities have been excluded from the analysis. As mentioned in Section 4.2.1, the construction activities included typically have life spans greater than ten to twenty years. As the amount of land in Alberta used for beef production has reached its maximum (ARD, 2009a) for this point in the cycle, it is not expected that a major expansion of the beef production industry in Alberta will occur, and therefore no significant construction of cow-calf operations and feedlots will occur in the near future. The model is set up to account for these activities; however, the emissions from these activities are expected to be minimal to the overall system.

Operation and Maintenance Activities

Several activities have not been included in the analysis due to lack of adequate data to quantify the amount of materials used on beef farms in Alberta, and due to the expectation that the emissions associated with these activities will be minimal compared to the energy requirements, including the following:

- Operation and Maintenance:
 - Produce materials for replacement components, manufacture and transport replacement components (R1, R4, R7).
 - Transport used steel, wood, concrete for recycling or further end use, recycle steel and wood (R5a, R5b, R5c, R8a, R8b).
 - Extract and transport gravel materials (R3, R6).
- Forage and Cereal Sub-Activities: The activity to Store Seed in the Regional Storehouse (B14) has not been included in the analysis because adequate data quantifying emissions for this activity are not available.
- Cereal Activities: The activity to Treat Harvested Crop (grain) (CC10) was not included in the analysis given the lack of accurate and reliable data regarding energy and resources consumption related to grain storage conditions in Alberta. While this process is expected to have a minimal contribution to the assessed environmental

impacts, a placeholder has been inserted to mark the data gap; further quantification may be performed depending on future availability of data.

Feedlot and Pasture Activities:

- Activities FL20 and FL32 for the production and transport of protein supplement were not included in the analysis. Activity FL32, transportation of the protein supplement, was replaced with transportation of the mill-run carrier as feed additive, activity FL 37.
- Activities FL21 and FL22 for the production of vitamins and growth promotants were not included as reliable emissions data for production of vitamins and growth promotants were not available.
- Activities FL23 and FL35 for the production and transport of vaccination/antibiotics were not included in the analysis. The total amount of vaccinations/antibiotics administered and data quantifying the associated emissions was not available.
- Millrun is considered a waste product from wheat processing facilities and therefore the emissions should be attributed to the processing activity. DDG and other feed additives were not included in the diet representative of 2001 practices as obtained from the nutritionist.

Decommissioning Phase Activities

All decommissioning phase activities have been excluded from the analysis. Similarly to the construction phase, the life span of cow-calf operations and feedlots is typically greater than ten to twenty years. Beef production in Alberta is not significantly declining, and therefore, it is not expected that cow-calf operations and feedlots will be decommissioned to any significant degree.

The model has been created in a manner that can incorporate excluded activities in the event that future revisions to the model are desired or additional data of reliable quality becomes available.

4.3 <u>FUNCTIONAL UNIT</u>

In an LCA of beef production, the most common one-dimensional functional unit is based on mass, typically one kilogram (kg). Mass is a simple measurement of the quantity of the product and is often used to quantify the price of the product.

When defining the functional unit based on mass, it is critical to define when the mass is measured. Typically, there are three distinct points of measurement: live weight (LW), shrunk weight (SW), and warm carcass weight (WCW). The live weight is the weight of the animal on farm, before transportation to the slaughterhouse. The shrunk weight is the weight of the live animal when it arrives at the slaughterhouse. The warm carcass weight is the weight of the muscle and bones immediately after the animal has been slaughtered and dressed.

The reduction of live weight to shrunk weight varies with conditions to which the animals are exposed during transport to the slaughterhouse. Typically, shrunk weights are 96% of live weight (Lardy, 1999).

During the slaughter processing phase, the dressing percentage of a beef animal ranges from as low as 40 percent for cows and bulls to as high as 60 percent for steers and heifers, varying with factors such as breed, age, gender, frame size, diet prior to slaughter, and travel time to slaughter (McKiernan et al., 2007; Alberta Feeder Associations Ltd., 2009).

For the purposes of this LCA, the functional unit has been defined as one kg live shrunk weight. This allows for the estimation of environmental impacts up to the slaughterhouse door, which has been defined as the project boundary. The results have been presented for the entire calf crop (i.e., both calf-fed and yearling-fed systems) combined as well as reported separately for the calf-fed and yearling fed production models.

4.4 DATA QUALITY ASSESSMENT METHODOLOGY

The data used in the model and data checks are contained within the Beef Data and Emission Factor Data tabs of the model spreadsheet. A data check was conducted to verify the quality and the relevancy of the data to the project. A selection of the most applicable data was conducted where more than one data source was available based on the results of the data check.

The procedure used to conduct the data check was adapted from Pembina's methodology for data selection, which is based on guidance obtained from ISO 14040 Environmental Management – Life Cycle Assessment – Principles and Framework, and ISO 14044 Environmental Management – Life Cycle Assessment – Requirements and Guidelines. One of the more important principles is to understand the technology and the regional contexts. This main principle was supplemented with a detailed review of

each data set to consider the vintage, geography, precision, completeness, representativeness, consistency, reproducibility, source and uncertainty of the data set.

The beef data and emission factor data used in the model have been provided in Appendices B and C of this report, respectively, for reference. Note that the ration data used during this study was provided by a ruminant nutritionist, and therefore, has been included in a separate appendix (Appendix D). This information has not been duplicated in Appendix B (beef production data).

4.5 BEEF PRODUCTION DATA SOURCES

The beef production data is summarized in the Beef Data tab of the model spreadsheet along with the specific sources for each item, and has been provided in Appendix B for reference. In general, the sources of data include industry experts (producers, auction mart managers, Livestock Identification Services), government agencies (Alberta Agriculture and Rural Development, Statistics Canada), industry organizations and associations (CanFax [a division of the Canadian Cattlemen's Association], Alberta Plastics Recycling Association), and independent research groups (universities, consultants). In addition, because of the complex nature of animal diet in the beef industry in Alberta, a ruminant nutritionist was retained to provide representative, balanced rations.

4.5.1 RATION DATA

Well-balanced rations are a crucial component of any livestock operation. Ration quality influences factors such as fertility in breeding animals, as well as growth rate, finishing age, and carcass quality in slaughter animals. Consequently, rations play a similarly important role in an LCA of beef production. In an LCA, rations influence upstream emissions related to feed production, in that they dictate the crops grown. Of particular importance is the influence of rations on downstream emissions, especially from the biological activity of the animals.

Given the amount of variation in production systems and feeds, a single ration cannot be representative of the entire beef life cycle. Consequently, CRA retained an expert ruminant nutritionist (Mr. Dwight Karren of Feedlot Nutrition) familiar with the Alberta beef production systems to develop rations representative of each stage of an animal's life in the Alberta beef production system, averaged both regionally and temporally.

The information obtained from Mr. Dwight Karren is provided in Appendix D. These rations are not intended for use.

The beef production system is complex. Cattle typically produce one calf per year. However, the consumer market demands that beef be readily available every day of the year. Consequently, a flexible production system is required. Cows can be bred to calve at any time of the year; however the spring and fall are the most common periods. For this project, spring calving has been assumed.

Time from calving to market is dictated largely by growth rate, mature weight, and grade. These factors in turn vary by breed, climatic conditions, and diet.

Ranchers in Northern Alberta tend to have relatively small land bases (which limit their space for homegrown crop production and manure management) and raise larger heavy milking breeds of beef cattle. Their breeding cycle and climatic conditions typically require that cows calve while on winter feeds.

In contrast, ranchers in Southern Alberta tend to have larger land bases (providing more room for homegrown crop production and manure management) and raise smaller British breeds. Their breeding cycle and climatic conditions typically result in cows calving while on new spring grass.

In Alberta, most cattle are finished in large feedlots that feed year-round. Traditionally, feedlots select rations based upon purchased barley grain, homegrown barley silage, and purchased supplements.

The rations provided by the nutritionist as representative of the average for Alberta are for a cow herd on pasture (or winter feed equivalent) for 365 days a year, as well as the various stages of the calf-fed and yearling-fed production models. In feedlot, the rations consist of barley grain, barley silage, and alfalfa hay, and make provisions for minerals while on pasture and supplements while in the feedlot. It is acknowledged that there are a variety of diet practices amongst producers and that the average rations will not necessarily mirror all operations. However, for the purposes of this project, an average, reasonable representative diet was required. The diet and approximate consumption is not intended nor recommended to be implemented but rather has been formulated specifically for the purposes of this study.

4.6 EMISSION FACTOR DATA SOURCES

The emission factor data incorporated in the model has been summarized in the Emission Factor Data tab of the model along with the specific sources for each item, and has been provided in Appendix C for reference. In general, each process presented in the Activity Map was described in terms of environmental emissions to air, water, and soil.

The Ecoinvent V2 database contains international industrial life cycle inventory data on energy supply, resource extraction, material supply, chemicals, metals, agriculture, waste management services, and transport services. The data in Ecoinvent V2 covers the vast majority of processes included in the Activity Maps for the current project. Ecoinvent V2 offers one of the highest levels of detail in terms of emission factors for the assessed processes. The significant level of detail of emissions from the processes described in Ecoinvent V2 allows the selection of appropriate emissions for further quantification of environmental impacts, as described in Section 3.2.

Given the considerations above, Ecoinvent V2 was chosen as the primary data source for quantification of the emission factors of the processes involved in the LCA. However, certain processes described in Ecoinvent V2 are characteristic for different geographic regions, not necessarily representative of Alberta conditions. Where appropriate, processes from Ecoinvent V2 were adapted to Canadian and Alberta specific conditions, as follows (refer to Table 12 for more information):

- Emission factors from Canadian and Alberta specific databases were used to replace the corresponding factors in the original processes from Ecoinvent.
- The agricultural practices described in Ecoinvent were adjusted to be more representative for Alberta practices. The emissions from the agricultural processes described in the activity map were quantified based on the emissions generated by similar processes described and quantified in the Ecoinvent V2 database. However, while the result of the agricultural process is the same for both systems, Canadian and, in the case of Ecoinvent, either generic or European, the technology behind the process may differ. The technical notes documenting the agricultural processes in Ecoinvent and the calculation methodology for the corresponding environmental emissions (Agriculture 15, Ecoinvent V2, Nemecek and Kagi, 2007) were used to adjust the emissions, to better reflect the conditions for Alberta. The adjustment of emissions was based on the fuel consumption for the same agricultural process for Alberta and, respectively, Ecoinvent-specific conditions. Details of the calculations can be found in the Cereal Activities and Forage Activities tabs of the model.

- The energy consumption activities (such as production of crude, transportation of crude, refining of crude into diesel/gasoline etc) were quantified by using proxy of similar processes from Ecoinvent. In an attempt to preserve the detail of data offered by Ecoinvent while reflecting characteristics of the energy consumption system in Alberta, Canada, and North-America, the emission factors were adapted to the project-specific boundaries. Details of the calculations performed can be found in the Emission Factor Data tab of the model, for each of the processes involved in the energy consumption.
- Where included in a process module, transportation distances were analyzed and adapted for the specifics of the model.

4.7 DESCRIPTION OF MODELLING PROCESS

Please refer to Appendix E for a discussion of the model, which includes a description of the modelling process and an overview of the calculations performed in the model.

5.0 <u>INVENTORY DATA AND RESULTS</u>

5.1 <u>ANIMAL PRODUCTION</u>

5.1.1 <u>INVENTORY DATA</u>

Table 4 provides a detailed breakdown of the cattle population numbers included in the boundaries of the beef production in Alberta (cows, bulls, calf-fed calves, and yearling-fed calves). Refer to Appendix E for a description of the methodology used to calculate these values.

Table 5 provides a summary of the slaughtered cattle included in the study. These results allow for the calculation of the total emissions in units of kg carbon dioxide equivalents (CO₂e) per kg of shrunk weight (functional unit). The total slaughtered weight has also been divided for both the calf-fed and yearling-fed systems in order to differentiate the total emissions from each system. The 45 percent calf-fed and 55 percent yearling-fed ratio as provided by ARD (mentioned previously) was used to divide the weights for all animals. It is understood that yearling-fed cattle tend to be slightly heavier than calf-fed cattle from the feedlot. However, the final weight at feedlot was provided for both systems (calf-fed and yearling-fed) with the ration data, and therefore, these weights were used as they are more suited for the rations. A breakdown between heifers and steers was also assumed based on the Statistics Canada May 15, 2001 census data.

5.1.2 ASSUMPTIONS

As outlined in Appendix E, the May 15, 2001 census data from Statistics Canada (Statistics Canada, 2001) were used as starting values for each animal type in Alberta's beef industry, and the number of slaughtered cattle from Alberta Agriculture Statistics Yearbook (Alberta Agriculture Statistics Yearbook, 2008) was used with other references to track the number of cattle throughout the time period considered in this study. The ratio of calf-fed calves to yearling-fed calves in Alberta is 45 percent and 55 percent, respectively (ARD, 2009a). The calves have been allocated into each system according to this assumption.

The life of the cows, bulls, and replacement animals were considered for all of 2001, and the life of the calves (both calf-fed and yearling-fed calves) were considered from birth in 2001 to arrival at the door of the slaughterhouse in 2002. The emissions associated with exported animals were included in the calculations up to the time of export, and

none of the emissions associated with imported animals prior to the time of import were included in the calculations.

Replacement heifers were considered cows for this analysis. It was assumed that there were no cow imports.

The number of replacement bulls was not known for May 2001, therefore the difference in the Statistics Canada May 15, 2001 census data for bulls and the Statistics Canada number for bulls in January 2001 (Statistics Canada, 2002) was assumed to be the number of replacement bulls. Replacement bulls were considered as breeding bulls for this analysis. It was assumed that there were no bull imports.

It was assumed that calves were born by May 1, 2001. The number of bulls and calves from Statistics Canada May 15, 2001 census data was reduced to account for the number of animals in the dairy system based on the percentage of each animal type compared to the total number of each animal type within Alberta. Beef cow and replacement heifer numbers were recorded as total numbers in beef operations in Alberta and did not require adjustment.

The number of cows, bulls, replacement heifers and bulls, and calves were tracked to quantify the feed consumption (and therefore crop production), enteric fermentation emissions, and manure generation of each animal type for the period of the study.

Assumptions were made to account for the import and export times, including the following:

- Cows and bulls were exported before feedlot and before slaughter
- Cows and bulls from the dairy industry in Alberta entered the beef system at the feedlot
- Cow and bull culls entered the beef system at the gate of the slaughterhouse
- Calves were imported and exported before feedlot and before slaughter
- Calves from the dairy industry in Alberta entered the beef system at backgrounding/feedlot

The transportation of imported cattle is included in the study. However, all activities prior to transportation to Alberta are excluded. Activities associated with cattle that are exported are included until they are delivered to their destination. The transportation of mortalities to rendering plants is also considered in the study. All transportation

calculations are based on a weight and distance basis, such that the total weight of the animals transported and the assumed transportation distance is used to calculate the emissions from transportation.

Cattle emit both CO₂ and CH₄ into the atmosphere. CO₂ from livestock respiration is not included in this study as CO₂ from respiration is considered to be biogenic. The CO₂ consumed by plants during photosynthesis is returned to the atmosphere as CO₂ during plant and herbivore respiration (IPCC, 2006). This CO₂ is part of a closed loop system, and there is no net emission of CO₂ to the atmosphere. Unlike CO₂, methane is not immediately available for plant consumption, and is persistent for several years in the atmosphere. Methane emissions have therefore been included in the study.

Emissions from enteric fermentation were estimated using a modified IPCC 2006 Tier 2 approach. For animals older than six months of age (i.e., after weaning), dry matter intake (DMI) was taken from the rations developed by Mr. Dwight Karren. These values were used, in conjunction with IPCC 2006 values for gross energy and methane loss, in the IPCC 2006 Tier 2 equations to estimate methane emissions.

IPCC 2006 does not include a methodology for estimating emissions from enteric fermentation for nursing calves (i.e., animals under six months). Based upon consultation with industry experts, notably Dr. John Basarab, it was decided that the exclusion of these emissions might represent a significant omission. Based on animal physiology, it was decided that emissions from nursing calves age 0 to 3 months could be excluded. For nursing calves 3 to 6 months old, estimated values of DMI and methane loss (personal communication with Dr. Basarab) were used in the IPCC Tier 2 equations to estimate methane emissions.

Description of Calculation for "Cattle * Days"

Animals were tracked through the system as cattle * days to accurately calculate the total amount of feed required, the total amount of manure generated, the total enteric fermentation emissions, and other totals as relevant. It was not possible to account for one total number of each type of animal through the study as this would not accurately account for mortalities, imports, exports, and animals from the dairy industry. Therefore, the number of cattle per stage (i.e., winter feeding, pasture, backgrounding, feedlot, auction, transportation) was calculated for each type of animal. A total number of days was set for each stage (typically based on rations). The total number of cattle * days per stage were calculated by multiplying the number of animals in each stage by the total

number of days spent in each stage. Table 6 provides an example of calculations for the cattle * days for cows.

5.1.3 EMISSIONS

Tables 7 and 8 summarize the emissions from enteric fermentation calculated for the study, based on cattle type and diet, and are divided into total enteric fermentation emissions for the calf-fed and yearling-fed systems. Appendix F presents the calculation table used in the spreadsheet model, to provide more information regarding the values used to calculate enteric fermentation emissions. Refer to Section 6.0 for further analysis of the cattle enteric fermentation emissions.

5.2 FEED

The cattle feed inventory data is related to a chain of processes that include the production of cereal, silage, forage, and supplemental ingredients as required in the cattle diet. The feed requirements were calculated from the information provided by the ruminant nutritionist (refer to Section 4.5.1) based on the rations representative of each stage of an animal's life in the Alberta beef production system.

The following subsystems were considered in the production of cattle feed, as outlined in Figure 1a:

- Forage and Cereal Sub-Activities
- Cereal Activities
- Forage Activities
- Feedlot and Pasture Activities (partially other activities in Figure 1b)

5.2.1 INVENTORY DATA

The inventory data inputs for the cattle feed production were based on the total feed by type (barley, barley silage, alfalfa, supplements), as outlined in the cattle diets.

The overall feed requirements for the entire beef production system in Alberta, presented in Table 9 as amounts of basic ingredients and supplements, were used to calculate the outputs for the Forage and Cereal Sub-Activities, as follows:

- Area of land required for cultivation of cereal and forage
- Quantity of seed
- Area of land required for seed production
- Amount of synthetic fertilizer applied to crops
- Amount of pesticides applied to crops
- Amount of manure used as fertilizer

The presented area required for feed production is not indicative of the actual land area used for crop production in Alberta. The calculated area required for feed production is instead based on the total feed requirements of the calf-crop (i.e., over a period of 15 to 20 months) and the average yields of barley, barley silage, and alfalfa in Alberta. This approach was taken to facilitate the quantification of related emissions over the entire study period.

The production of cereal and silage was quantified by data related to agricultural practices for Cereal Activities and Forage Activities (refer to Figure 1a), as follows:

- Cultivation of soil
- Application of fertilizers
- Irrigation (where applicable)
- Application of mechanical and chemical treatment
- Harvesting

The Feedlot and Pasture Activities quantified by data related to the feed requirements are as follows:

- Final production of feed, including treatment and mixing of cereal grains
- Production of diet supplements

5.2.2 <u>ASSUMPTIONS</u>

The feed production consists of a variety of processes, including the production of seeds, cereal grains and forage needs (as per diet requirements) and the feed mixing activity.

Fertilizers

The manufacturing and transport of synthetic fertilizers used for feed production takes into account the equipment and infrastructure related to the production of nitrogen (N), monoammonium phosphate (P_2O_5), potassium oxide (K_2O), and ammonium sulphate (S) synthetic fertilizers. The production data for synthetic fertilizers was imported from the Ecoinvent V2 database. The generation of organic fertilizers (manure) was not included in the Forage and Cereal Sub-Activities; however, the impact of organic fertilizer (i.e., manure) production was included in subsequent life cycle steps in the beef production system (See Figure 1a).

The fertilizer quantities were calculated based on expert evaluation of Alberta fertilizer guidelines. Table 10 presents the fertilizer consumption on a nutrient basis assuming no manure is applied for the grain and forage components of the diet.

Manure was assumed to be utilized as fertilizer, and therefore, the amount of synthetic fertilizers needed to meet crop requirements was accordingly reduced. The required amounts of synthetic fertilizer were calculated based on the contribution of N, P_2O_5 , K_2O , and S from manure. Synthetic fertilizers fulfill the remaining grain production requirements as follows: 70 percent for N, 52 percent for P_2O_5 , 0 percent for K_2O and 39 percent for S.

It is acknowledged that there are a variety of fertilizer practices amongst producers and that the approach provided here to calculate fertilizer requirements from manure and synthetic fertilizers will not necessarily mirror all operations. The fertilizer application rates presented in the model and in this report are neither intended nor recommended to be implemented but rather are intended only for the purposes of this study.

Based on retail sales statistics (Canadian Fertilizer Institute, 2006), 78 percent of the nitrogen contribution comes from urea usage, while 22 percent comes from anhydrous ammonia. The nitrogen content in the compound fertilizers as monoammonium phosphate and ammonium sulphate displace only the use of anhydrous ammonia.

To provide a comparison between fertilizers, the manufacturing processes as analyzed in Ecoinvent allocate environmental impacts based on the mass and energy of the nutrients. In most of the cases, the compound fertilizer nutrients are held with the same molecule (for the current case, the P_2O_5 fertilizer molecule). Based on this allocation, all allocated molecules belonging to a specific fertilizer must be used together to account adequately for all the individual components and the modelled nutrient rations correspond to the actual nutrient ratios of fertilizers. Consequently, the fertilizer

requirements presented in Table 11 do not represent the actual quantities of synthetic fertilizers used in the field, but rather the values used by Ecoinvent to quantify the production of required fertilizers.

Grain and Forage Production

The CO₂ and N₂O emissions from grain and forage production were estimated using HOLOS (Little et al, 2008), a whole-farm modelling software program that estimates GHG emissions based on information entered for individual farms. The following emissions were calculated:

- Cropping direct soil N2O emissions
- Cropping indirect soil N2O emissions due to leaching or runoff and volatilization
- Carbon storage and emissions from soil/land use management
- Soil organic carbon change in pasture

The calculation algorithms used in the HOLOS model are generally based on the Intergovernmental Panel on Climate Change (IPCC, 2006) and the Environment Canada National Inventory Report 1990-2007, Tier 2 (Environment Canada, 2009) methods. The modelling parameters and emissions selected for the calculations were modified for Canadian conditions, with focus on the Prairie region (Rochette et al. 2008).

Cropping/Land Use - Direct and Indirect Soil N2O Emissions

Nitrous oxide is directly emitted from Canadian farms through the processes of nitrification and denitrification. As the amount of nitrogen added is increased to support higher yields, so do losses as N_2O emissions to the atmosphere increase (Bouwman and Boumans, 2002a,b).

Direct soil N₂O emissions from cropping and land use were calculated as follows:

- Emissions due to nitrogen inputs from:
 - Application of fertilizer
 - Crop residues (above and below ground)
 - Mineralization
 - Application of manure on land

- Emissions due to tillage
- Emissions due to soil texture
- Emissions due to irrigation
- Emissions due to landscape/topography
- Emissions due to fallow

The calculation of nitrogen inputs of the farm such as nitrogen fertilizer, above and below ground crop residue decomposition, nitrogen mineralization, and nitrogen from land applied manure were based on HOLOS algorithms. The emission estimates accounted for the crop rotation information, fertilizer and herbicide inputs, crop yields and irrigation usage. Default values related to location and soil type were used for fertilizer inputs and crop yields. The tillage system (intensive, reduced or no-till) was selected to reflect the tillage practices of the entire cropped area in Alberta.

Indirect sources of N_2O from soils come from redeposition of nitrogen from agricultural soils to surrounding soil or water. When synthetic fertilizer or manure is applied to agricultural soils, some of the nitrogen is transported off-site through volatilization, redeposition or leaching, erosion, and runoff. This nitrogen can then go through subsequent nitrification and denitrification after loss from the farm, producing N_2O ; this is referred to as indirect emissions.

Indirect soil N₂O emissions from cropping and land use were calculated as follows:

- Emissions due to leaching and run-off
- Emissions due to volatilization

Soil/Land Use Management - Soil Carbon Storage and Emissions

In Canadian soils, large amounts of carbon are stored in organic matter. Some of this organic matter carbon is lost when tillage accelerates decomposition and the removal of harvests, resulting in less carbon returning to the soil. The amount of CO₂ produced by a farm varies according to management practices. The amount of carbon potentially stored also varies across Canadian farms due to regional conditions and past farm management practices.

Soil carbon storage and emissions were calculated based on the methodology developed for the National Inventory Report, the Canadian Agriculture Monitoring Accounting and Reporting System, CanAG-MARS, 2007 (previously titled National Soil Carbon and

Greenhouse Gas Accounting and Verification System) to estimate CO₂ emissions or removal from soil carbon change. The calculation of carbon gains and losses were based on changes in management practices (tillage, fallow, perennial crops, permanent cover or grassland), the area affected by the change in management, and the time since the change. The various carbon factors associated with each situation were taken from the CENTURY model (McConkey et al., 2003).

The soil carbon change in soil from land use was calculated as carbon change in mineral soils due to changes in tillage practices and the time since the management change. For the purposes of this project, a time period of two years was assumed.

As more accurate data becomes available, the model allows further refinement of calculations of carbon change in mineral soils due to:

- Fallow area
- Perennial/annual crop areas
- Grassland

CO₂ fossil emissions from urea usage were calculated according to the 2006 IPCC guidelines, where 100 percent of carbon atoms from urea are emitted as CO₂.

The following Alberta-specific information was used in the calculations (Alberta Online Encyclopedia, N.D.):

- 25 percent of the lands included in the current study are Black and Grey soil zones
- 75 percent of the lands included in the current study are Brown and Dark Brown soil zones
- The topographic flatness factor Ftopo was estimated at 11 percent for both zones
- Three different cropping methods are used for the entire harvesting surfaces: 27 percent no-till, 36 percent reduced-till and 37 percent full-till (2001 data)

The emissions from the processes related to production of grain and forage presented on Figures 1a and 1b were quantified based on processes from the Ecoinvent V2 database, and adjusted to reflect Alberta-specific characteristics, based on fuel consumption per hectare. The Ecoinvent processes used are shown in Table 12.

The data related to the feed production includes the production of feed mixes and supplements. The processing and mixing of cereal grains inventory was based on

specific feed mill data. Accordingly, activities FL11 Process (roll) grain and FL16 Mix Feed were quantified with specific feed mill energy consumption data. The emissions for the remaining components of the diet were inventoried based on data availability. Where such data has not been available, placeholders were marked as data gaps.

The Ecoinvent processes used to define the production of supplements are shown in Table 13.

Table 14 provides a breakdown of the energy requirements for farm machinery in Alberta. This information, as provided by ARD (ARD, 2009b), was used to adjust the Ecoinvent processes to better reflect Alberta-specific conditions.

Soil Organic Carbon Change in Pasture

Recently, much emphasis has been placed on the potential for agricultural practices to increase the carbon sequestering potential of agricultural lands as a means of reducing the effects of carbon dioxide levels on climate change. In particular, changing cropping and pasture management practices may alter the degree to which plants uptake and store carbon dioxide in their tissues (Skinner, 2008; AAFC, 2005; Soil Conservation Council of Canada, 2001; Moulin et al, N.D.).

Carbon is constantly in a state of flux, sometimes being sequestered and sometimes being released. Natural systems have a tendency to approach a state of equilibrium, so that the net carbon flux is zero – where as much carbon is being stored as is being released. A stand of pristine native prairie is a suitable example. Although point readings may give the impression of a carbon debit or credit, over the course of a year, or at worst several years, there likely is no net change in carbon (AAFC, 2005).

The pasture carbon balance is a function of several processes: photosynthetic uptake (plants), ecosystem respiration (plants, microorganisms, herbivores), and net biome productivity (losses from fire, export of harvested biomass, inputs from manure) (Skinner, 2008; Soil Conservation Council of Canada, 2001). In turn, these processes are dependant upon climate (number of sun-hours, precipitation, temperature), species present, and many other variables. Determining a carbon sequestration coefficient for a pasture is a relatively complex exercise.

A review of existing literature indicates that the science of carbon sequestration by pasture systems is still fairly new and highly controversial. Studies have shown that net carbon flux ranges from positive to negative, i.e., pastures may act as a net sink of carbon or they may act as a net source of carbon emissions depending upon the state of

variables discussed above (Skinner, 2008; AAFC, 2005; Soil Conservation Council of Canada, 2001; Moulin et al, N.D.).

For the purposes of this first-approximation LCA of the beef industry in Alberta, only approximate estimates of the carbon sequestration of grazed pasture have been made. The rate of soil organic carbon (SOC) sequestration has been estimated based upon expert opinion (ARD, 2010).

SOC sequestration was estimated based upon the total area of pasture in Alberta multiplied by the estimation of SOC sequestration on pasture from ARD (expressed as T ha⁻¹ yr⁻¹). It was assumed that only one year of sequestration applied to the current calf-crop, in that the pastures, as with the breeding animals on them, would be allocated to the following calf-crop after the first year.

The completed calculations make no allowance for the original pool of stored carbon in the soils, soil type, or climate. The equations allow for differences in biomes in that sequestration rates for both managed and native pasture have been estimated. However, the calculations have only made use of a single average sequestration rate and the total pasture land area of Alberta used for beef production. Due to the highly approximate nature of this estimation, it has been included only for discussion purposes and the amount of carbon dioxide sequestered by pastures has not been included in the total footprint reported by this LCA study of beef production in Alberta. Due to the potential for SOC by pasture lands to mitigate the environmental impacts of beef production in Alberta, it is strongly recommended that future iterations of the model include a more detailed and complete assessment of carbon sequestration, along with a specific assessment of the appropriateness of including this factor as it relates to the carbon cycle. Based on the availability of an appropriate calculation methodology in the future, the total pasture carbon balance may be included in future iterations of the model.

Transportation

The transportation distances for seeds, fertilizers, pesticides and feed ingredients were based on specific data for Alberta agricultural and livestock practices, and on reasonable assumptions where data gaps were encountered.

5.2.3 EMISSIONS

The emissions from the processes described in the activity map and the processes related to manure, soil and cropping management were inventoried and grouped according to the environmental impact categories selected for further LCIA, as presented in Section 3.2.

Cropping/Land Use – direct and indirect soil N_2O emissions are summarized in Table 15. Details of the calculations are provided in the Summary soil N_2O Crop, Land Use tab of the model.

The total soil carbon change in soil from land use emissions for the entire calf crop is -236,033,981 kg CO₂ (2 year period). Details of the calculations are presented in the C Change in Soil From Land Use tab of the model. The model accounts for the soil carbon change from land use emissions for two years (one calf-crop), but uses annualized data calculated from a five-year average based on tillage information for 2001 and 2006, as these years are the only ones for which reliable data was available. To account for the full time period considered in this study, the annualized value was multiplied by two. These calculations may be refined in future iterations of the model as additional data becomes available.

The direct CO₂ emissions from managed soils for the entire calf crop, where N synthetic fertilizers are used, are 134,473,208 kg CO₂ for barley, 54,510,680 kg CO₂ for barley silage, and 0 kg CO₂ for alfalfa grass. Details of the calculations are presented in the CO₂ Direct Soils tab of the model.

Refer to Section 6.0 for further analysis of emissions from feed activities.

5.3 MANURE

Animal production inventory data from Section 5.1.1 were used to calculate the total amount of manure generated in the study. The estimated amount of generated manure was used to calculate the CH_4 and both direct and indirect N_2O emissions from manure management, as presented in the following subsections.

5.3.1 INVENTORY DATA

Tables 16 and 17 provide the manure generation rates, the total manure generated, and the breakdown of manure generated for the calf-fed and yearling-fed systems.

5.3.2 **ASSUMPTIONS**

The energy required to collect manure on the farms is included in the total energy used on beef farms in Alberta (refer to Section 5.4).

Both N₂O and CH₄ are emitted as a result of manure management. Depending on the manure storage system, the manure characteristics (animal source, solid versus liquid) and the quantity of manure, the amount and type of GHG produced are different. Manure begins to decompose shortly after it is excreted. Under anaerobic conditions, CH₄ is predominately produced (along with CO₂, which is considered to be biogenic in this context), while aerobic conditions will produce N₂O. Consequently, the covered manure storage facilities are exposed to little oxygen and will primarily produce CH₄ and little N₂O, while open-air manure storage facilities will produce more N₂O and little CH₄ (Environment Canada, 2009).

Emissions are calculated for each cattle category (calves before weaning, cows/bulls, backgrounding - calf-fed, calf-fed heifer, calf-fed steer, backgrounding - yearling-fed, pasture - yearling-fed, yearling-fed heifer, yearling-fed steer) and corresponding diet. Note that the digestible energy percentage of the rations for calves before weaning (3 to 6 months) was assumed to be the same as the pasture, as no other information was available. The calculations followed the IPCC 2006 methodology adapted within HOLOS. The energy in feed, dry matter intake and average daily gain are determined in the model. The HOLOS algorithms used for estimation of cattle manure emissions depend on the cattle cycle as selected by the choice of beef cow scenario.

Manure CH₄ emissions were estimated based on volatile solids production and the manure management system. For cow-calf livestock (excluding backgrounders), all manure is assumed to be deposited on pasture.

Manure direct and indirect N₂O emissions were estimated based on:

- Protein intake, as a function of dry matter intake and the protein content of the feed
- Nitrogen excretion rates, depending on protein intake and retention

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The nitrogen excretion rates, along with the manure handling system, are used to estimate manure N_2O emissions, both direct and indirect. Manure from backgrounder manure handling systems is eventually land-applied. These emissions are calculated in the soil N_2O component.

5.3.3 EMISSIONS

Table 18 presents the results of CH₄ emissions calculations from manure, by different classes of cattle within the beef cow production system.

Table 19 presents the summary results of manure N_2O direct and indirect emissions calculations, by different classes of cattle within the beef cow production system. Tables 19a and 19b present, respectively, the detailed calculations of manure N_2O direct and indirect emissions.

5.4 ENERGY

Energy requirements on beef farms include the operation of farm machinery, heat and light use, and other miscellaneous uses including the operation of pumps to provide water to the cattle. The subsystem Energy Consumption activities were considered in the production of energy for beef farms (Figure 1a).

5.4.1 <u>INVENTORY DATA</u>

Table 20 provides a breakdown of the energy used on all beef farms in Alberta.

Propane was excluded from the analysis, as the percent of energy derived from propane is less than 1 percent of the total energy used, and therefore negligible.

5.4.2 ASSUMPTIONS

The reference for energy used on beef farms in Alberta included categories such as trucks and auto, farm machinery, heat and light, other uses, and non-farm, with minimal description of what was specifically included in each category (Khakbazan, 2000). It was assumed that the non-farm category was not relevant to this study as it provided a value

for energy used off-farm. In addition, the trucks and auto category was assumed to be outside the project boundaries as farm machinery is included in its own category and the use of personal vehicles for farmers has been included in the "other" category. This reference includes energy usage from 1997. Also, according to the ARD experts and the Steering Committee, the volume of gasoline in relation to the volume of diesel consumed as presented in Khakbazan (2000) is unrealistically high. Therefore, the volume of gasoline consumed on beef farms was adjusted to be 10 to 15 percent of the volume of diesel consumed based on the advice of the ARD and the Steering Committee. A more recent and accurate analysis of energy used on farms may be warranted in further LCA studies for the production of beef in Alberta.

The energy consumption values in Table 20 were used to calculate the following activities:

- Diesel produce crude, transport crude, refine crude into diesel/coloured diesel, transport diesel/coloured diesel, operate trucks and farm machinery
- Gasoline produce crude, transport crude, refine crude into coloured gasoline, transport coloured gasoline, operate trucks and farm machinery
- Natural gas produce natural gas, transport natural gas, process natural gas, transport processed natural gas, heat and light farm
- Electricity generate electricity, transmit electricity, heat and light farm and other farm-related uses

The emissions from the processes presented on the activity map were quantified based on processes from the Ecoinvent V2 database, adjusted to reflect Alberta specific characteristics. The Ecoinvent processes used as proxy are shown in Table 21.

IPCC 2006 emission factors for the combustion of diesel and gasoline in agricultural equipment (off-road mobile sources and machinery) were used in the study.

5.4.3 EMISSIONS

The emissions from processes described in Table 21 were inventoried and grouped according to the environmental impact categories selected for further LCIA, as presented in Section 3.2. Refer to Section 6.0 for further analysis of the energy usage emissions.

5.5 WASTE

The majority of waste generated on farms includes the plastics involved in the production and packaging for transport of feed (i.e., silage plastic covers and bailer twine), bedding, feed supplements, antibiotics, growth promotants, and other miscellaneous items. Most of the waste produced on beef farms is associated with transport and storage of feed.

5.5.1 INVENTORY DATA

Table 22 provides a summary of the waste generated on Alberta beef farms and the method of disposal as discussed in Section 5.5.2 below.

5.5.2 <u>ASSUMPTIONS</u>

The Alberta Plastics Recycling Association provided an estimate of the amount of polyethylene and polypropylene to be marketed in 2008 for the agricultural sector of Alberta (Alberta Plastics, 2008). This value was used to estimate the total waste generated on Alberta beef farms, as no other data sources were available. Alberta farm cash receipts were used to calculate the total percentage from the beef industry. This percentage was used to estimate the total amount of plastics used in the beef industry of Alberta. This value may require further study for any additional LCA studies to obtain a more accurate result of the emissions from the production and management of waste from Alberta beef farms. In addition, this estimate is based on 2008 data and may not be completely representative of 2001 data. It is not clear whether the production of plastics has been included in the processes used for this study, and therefore, the production of some of the plastics may be double-counted. Due to a lack of specific details regarding which plastics were included and which were excluded, the production of all plastics has been included for conservative purposes.

The energy required to collect waste on the farms is included in the total energy used on beef farms in Alberta (refer to Section 5.4).

The majority of the waste generated on Alberta beef farms in 2001 was either burned or buried. A breakdown of 75 percent burned and 25 percent buried was assumed, based on the lack of actual data. Therefore, there were no emissions associated with Activity FL13, transport of garbage. The only emissions associated with Activity FL25, disposal of garbage are the emissions created by burning the plastics. Emission factors for

burning plastic were calculated based on 2006 IPCC Guidelines and USEPA Emission Factors and AP 42.

5.5.3 EMISSIONS

Table 23 provides a summary of the emissions associated with the production and combustion of agricultural plastics.

5.6 <u>BEDDING</u>

Bedding material is required both on cow-calf operations and feedlots. Bedding provides comfort and insulates the animals from snow and ice from the ground. The activities associated with bedding are outlined on Figure 1b under Feedlot and Pasture Activities.

5.6.1 <u>INVENTORY DATA</u>

Table 24 provides the breakdown of the bedding requirements in cow-calf operations and feedlots.

5.6.2 ASSUMPTIONS

Based on the data collected for this study, 95 percent of all bedding used on Alberta beef farms is straw, with 5 percent being wood chips. Therefore, for this analysis, it was assumed that the required bedding material was straw.

The emissions from Activity FL5, production of bedding material, were quantified based on the process "straw, from straw areas, at field" from the Ecoinvent V2 database. The emissions from the Activity FL10, Transport Bedding, were quantified on a weight and distance basis. Emissions associated with Activity FL15, Store Bedding, were assumed to be insignificant. The emissions associated with Activity FL27, Bed Livestock, are included in the total energy used on beef farms in Alberta (Section 5.4).

5.6.3 <u>EMISSIONS</u>

The total emissions (for the entire calf crop) associated with the production and transport of the required bedding are 89.5 kilotonnes CO_{2e} and 1.17 kilotonnes CO_{2e} , respectively. The energy required to move the bedding around the site and to bed the animals is assumed to be included in the on-farm energy usage. These emissions have been incorporated into the total emissions for feedlot and pasture activities.

6.0 ENVIRONMENTAL IMPACT QUANTIFICATION AND ANALYSIS

Four environmental impact categories were quantified and assessed in the following sub-sections:

- Global Warming Potential, GWP 100a, as per IPCC 2007
- Aquatic eutrophication, as per IMPACT 2002+
- Aquatic acidification, as per IMPACT 2002+
- Non-renewable energy resources consumption, as per IMPACT 2002+

6.1 GREENHOUSE GAS EMISSIONS

The life cycle of the project as described in Figures 1a and 1b results in a carbon intensity of 14.5 kg CO₂e per kg of beef live (shrunk) weight for the entire calf crop, with a breakdown of 14.1 kg CO₂e per kg of beef live (shrunk) weight for the calf-fed system, and 14.8 kg CO₂e per kg of beef live (shrunk) weight for the yearling-fed system. Slaughterhouse emissions are not included as part of this analysis. Refer to Table 25 for a summary of the total GHG emissions per calf crop and the GHG emissions for both the calf-fed and yearling-fed systems. It must be noted that this carbon intensity value is only a first approximation, based on provincial average estimates for all parameters, and based on both local and international estimation techniques. Therefore, strict comparison of this value to LCAs from other jurisdictions must include an analysis that assumptions and boundaries are equivalent. Otherwise, any comparison with other jurisdictions may be invalid and misleading. Additionally, equivalence factors for different emissions are subject to changes over time, as improved information and research becomes available. Specifically, in the case of CO₂ equivalents for methane, the IPCC Second Assessment Report (1995) indicates a value of 21, while the most recent Fourth Assessment Report (2007) indicates an equivalence factor of 25. Given the time span of different LCA studies as presented in the specific literature, a meaningful comparison between CO2 equivalent emissions must be made with full understanding of the respective global warming potentials utilized.

Even though the yearling-fed and calf-fed production models are substantially different in feeding strategies and age at slaughter, the carbon intensity associated with each model only differs by approximately 0.7 kg CO₂e per kg of beef live (shrunk) weight. The yearling-fed system, by virtue of feeding strategy and the extra age of animals at slaughter, has a higher enteric fermentation emission in comparison to the calf-fed system of approximately 1.2 kg CO₂e per kg of beef live (shrunk) weight. However,

because of the feeding strategy employed by the calf-fed model, the calf-fed model has elevated Forage and Cereal emissions in comparison to the yearling-fed system of approximately 0.5 kg CO₂e per kg of beef live (shrunk) weight. The net result of these differences accounts for the observed difference of 0.7 kg CO₂e per kg of beef live (shrunk) weight.

The most significant GHGs associated with the production of beef in Alberta are methane, carbon dioxide and nitrous oxide.

The overall carbon intensity of the beef production system is comprised entirely of emissions from the activities related to the Operation and Maintenance. Emissions related to Construction and Decommissioning were deemed to be insignificant and were not included in the model calculations. The various elements comprising Operations and Maintenance include:

- Forage and Cereal sub-activities relating to production and transport of seed, fertilizer and pesticides/herbicides; the transportation of and application of manure; and irrigation.
- Energy Consumption activities relating to the use of energy on cattle farms. This
 includes: the production, refinement and transportation of crude oil into diesel and
 gasoline; the production, processing and transportation of natural gas; and the
 generation and transmission of electricity. All emissions from the use of fuels on
 cattle farms are included in this category.
- Physical Operations and Maintenance activities required on cattle farms. This includes production, transportation and installation of replacement materials.
- Cereal activities related to the production of barley. This includes planting, application of fertilizer, irrigation, harvesting, and transport of crop.
- Forage activities related to the production of barley silage and alfalfa. This includes cultivation, application of fertilizer, planting and irrigation, chemical treatment application, harvesting, and transport of crop.
- Feedlot and Pasture activities including deposition, collection, storage, and disposal
 of manure; collection, handling and disposal of garbage; collection, handling and
 disposal of mortalities; production, handling and use of bedding; transport,
 handling, processing and use of feed including associated minerals, supplements
 and vitamins; production and transportation of growth promotants and
 vaccinations/antibiotics; transport of other feed additives; and supplying water to
 livestock.

• Livestock activities including feeding and transportation activities relating to cows, bulls, cattle from dairy, and calves under the yearling-fed and calf-fed systems.

In addition to these activities are direct emissions from the animals. Figure 2 presents the relative contribution to GHG emissions of each of the above stages of the beef production system, divided into the calf-fed and yearling-fed systems.

As shown on Figure 2, the largest contributors to the overall carbon intensity are related to four main categories: Forage and Cereal sub-activities, Energy Consumption, Enteric Fermentation Emissions, and N₂O from GHG Beef Activity, Soil, and Crops. These four categories cumulatively account for approximately 94.8 percent of the total footprint for both systems. Figure 3 presents the same data as on Figure 2, but with the cereal and forage activities combined into one category.

Approximately 10.0 percent of the total calf-fed carbon footprint is related to forage and cereal activities. Of this total, 68 percent is related to cereal and 32 percent is related to forage.

Approximately 7.9 percent of the total yearling-fed carbon footprint is related to cereal and forage activities. Of this total, 53 percent is related to cereal and 47 percent is related to forage.

The categories representing greater than 5 percent each of the total GHG emissions are discussed in greater detail in the subsequent sections. For this analysis, forage and cereal were combined into one category for discussion purposes. The specific activities related to the yearling-fed and calf-fed systems, in the definitions used in the activity mapping, are mostly related to transportation of the animals. The feed production and enteric emissions components associated with the animals themselves are captured in other categories.

6.1.1 FORAGE AND CEREAL

Forage and cereal activities represent approximately 10.0 percent of the carbon footprint for the calf-fed system. Figure 4 presents the breakdown of barley, barley silage and alfalfa utilized in the calf-fed system. Barley, barley silage and alfalfa represent 67.9 percent, 16.6 percent and 15.5 percent, respectively, of the forage and cereal emissions. The three largest emissions categories within barley are the production of fertilizer, the production of seed, and the processing of seed. The three largest emissions categories within barley silage are the production of fertilizer, the processing of seed,

and crop harvesting. The three largest emissions categories within alfalfa are crop harvesting, transportation of the harvested crop (feed), and the production of fertilizer. The largest emission category for barley and barley silage is the production of fertilizer. The largest emission category for alfalfa is crop harvesting.

Forage and cereal activities represent approximately 7.9 percent of the carbon footprint for the yearling-fed system. Figure 5 presents the breakdown of barley, barley silage and alfalfa utilized in the yearling-fed system. Barley, barley silage, and alfalfa represent 53.2 percent, 28.1 percent and 18.8 percent, respectively, of the forage and cereal emissions. The three largest emissions categories within barley silage are the production of fertilizer, the processing of seed, and crop harvesting. The three largest emissions categories within alfalfa are crop harvesting, transportation of the harvested crop (feed), and the production of fertilizer. The largest emission category for barley and barley silage is the production of fertilizer. The largest emission category for alfalfa is crop harvesting.

Figure 6 provides a summary of the total emissions for both systems normalized on a tonne of feed basis, for comparison purposes. The production of barley on a per mass basis produces the majority of related GHG emissions, followed by barley silage, then alfalfa.

Figure 7 presents the individual contributions for significant activities (greater than 5 percent of total emissions) for the cereal and forage components, divided into the calf-fed and yearling-fed systems. Figure 7 indicates that the largest GHG emission components of cereal and forage activities are: production of fertilizer, crop harvesting, transporting the harvested crop (feed), processing of feed, production of seed, and transportation of manure, together representing 75.8 and 77.2 percent of the total emissions from this category for the calf-fed and yearling-fed systems, respectively. The emissions from seed production and processing, and the transportation of harvested crop (feed) and manure are very similar, each representing five to eight percent of the total emissions.

Figure 8 presents the fertilizer emissions components due to different subcategories of fertilizer used for cereal and forage.

6.1.2 <u>ON-FARM ENERGY CONSUMPTION ACTIVITIES</u>

On-farm energy consumption represents approximately 19.1 percent of the total carbon footprint for the calf-fed system and 18.2 percent for the yearling-fed system. Figure 9

presents the total amount of energy derived from each of the different energy sources in terajoules (TJ). Diesel fuel usage represents more than half of the total energy utilized on beef farms in Alberta.

Figure 10 presents the total GHG emissions due to energy processes and usages on cattle farms for each of diesel, gasoline, natural gas and electricity usage. The production, transportation and refining of the fuels is included, as are combustion-related components for the energy sources except electricity. Note that these emissions have not been divided between the calf-fed and yearling-fed systems, as an accurate method of dividing these emissions between the two systems is not available at this time. As there is no exact method for determining the amount of on-farm energy consumed for each of the systems (calf-fed and yearling-fed) based on the available information, the results in Figure 10 provide the total GHG emissions for the entire beef production in Alberta. The total GHG emissions may be divided by assuming that 45 percent of the total emissions are associated with the calf-fed system and 55 percent are associated with the yearling-fed system (ratio as provided by ARD). These emissions have been divided using this method for the overall comparison between the two systems; however, the individual system results have not been provided here.

Diesel fuel consumption on-farm is the largest contributor to GHG emissions (approximately 58.9 percent). Electricity-related emissions are low due to the relatively low consumption of electricity on beef farms.

Of the diesel fuel total, a breakdown relative to sub-activities is provided on Figure 11. The results have been segregated based on the calf-fed and yearling-fed ratio of 45 percent to 55 percent for illustration purposes only. The combustion of diesel represents over 61 percent of the total energy profile.

6.1.3 <u>CATTLE ENTERIC FERMENTATION EMISSIONS</u>

Enteric emissions represent 51.1 percent of the total carbon footprint (49.0 percent of the calf-fed system and 52.8 percent of the yearling-fed system). Figure 12 identifies the differences in enteric emissions as a function of type of animal, on a normalized tonnes of CO₂e basis. As shown on Figure 12, cows from both the calf-fed and yearling-fed systems represent the largest source of enteric emissions at 62.3 percent of the total. The calf-fed system represents 42 percent of the total enteric fermentation emissions per calf crop, while the yearling-fed system represents 58 percent of the total.

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For cows and bulls, the total enteric emissions according to diet per calf crop are presented on Figure 13. Generally, the GHG emission profile is comparable according to feeding stage (winter diet, calving diet, breeding diet, pasture).

As enteric emissions were apportioned as a function of individual diets for animals in the yearling and calf-fed systems, it is possible to identify which diet is responsible for the majority of emissions. Figures 14 and 15 present the breakdowns according to diets for calf-fed and yearling-fed systems, respectively.

For animals in the calf-fed system, backgrounding and the finishing diets for heifers and steers represent 65.4 percent of the enteric emissions for this system.

For animals in the yearling-fed system, the backgrounding, pasture and the finishing diets for heifers and steers represent the vast majority of enteric GHG emissions, representing nearly 89.4 percent of the enteric emissions for this system.

Table 7 provides a summary of the enteric fermentation emissions based on the calf-fed and yearling-fed systems. Table 8 provides a summary of the enteric fermentation emissions from the calf-fed system and the yearling-fed system per functional unit. The enteric fermentation emissions from the calf-fed system account for 3.1 kg CO₂e/kg live (shrunk) weight, and the emissions from the yearling-fed system account for 4.3 kg CO₂e/kg live (shrunk) weight. Figure 16 illustrates the differences in emissions per functional unit for both the calf-fed and the yearling-fed systems. Appendix F provides the calculation table included in the spreadsheet model to provide more information regarding the values used to calculate enteric fermentation emissions.

6.1.4 N₂O EMISSIONS FROM GHG BEEF ACTIVITY, AND SOIL CROPPING

The total quantity of N_2O emissions generated from manure management and soil cropping are summarized in Table 26. Details about the calculation methodology for N_2O direct and indirect emissions from manure are presented in Section 5.3.

Examination of the data shows that the contributions to GHG emissions from the manure management and soil cropping practices involved in the entire life cycle of the beef cattle are 2.36 kg CO₂e/kg live (shrunk) weight (also the result for each system), which is 16.3 percent of the overall GHG emissions (16.8 percent for the calf-fed system and 15.9 for the yearling-fed system). This result indicates that the manure management and soil cropping practices play an important role in the generation of GHGs.

6.1.5 SOIL ORGANIC CARBON CHANGE

The total soil organic carbon change in pasture for the production of beef in Alberta per calf crop was calculated to be -7,017.8 kt CO₂e, or -4.92 kg CO₂e/kg live shrunk weight. Note that these values have not been accounted for in the total emissions for the study, as the analysis of the entire carbon cycle has not been included in this study. This specific issue requires further study and a determination should be made of the appropriateness of including this in a beef LCA study on an absolute basis and as it reflects common practice in other beef LCAs. Refer to Section 5.2.2 for more information.

6.2 AQUATIC ACIDIFICATION

Aquatic acidification as an environmental impact category was assessed in accordance with the IMPACT 2002+ method. The IMPACT 2002+ method uses a mid-point characterization approach for assessment of aquatic acidification. Midpoint characterization factors are based on equivalency principles, such as midpoint characterization scores and are expressed in kg-equivalents of a substance compared to a midpoint reference substance, specifically kilograms sulphur dioxide equivalent (kg SO₂ eq) into the air in the case of aquatic acidification (Joliet et al., 2003). The overall long-term effects are considered through the use of infinite time horizons (approximated by a 500 years horizon).

The characterization factors for aquatic acidification are adapted from Hauschild and Wenzel (1998), which also correspond to Guinee & et al. (2002). Updated midpoint characterization factors for kg SO₂ eq into the air can be downloaded from http://www.epfl.ch/impact.

Analysis of the project as described on Figures 1a and 1b results in a total aquatic acidification quantification of $32.8 \text{ kt SO}_2 \text{ eq}$, which translates to an intensity of $0.0230 \text{ kg SO}_2 \text{ eq}$ per kg of beef live (shrunk) weight. The total aquatic acidification effect for the calf-fed and yearling-fed systems are $15.3 \text{ kg SO}_2 \text{ eq}$ and $17.5 \text{ kg SO}_2 \text{ eq}$, respectively, equating to intensities of $0.0238 \text{ kg of SO}_2 \text{ eq}$ per kg of beef live (shrunk) weight for the calf-fed system and $0.0224 \text{ kg of SO}_2 \text{ eq}$ per kg of beef live (shrunk) weight for the yearling-fed system. Slaughterhouse emissions are not included as part of this analysis. Table 27 and Figure 17 presents the contribution of different activities to the acidification effect.

Figures 18 through 22 describe the contribution of different processes from the activity map to the aquatic acidification effect, as follows:

- For the Cereal and Forage activities, the contribution of the main components of the diet, specifically barley, barley silage and alfalfa (Figures 18 and 19).
- For the Feedlot and Pasture activities, the individual contribution of the main processes as described in the appropriate section of the Activity Map (Figure 20).
- For the Cattle Transportation activities, the individual contribution to the acidification effect for transportation of each type of cattle (Figure 21).
- For the Energy Consumption activities, the individual contribution to the acidification effect of each type of fuel (diesel, gasoline and natural gas) and electricity (Figure 22).

For the above categories, the results are presented as follows:

- Overall, per calf crop
- For the individual contribution of the calf-fed and yearling-fed systems

The overall SO₂ acidification intensity of the beef production system is comprised mostly of emissions from total Forage and Cereal activities (forage and cereal sub-activities, cereal activities, forage activities) (39.9%), followed by Energy Consumption activities (39.5 percent), and Feedlot and Pasture activities (17.7%) (see Figures 1a and 1b and Table 27).

Figure 18 illustrates the contribution of barley, barley silage and alfalfa within the Forage and Cereal activities to the aquatic acidification impact. The Forage and Cereal Activities include Forage and Cereal sub-activities, Cereal Activities, and Forage activities, each with a contribution to the overall acidification effect of, respectively, 24.9, 7.8, and 7.2 percent. The most significant contribution comes from the production of fertilizers and harvesting of the forage crop. The significant emissions from the harvesting of the forage crop relate to the extent of the area cultivated for forage and the fuel consumption for harvesting. Among different crop practices in the field, harvesting is the most intensive in terms of fuel consumption.

Figure 19 presents the summary of aquatic acidification emissions per calf crop from major Cereal and Forage activities. The contribution of the two systems to aquatic acidification is relatively similar, as shown on Figure 19.

Examination of Figure 20 shows that the major contribution to acidification from the Feedlot and Pasture activities is generated by production of mineral. Again, as observed on Figure 20, the contribution of the two systems to aquatic acidification is relatively similar, with a slightly higher contribution from the yearling-fed system with a total of 3.20 kt SO₂ eq compared to 2.60 kt SO₂ eq for the calf-fed system.

Within the Cattle Transportation results, Figure 21 presents the total acidification emissions per calf crop. As observed from the figure, the major contribution to the aquatic acidification effect is generated by transportation of the cattle to the slaughterhouse. This significant contribution to acidification is a result of the total number of cattle being transported to the slaughterhouse, at the end of the studied period of the life cycle of beef production.

Within the energy consumption results, Figure 22 presents the total aquatic acidification emissions per calf crop due to the production of energy. Examination of the figure reveals that similar contributions to the aquatic acidification effect are generated by production of diesel, natural gas and electricity.

6.3 AQUATIC EUTROPHICATION

Aquatic eutrophication as an environmental impact category was assessed in accordance with the IMPACT 2002+ method. At the present time, aquatic eutrophication in Alberta is being studied, and there is currently no Alberta-specific data that can be adapted for existing methodologies for calculating the eutrophication effect. The IMPACT 2002+ method uses a mid-point characterization approach for assessment of aquatic eutrophication. Midpoint characterization factors are based on equivalency principles, such as midpoint characterization scores and are expressed in kg-equivalents of a substance compared to a midpoint reference substance, specifically kilograms of phosphate equivalent (kg PO₄ eq) into the water in the case of aquatic eutrophication (Joliet et al., 2003). The overall long-term effects are considered through the use of infinite time horizons (approximated by a 500 year horizon).

Eutrophication literally means "nutrient enrichment", and generally refers to nitrogen and phosphorus. The greatest risk for Alberta agriculture eutrophication contribution is generally from soil amendments (synthetic fertilizers and manure). Surface water is at risk for increased eutrophication if additional nutrients are transported via run-off (snowmelt runoff, rainfall runoff, or irrigation runoff are transport mechanisms).

Phosphorus losses from agricultural lands are recognized as a significant contributor to surface water degradation. Livestock production systems, including cow-calf operations and confined feeding operations, are considered the primary sources of agricultural phosphorus loss. For cow-calf operations, direct access of cattle to streams is limited to reduce risk. Generally, contributions from direct runoff from feedlot pens and/or lagoons are minimal risk due to operational practices and feedlot locations relative to surface water. However, manure spreading related to feedlots is a significant source of excess phosphorus in surface water. Other potential risks could relate to erosion concerns - tillage, stream bank erosion for livestock access, dust from the homestead and roads, etc.

In terms of eutrophication, the risk of surface runoff is varied across the province. For this reason it is important to recognize that the eutrophication values are a generalized value for the province, but do not reflect specific regions.

The characterization factors for aquatic eutrophication are adapted from Hauschild and Wenzel (1998), which also correspond to Guinee & et al. (2002). Updated midpoint characterization factors for kg PO₄ eq into the water can be downloaded from http://www.epfl.ch/impact.

Aquatic eutrophication is divided into two classes, for P-limited and N-limited watersheds. The values for P-limited watersheds are applied by default as recent evidence shows that phosphorus ultimately is the relevant compound in most cases. This can be explained by the fact that cyanobacteria in lakes and rivers are fixing atmospheric N when nitrates are limiting in the aquatic media. Therefore, in the long term, increases in nitrate concentration will not influence the ecosystem's development, whilst an increase in phosphate will lead to an increasing impact (Barroin 2003).

Analysis of the project as described on Figures 1a and 1b, and including the phosphorus run-off to surface waters, results in a eutrophication impact of 5.56 kt PO₄ eq, which translates to an intensity of 0.00389 kg PO₄ eq per kg of beef live (shrunk) weight. The total aquatic eutrophication effect for the calf-fed and yearling-fed systems are 2.51 kt PO₄ eq and 3.05 kt PO₄ eq, respectively, equating to intensities of 0.00391 kg PO₄ eq per kg of beef live (shrunk) weight for the calf-fed system and 0.00388 kg PO₄ eq per kg of beef live (shrunk) weight for the yearling-fed system. Slaughterhouse emissions are not included as part of this analysis. Table 28 and Figure 23 present the contribution of different activities to the eutrophication effect.

The total emissions from phosphorus run-off account for 74.6 percent of the total eutrophication effect.

Figures 24 through 28 describe the contribution of different processes from the Activity Map to the aquatic eutrophication effect, as follows (the structure of the presentation of results is identical to the structure previously described in Section 6.1, for the GHG emissions):

- For the Cereal and Forage activities, the contribution of the main components of the diet, specifically barley, barley silage and alfalfa
- For the Feedlot and Pasture activities, the individual contribution of the main processes as described in the appropriate section of the Activity Map
- For the Cattle Transportation activities, the individual contribution to the eutrophication effect for transportation of each type of cattle
- For the Energy Consumption activities, the individual contribution to the eutrophication effect for each type of fuel (diesel, gasoline and natural gas) and electricity

For the above categories, the results are presented as follows:

- Overall, per calf crop
- For the individual contribution of the calf-fed and yearling-fed systems

Significant contributions to the aquatic eutrophication impact category are generated by:

- Phosphorus run-off activities contribute 74.6 percent of the total eutrophication effect
- Energy generation activities contribute 16.6 percent of the total eutrophication effect. Within these activities, diesel and gasoline have the highest contributions through the refining of crude.
- Forage and Cereal activities, with contributions from the Forage and Cereal sub-activities, Cereal activities, and Forage activities with, respectively, 3.6, 0.5 and 0.4 percent to the overall eutrophication impact (Figure 24). Examination of Figure 25 shows that within the Forage and Cereal activities, Production of seed, Processing of seed and Production of fertilizer represent major contributors to the eutrophication effect. The calf-fed and yearling-fed systems have similar contributions, slightly higher for the yearling-fed system with 0.128 kt PO4 eq compared to 0.126 kt PO4 eq for the calf-fed system.
- Feedlot and Pasture activities, with 3.90 percent of the total eutrophication effect. Within this category, FL17, Production of Bedding and Production of Mineral have

the most significant contributions (Figure 26). Within the Feedlot and Pasture Activities, the calf-fed and yearling-fed systems have similar contributions, slightly higher for the yearling-fed system with 0.121 kt PO4 eq compared to 0.098 kt PO4 eq for the calf-fed system.

Figure 27 (Cattle Transportation activities) has been provided to remain consistent with the figures in Section 6.1.

6.4 NON-RENEWABLE ENERGY RESOURCES

The non-renewable energy resources consumption as an environmental impact category was assessed in accordance with the Impact 2002+ method. The IMPACT 2002+ method uses a mid-point characterization approach for assessment of non-renewable energy resources consumption. Midpoint characterization factors are based on equivalency principles, such as midpoint characterization scores, and are expressed in megajoule (MJ) equivalents compared to a midpoint reference. In the case of the non-renewable energy resources as a mid point category, the midpoint reference substance is the primary non-renewable source of energy as MJ equivalents (or one kg of crude oil).

Characterization factors for non-renewable energy resources consumption, in terms of the total primary energy extracted, are calculated with the upper heating value (Frischknecht et al. 2003). Updated midpoint characterization factors for kg MJ equivalents can be downloaded from http://www.epfl.ch/impact.

Analysis of the project as described on the Activity Map results in a non-renewable energy resources consumption of 346,483 TJ eq, which translates to an intensity of 242.8 MJ eq per kg of beef live (shrunk) weight. The total non-renewable energy resources effect for the calf-fed and yearling-fed systems are 157,149 TJ eq and 189,334 TJ eq, respectively, equating to intensities of 244.8 MJ eq per kg of beef live (shrunk) weight for the calf-fed system and 241.3 kg of MJ eq per kg of beef live (shrunk) weight for the yearling-fed system. Slaughterhouse emissions are not included as part of this analysis. Table 29 and Figure 29 present the contribution of different activities to the non-renewable energy resources consumption effect.

Figures 30 through 34 describe the contribution of different processes from the Activity Map to the consumption of non-renewable energy resources, as follows (the structure of the presentation of results is identical to the structure previously described in Section 6.1, for the GHG emissions):

- For the Cereal and Forage activities, the contribution of the main components of the diet, barley, specifically barley silage and alfalfa (Figures 30 and 31)
- For the Feedlot and Pasture activities, the individual contribution of the processes as described in the appropriate section of the Activity Map (Figure 32)
- For the Cattle Transportation activities, the individual contribution to the eutrophication effect for transportation of each type of cattle (Figure 33)
- For the Energy Consumption activities, the individual contribution to the consumption of non-renewable energy resources of each type of fuel (diesel, gasoline and natural gas) and electricity (Figure 34)

For the above categories, the results are presented as follows:

- Overall, for the entire beef production system
- For the individual contribution of the calf-fed and yearling-fed systems to the entire beef production system

The most significant contributions to the non-renewable energy resources consumption impact is from refinery activities and activities with intensive fuel consumption, as described below:

- Energy Consumption Activities, with 89.6 percent of the total effect. Within this category, Production, Transportation and Refining of crude into diesel are the most intensive activities (Figure 34).
- Forage and Cereal activities, with contributions from Forage and Cereal sub-activities, Cereal activities, and Forage activities of, respectively, 5.3, 1.4 and 1.2 percent of the overall impact (Figure 31). Within the category of Forage and Cereal activities, the most important contribution is represented by the production of fertilizers, followed by harvesting of the crop (Figure 32). The contributions within the Forage and Cereal activities are slightly higher for the yearling-fed system with 13,814 MJ eq compared to the calf-fed system with 13,729 MJ eq.

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7.0 ANALYSIS OF RESULTS

7.1 <u>GAP IDENTIFICATION</u>

During the process of data collection, gaps initially encountered were addressed, as much as possible, by extensive research of databases, literature sources and expert opinion. Based on the current data inventory, the following data gaps currently remain:

- Energy requirements for grains storage practices in Alberta
- Energy requirements for treatment of harvested cereal grains
- Production of growth promotant
- Production of vitamins, as part of the cattle supplement diet
- Production of vaccines/antibiotics
- Production of trace mineral
- Lack of a standard methodology and sufficient data for the calculation of soil organic carbon sequestration on pasture

Further, with reference to the Activity Maps, the Construction and Decommissioning Phases, and the Operation and Maintenance Phase as it relates to Operation and Maintenance Activities with the feedlots, were not included in the analysis as they were considered to not represent a significant source of emissions within the life cycle of beef cattle. Accordingly, calculation of their contribution to the overall emissions in the current study was deemed unnecessary. However, as the LCA model is designed to support further enhancement, aspects related to construction, operation and decommissioning can be quantified if required.

In addition to the data gaps identified, several factors and assumptions were selected based on the best available data. However, as more current data is published in the future, refinement of these factors and assumptions, including the following, should be completed:

Cattle Inputs:

- Percent of cow and bull culls transported directly to slaughterhouse from cow-calf operation (not sent to feedlot)
- Breakdown of animal type and destination (feedlot, slaughterhouse, etc.) for international import data
- Interprovincial movement of cattle (imports and exports) for 2001-2002 (2007-2008 data currently being used)

Feedlot and Pasture:

- Actual quantities and types of garbage generated on beef farms in Alberta
- Actual breakdown of disposal methods for the garbage generated on beef farms in Alberta

Energy Usage:

- Actual energy usage breakdown for Alberta beef farms
- Transport distance of natural gas to natural gas processing (not readily obtainable)
- Transport distance of natural gas to consumer (not readily obtainable)

Transportation:

- Average cereal transportation distance
- Average forage transportation distance
- Average mineral transportation distance
- Average growth promotant transportation distance
- Average vitamins A, D, and E transportation distances
- Average nitrogen-based and phosphorous-based fertilizer transportation distance
- Average pesticide transportation distance
- Average bedding material transportation distance
- Average mortalities transportation distance

7.2 HOTSPOT IDENTIFICATION AND MITIGATION

Hotspots are identified in Section 6.0 as part of the analysis. CRA notes that mitigation approaches are part of a subsequent component of the overall project design; the main purpose of this study is to identify hotspots, as presented in Section 6.0 and as summarized here, but some examples of mitigation techniques have also been provided in this section. This is not intended to be a comprehensive description of mitigation, however.

In terms of GHG emissions, the main hotspots in the life cycle of beef production are generated by emission of CO_2 , CH_4 , and N_2O .

The following sources are examples of where these emissions are generated within the study:

- Carbon dioxide
 - The burning of fossil fuels for equipment and facilities
 - Losses in soil organic matter
- Methane
 - Enteric fermentation by ruminant animals
 - Livestock manure
- Nitrous oxide
 - Fertilizer usage, predominately synthetic N fertilizer
 - Decomposing crop residues
 - Manure on pasture and in storage

In terms of the Activity Map, the main hot-spot items are cattle enteric emissions, on-farm energy consumption, nitrous oxide emissions from beef biological activity and soil cropping, and forage and cereal activities. These categories represent approximately 95 percent of total GHG emissions.

In the case of cattle enteric fermentation, microbial fermentation in the rumen and hindgut of livestock produces CH₄ gas as a by-product. On average about 4 to 12 percent of gross energy intake (GEI) in the feed is converted to CH₄ gas (Manitoba and Climate Change, 2001). Enteric fermentation emissions per calf crop are dominated by emissions from cows (Figure 12), but the overall mitigation strategy and approach is not straightforward. In the calculation base, total dry matter intake (DMI) is the main correlated link to estimation of enteric emissions, and this parameter is directly linked to the feed requirements for individual animals, which is somewhat inflexible.

There are a number of options for reducing enteric fermentation emissions, as follows.

Promotion of high quality forages in ruminant feeding and grazing systems:

- Use of high quality forages. Boadi et al. (2000) showed that CH4 emissions of grazing steers that had access to high quality pastures declined by 50 percent compared to emissions from matured pastures.
- Use of legumes in grazing rotations. McCaughey et al. (1999) observed lower CH4 emissions (7.1 percent of GEI) from alfalfa-grass pasture than grass -only pastures (9.5 percent of GEI) in Brandon, Manitoba.

Feed and Animal Management (Wittenberg & Boadi, 2001):

- Formulate and evaluate diets to avoid overfeeding and under feeding of nutrients (protein and minerals)
- Diets formulated by qualified professional animal nutritionist
- Use of rotational grazing
- Use of high grain to forage ratios in rations can reduce CH4 emissions to 2 to 3 percent of GEI (Johnson et al. 1996)
- Grinding and pelleting of feed (20 to 40 percent of total CH4 emissions)

Feed Additives:

- Use of ionophores: Research has shown that ionophores may decrease CH4 emissions.. Ionophores, specifically monensin, have been included in the feedlot diets considered in this study.
- Addition of edible oils to grain diets: Methane emissions were reduced by 33 percent when 4 percent canola oil was added to a diet containing 85 percent concentrate in a feedlot study (Mathison et al. 1997). Edible oils cannot be added to diets more than 5 to 6 percent of ration, as excessive amounts of edible oils depresses fiber digestion.
- Compounds that inhibit CH4 production: Compounds that reduce CH4 production (e.g., bromoethanosulfonate) have been successful in reducing CH4 emission by 71 percent, but effects have only lasted 3 days in sheep (Dong et al. 1997). There are concerns of adaptation and animal toxicity.
- Defaunation: Compounds that eliminate the protozoal community from the rumen may reduce methane emissions. However, there are concerns of animal toxicity.

Significant research has been and continues to be done on developing mitigation strategies for enteric methane production.

On-farm energy consumption emissions:

On-farm energy consumption activities are dominated by the use of diesel fuel in machinery and for other on-farm activities (Figure 9). It is expected that emissions related to diesel fuel production and combustion are relatively constant. Total diesel fuel consumption on-farm is an area of some potential mitigation activity, although it would be counter-productive to affect on-farm activities adversely. In addition, there is

some uncertainty in the total fuel consumption on-farm, and more detailed information is required with respect to this issue to accurately quantify emissions.

Options for reducing nitrous oxide emissions:

Nitrous oxide emissions from manure management are an important component of the overall emissions and relate to manure management and cultivation (Table 26). The ratio of emissions from each contributor is relatively even.

Mitigation approaches for nitrous oxide emission from soil management include increased use of no-till cropping methods. In addition, nitrous oxide emissions can potentially be mitigated by type and time of land application of manure, as follows:

- Fall application of manure may lead to high level of denitrification prior to winter and in early spring (Tessier and Marquis 1998).
- Liquid manure applied in bands may produce more N2O than manure applied uniformly on the soil surface, as the former creates more favorable conditions for denitrification by concentrating the nitrogen and carbon (Janzen et al. 1999).
- Injecting the manure directly into the soil or cultivation of land immediately after application can reduce N-volatilization by about 90 percent compared to normal surface spreading (DeVos et al. 1998).
- Managing in controlled systems such as anaerobic lagoons for the capture of emissions. It can be expected that in a well-operated system, biogas production can be initiated, with subsequent utilization/combustion of biogas for control of emissions to the atmosphere.

Alberta beef operations manage both liquid and solid manure, with approximately one percent being liquid manure. Therefore, the mitigation options outlined above for liquid manure handling may not have a significant effect on the overall emissions from beef production in Alberta. Emphasis should be placed on solid manure management to reduce nitrous oxide emissions.

The above mentioned potential mitigation measures are intended to be a preliminary discussion only, and further measures should be developed and evaluated as part of future studies.

7.3 COMPARISON TO EXISTING LITERATURE

As identified during the review of existing literature, several LCAs have been completed on beef industries around the world. Unfortunately, most of the results of these LCAs are not directly comparable to the results presented in this report. Comparison difficulties arise due to differing functional units, differing project boundaries, and a scarcity of detailed information regarding processes or activities that were excluded or included in the other assessments. Currently, a standard approach for completing a beef production LCA is not available, and therefore, each beef production LCA will differ based on which processes are included and which are not. There are no direct means of comparing previous beef LCAs to the results of this Alberta beef production LCA, as the approach of the other LCAs are not known. As such, a comparison of this study with the results from other beef LCAs is not productive at this time, and can potentially lead to misinterpretation of results.

Further, it should be noted that this is a first approximation of the impacts associated with the Alberta beef production system. Data gaps have been identified, as have issues related to availability of data for the baseline year. It is expected that further research and data gathering will address these issues over time, leading to a more accurate approximation. However, even if this is the case, the lack of uniformity in how beef LCAs are conducted may continue to hinder any meaningful ability to compare results between studies.

A particular and important aspect of this study is that it has attempted to be comprehensive in terms of mapping out the beef production system in Alberta. All pertinent factors have been included up-front, and although some processes have not been considered in the analysis because they have been deemed to be insignificant, the intent was to capture a broad set of project boundaries. It is unclear if other beef LCAs utilize a similar approach or establish a more specific definition of project boundaries. One example of this can be a definition of project boundaries that only includes factors that are demonstrably within the control of farmers.

A common example of the scarcity of detailed information regarding inclusion/exclusion of activities is the phrase "inclusion of energy generation". This phrase implies that the project includes the emissions associated with the direct production of energy, such as the combustion of fossil fuels. However, it is not clear whether the project has gone further upstream in the energy production process to include the emissions associated with extracting and refining fuels (included in this LCA study). This uncertainty appears in defining the boundaries of other supporting activities. Consequently, it is difficult to establish the boundaries of other projects

outside of the actual beef production cycle, and a comparison between studies is not straightforward.

One comparison that can be conducted is the results of the enteric fermentation emissions to literature values (Table 30). The results indicate that the enteric fermentation emissions calculated in this study are similar to literature values.

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8.0 LIMITATIONS OF STUDY

The current LCA study encompasses the Alberta beef production system to the door of the slaughterhouse. The main scope of the LCA study is to offer an understanding of the beef production system within the broader perspective of complex environmental interactions.

Performing any LCA is an intensive and challenging process. The complexity of the beef system in Alberta and its interaction with adjacent livestock systems and practices makes the task of performing the current LCA even more challenging and sensitive.

It is acknowledged that availability of reliable data can greatly impact the accuracy of the final results. Therefore, emphasis was placed on gathering information from updated, reliable, and expert sources.

Some of the limitations that can have an impact on the final results are:

- Delineation of the boundaries of the system is dependent on user definition. While
 efforts were made to include the entire life cycle of all the logistic and processes
 involved in the life cycle of beef cattle, some of the processes were omitted due to the
 lack of both primary and secondary data.
- Estimation of environmental emissions generated by the diverse and interlinked processes within the system is a key point of success for building a comprehensive inventory. However, the databases currently available do not reach a consensus in methodological terms and accuracy when reporting emissions. Every effort was made to use the most reliable environmental emissions for the processes involved in the analysis.
- Where primary and secondary data gaps were encountered, educated assumptions were made to capture relevant processes in the calculations.
- The complexity and diversity of different methods for modelling the transfer processes in the manure management and cropping practices can have an effect on the final outcomes. In addition to the recognized IPCC 2006 and Environment Canada 2008 Tier 2 standard methodologies, new methodologies developed specifically for conditions in Canada, and specifically Alberta, can lead to different results in emissions from manure management and cropping practices.
- While industrial processes are relatively well defined and characterized in terms of
 environmental emissions, agricultural practices tend to be more variable. The
 generic data used to quantify environmental emissions from agricultural practices in
 different geographic settings may introduce a source of uncertainty in the results.

However, every effort was made to adjust the generic agricultural practices and associated emissions to conditions specific for the area of the current study.

- The LCIA methodology and equivalence factors used to quantify some environmental impacts are generic. To date, representative factors for Alberta have not been developed.
- The LCIA results were based on the IPCC 2007 GWP (100 years) quantification methodology and IMPACT 2002+.

The results presented in this report are subject to these and other inherent limitations as they relate to data inputs and the ability of the various models and techniques utilized to accurately reflect actual conditions. It is also recognized that this is a first approximation of the life cycle of the Alberta beef sector, and that additional refinement and analysis of input parameters will yield more robust results.

9.0 CONCLUSIONS AND RECOMMENDATIONS

As this is the first approximation of the beef production system in Alberta, the results will change over time as further study and detail is added to the study in order to improve the accuracy of the results.

The total first approximation of GHG emissions for the Alberta beef production sector is 14.5 kg CO₂e per kg of live (shrunk) weight. This figure includes emissions per calf crop up to the door of the slaughterhouse. The total GHG emission from the calf-fed system is 14.1 kg CO₂e per kg of live (shrunk) weight. The total GHG emission from the yearling-fed system is 14.8 kg CO₂e per kg of live (shrunk) weight.

The largest components of the total emission figure include enteric emissions (51.1 percent of total); on-farm energy consumption activities (18.6 percent of total); and nitrous oxide emissions from soil and manure management (16.3 percent of total). The next largest category is total forage and cereal activities at 8.8 percent of total. The results for both the calf-fed and yearling-fed systems are similar to the percentage breakdown of the total emissions.

Within these categories, the largest contributors include enteric emissions from cows, on-farm diesel fuel usage, and nitrous oxide emissions from manure management and cropping activities.

The total acidification impact per calf crop is quantified as 0.0230 kg SO₂ eq per kg of beef live (shrunk) weight, with 0.0238 kg SO₂ eq per kg of beef live (shrunk) weight for the calf-fed system and 0.0224 kg SO₂ eq per kg of beef live (shrunk) weight for the yearling-fed system. The dominant categories of emissions contributing to this impact are related to total Forage and Cereal activities (forage and cereal sub-activities, cereal activities, forage activities) (39.9 percent), followed by Energy Consumption activities (39.5 percent), and Feedlot and Pasture activities (17.7 percent).

The total eutrophication impact is quantified as 0.00389 kg PO₄ eq per kg of beef live (shrunk) weight, with 0.00391 kg PO₄ eq per kg of beef live (shrunk) weight for the calf-fed system and 0.00388 kg PO₄ eq per kg of beef live (shrunk) weight for the yearling-fed system. The main contributors to the total (and each system) include total phosphorous emission from run-off (74.6 percent of total), on-farm energy consumption activities (16.6 percent of total), total forage and cereal activities (4.6 percent of total), and feedlot and pasture activities (3.9 percent of total).

The total non-renewable energy resources consumption impact is quantified as 242.8 MJ-eq per kg of beef live (shrunk) weight, with 244.8 MJ-eq per kg of beef live (shrunk) weight for the calf-fed system and 241.3 MJ-eq per kg of beef live (shrunk) weight for the yearling-fed system. On-farm energy consumption activities (including the production, transportation, and combustion of fuels) account for the highest fraction of the total (89.6 percent) followed by total forage and cereal activities (7.9 percent). In the on-farm energy consumption category, the majority of the impact category stems from production of crude, transportation, and combustion of diesel fuel.

A direct comparison to literature values from other LCAs is complicated by the use of differing project boundaries, functional units, and precise description of assumptions utilized. A standardized methodology for producing a beef production LCA is not available at this time. As this is only a first approximation of the beef production in Alberta, the final results of the study will change over time as further refinement of the data is conducted and additional processes are identified and included.

A number of data gaps and additional refinements of information are warranted for further study, including cattle input numbers related to cow and bull culls, type and fate of international cattle inputs, and within-province movement of cattle; feedlot and pasture data relating to quantities of waste production and destination; energy usage data including specific information related to on-farm use of fuel and transportation distances for fuel movement; and additional data regarding transportation of feed, supplements, fertilizers, bedding and mortalities. Of these data gaps, it is expected that the amount of on-farm energy consumption will likely have the greatest impact on the overall life cycle results.

CRA supports a third-party review of the data and assumptions as a means of validating the approach and methodology utilized; however, CRA notes that the numerical inputs to the model will change over time as additional data becomes available, and specifically as Alberta-specific data becomes available.

As this is a first approximation for the beef production in Alberta, it is recommended that additional study be conducted on a number of items in the study in order to increase the accuracy of the results and to address the data gaps. Also, further research for more Canadian-specific emission factor data may be warranted for the next iterations.

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All of which is respectfully submitted,

CONESTOGA-ROVERS & ASSOCIATES LTD.

Stephen D. Ball, M.S., P.Eng., CEA

Janya Bogoslavil

Tej Gidda, Ph.D., P.Eng.

Itulda

A: Construction A1. Clear site A11. Excavate/grade site AF1. Construct bunkers A21. Grade site A12. Source backfill materials AF2. Construct fences and gates A13. Construct access A2. Clear access roads AF3. Construct livestock right-of-way AF4. Construct manure A14. Transport gravel A3. Extract gravel AF5. Construct feed storage A4. Mine aggregate A15. Transport cement aggregate to site A5. Produce cement machinery storage AF7. Construct watering A16. Produce steel A23. Transport steel A6. Mine iron ore Construct Pasture and Crop Fields A25. Refine crude into fuel A8. Produce crude A18. Transport crude A26. Transport fuel AP1. Construct fences and gates A19. Transmit electricity A9. Generate electricity AP2. Construct watering facilities A10. Manufacture equipment/ machinery A20. Transport equipment/ machinery

B: Operation and Maintenance

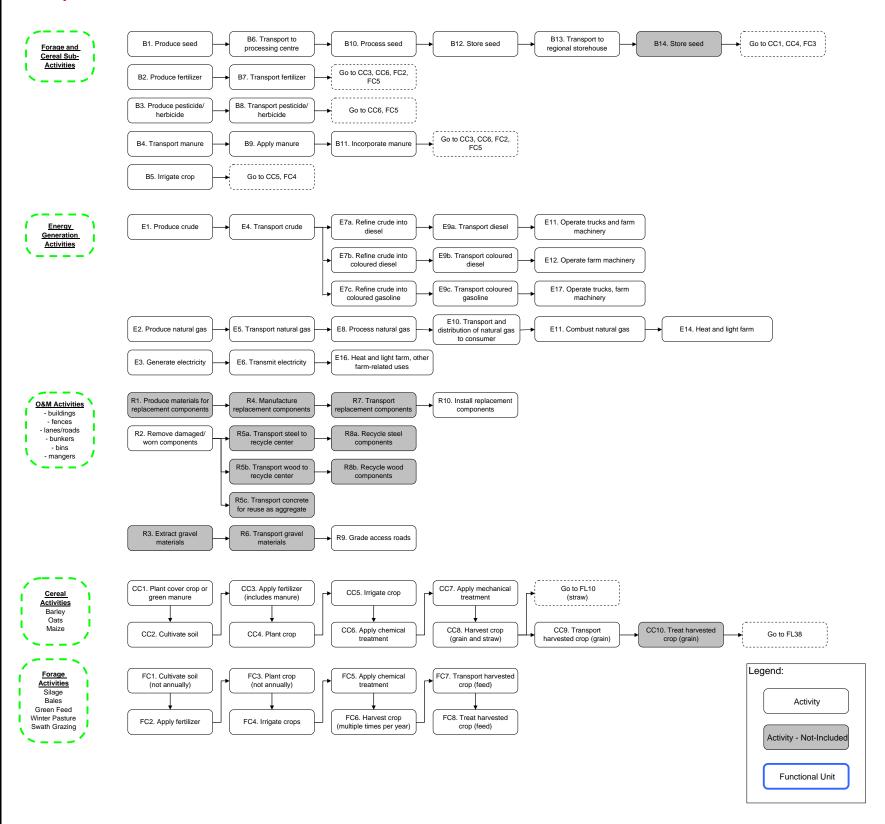
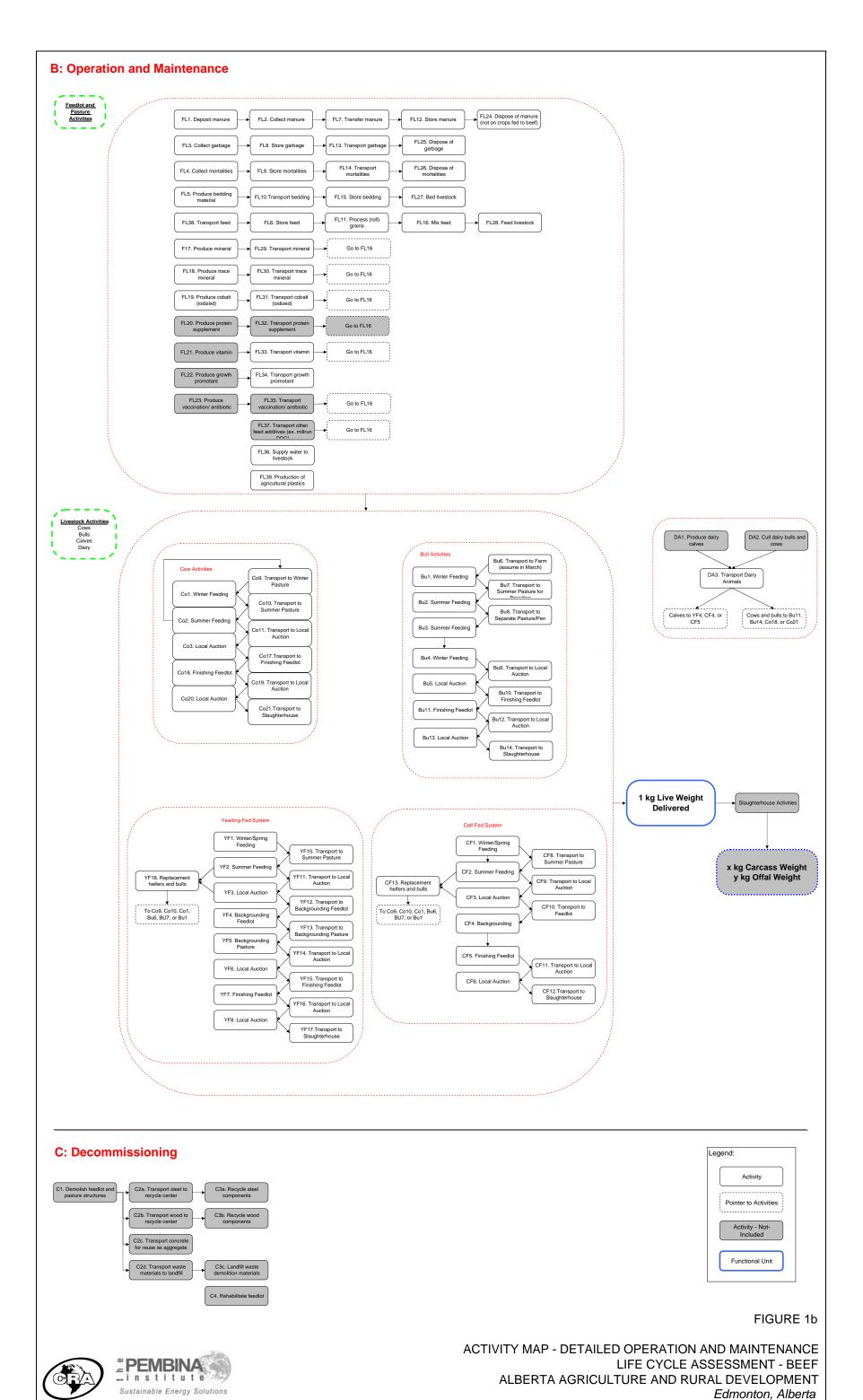


FIGURE 1a







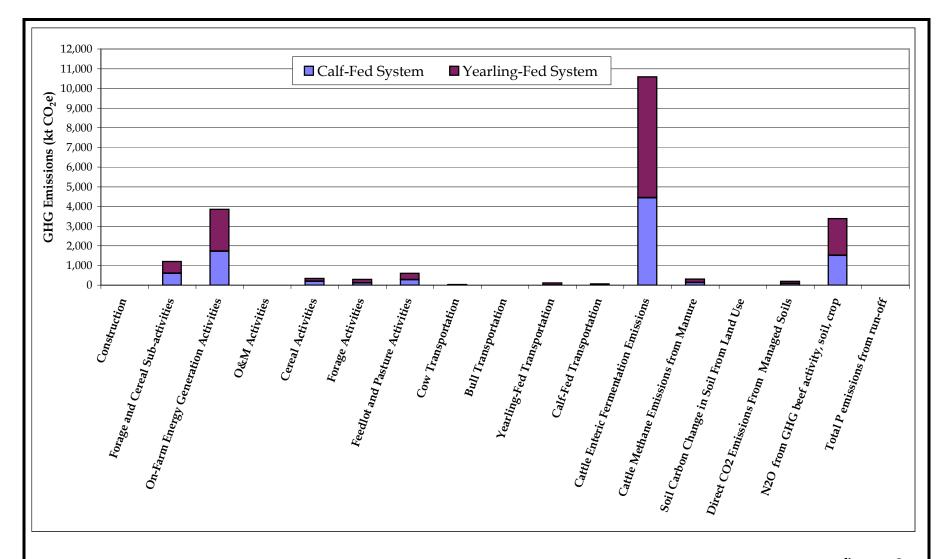


figure 2

SUMMARY OF TOTAL GHG EMISSIONS PER CALF CROP LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta





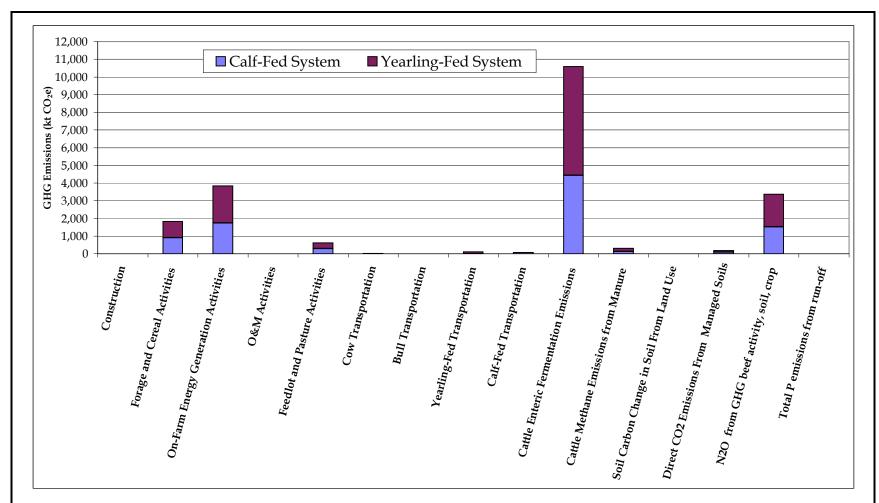
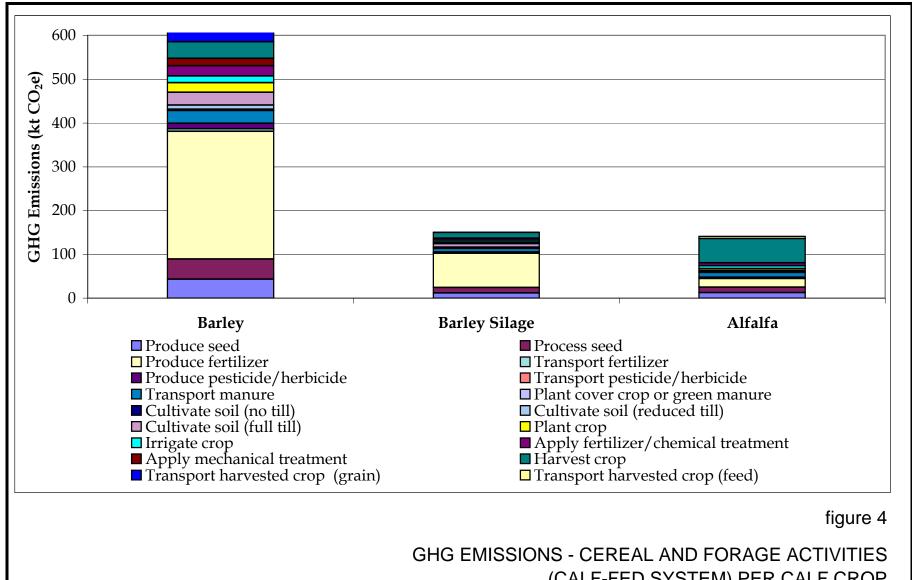


figure 3

SUMMARY OF TOTAL GHG EMISSIONS PER CALF CROP
(CEREAL AND FORAGE ACTIVITIES COMBINED)
LIFE CYCLE ASSESSMENT - BEEF
ALBERTA AGRICULTURE AND RURAL DEVELOPMENT
Edmonton, Alberta







GHG EMISSIONS - CEREAL AND FORAGE ACTIVITIES

(CALF-FED SYSTEM) PER CALF CROP

LIFE CYCLE ASSESSMENT - BEEF

ALBERTA AGRICULTURE AND RURAL DEVELOPMENT

Edmonton, Alberta





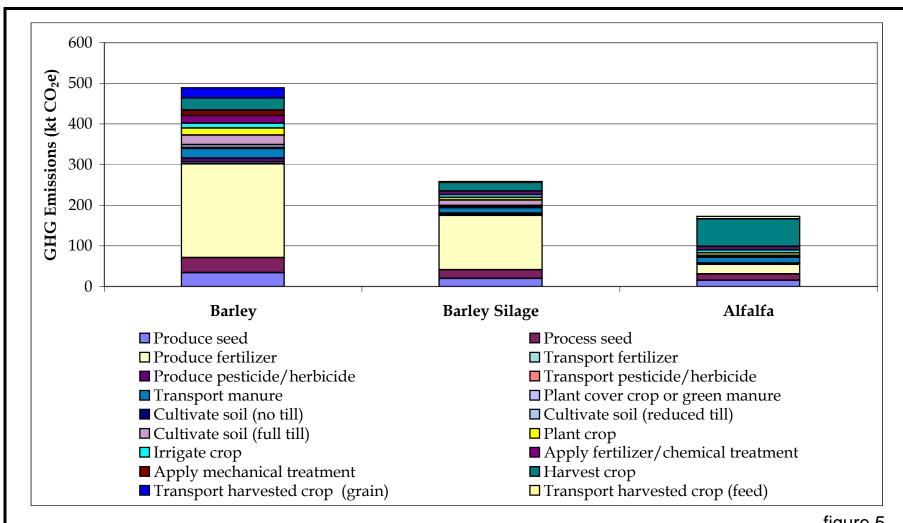


figure 5

GHG EMISSIONS - CEREAL AND FORAGE ACTIVITIES

(YEARLING-FED SYSTEM) PER CALF CROP

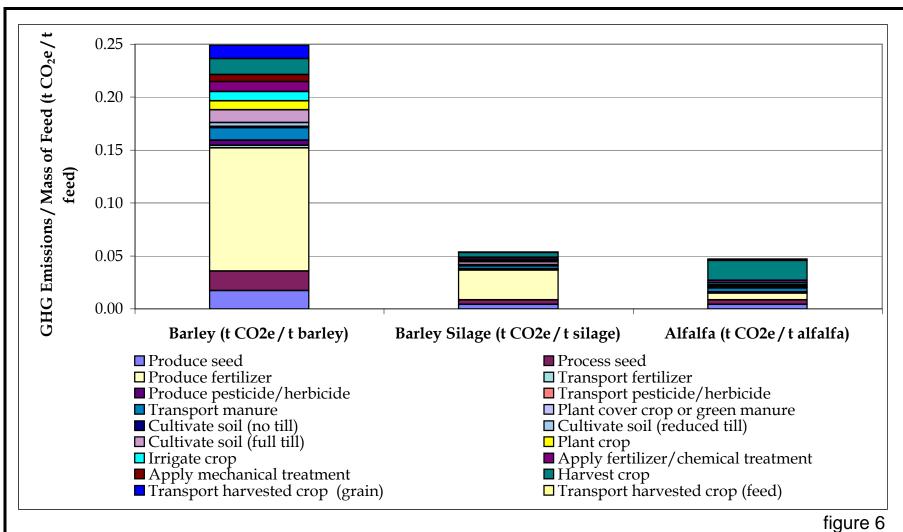
LIFE CYCLE ASSESSMENT - BEEF

ALBERTA AGRICULTURE AND RURAL DEVELOPMENT

Edmonton, Alberta







TOTAL GHG EMISSIONS PER MASS OF FEED PER CALF CROP CEREAL AND FORAGE ACTIVITIES LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta





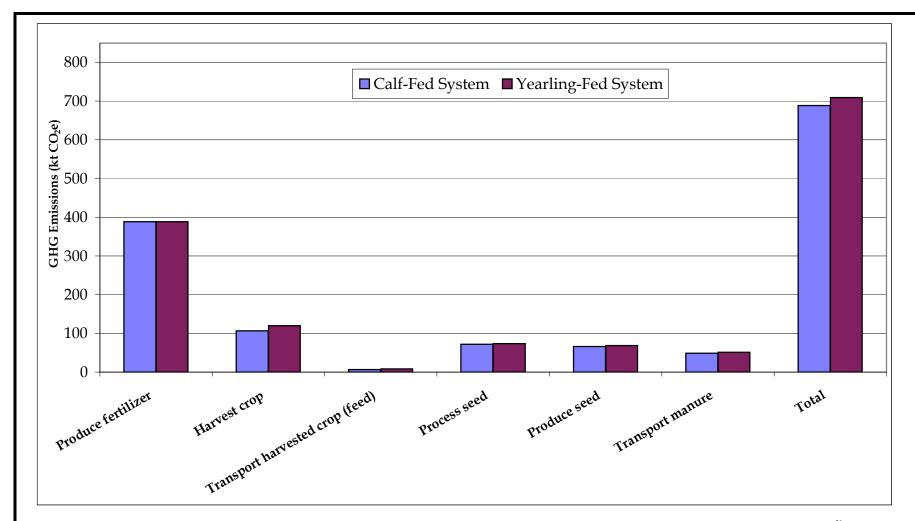


figure 7

GHG EMISSIONS PER CALF CROP - SUMMARY OF MAJOR CEREAL
AND FORAGE COMPONENTS
LIFE CYCLE ASSESSMENT - BEEF
ALBERTA AGRICULTURE AND RURAL DEVELOPMENT
Edmonton, Alberta





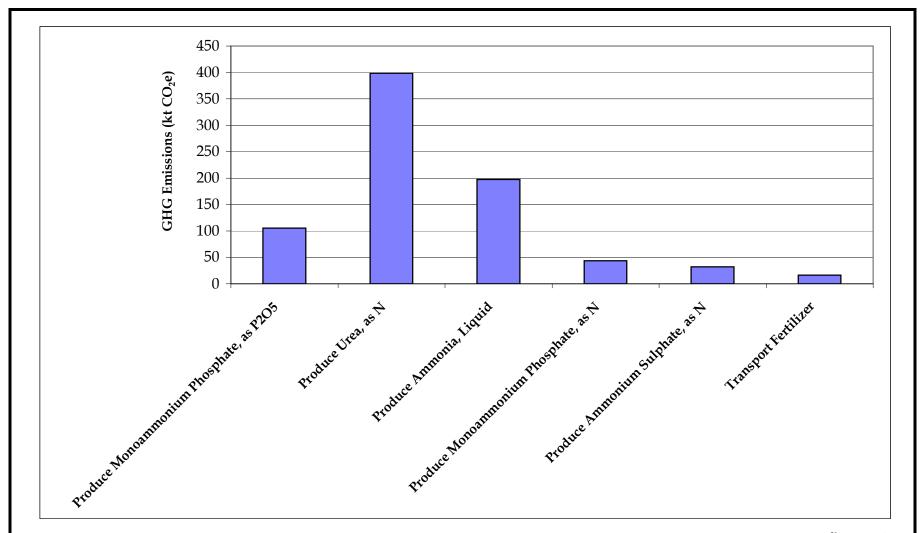


figure 8

Edmonton, Alberta

GHG EMISSIONS PER CALF CROP - SUMMARY OF FERTILIZER SUB-CATEGORIES

LIFE CYCLE ASSESSMENT - BEEF

ALBERTA AGRICULTURE AND RURAL DEVELOPMENT





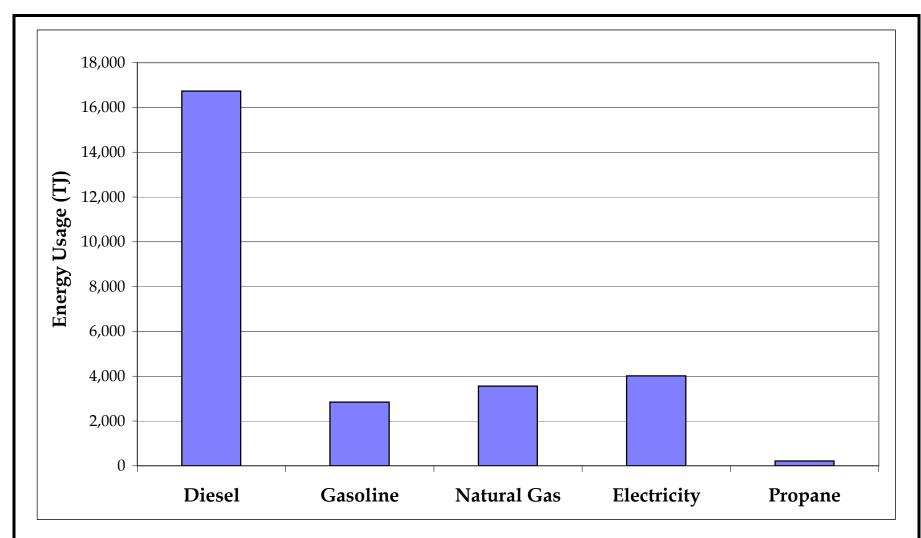


figure 9

TOTAL ON-FARM ENERGY USAGE FOR ALBERTA BEEF FARMS PER CALF CROP

LIFE CYCLE ASSESSMENT - BEEF

ALBERTA AGRICULTURE AND RURAL DEVELOPMENT

Edmonton, Alberta





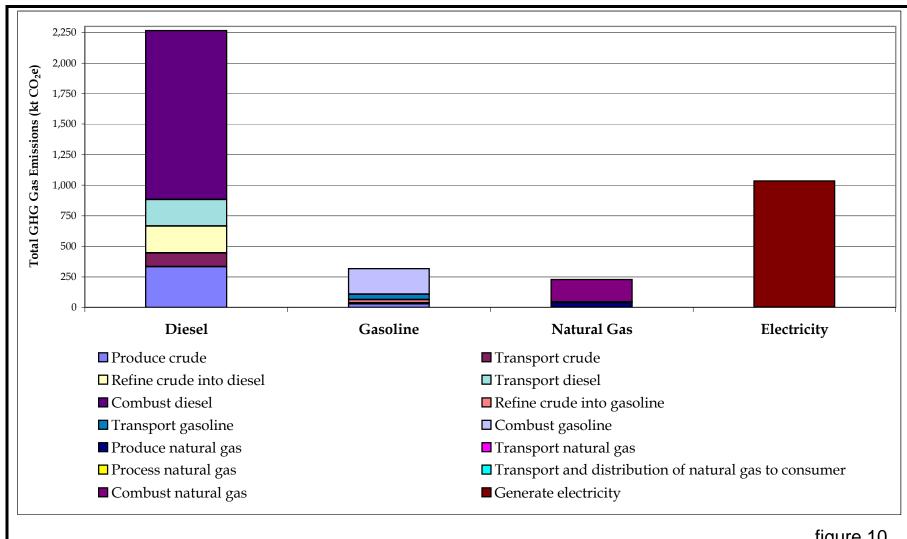


figure 10

TOTAL GHG EMISSIONS PER CALF CROP - ENERGY USAGE LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta





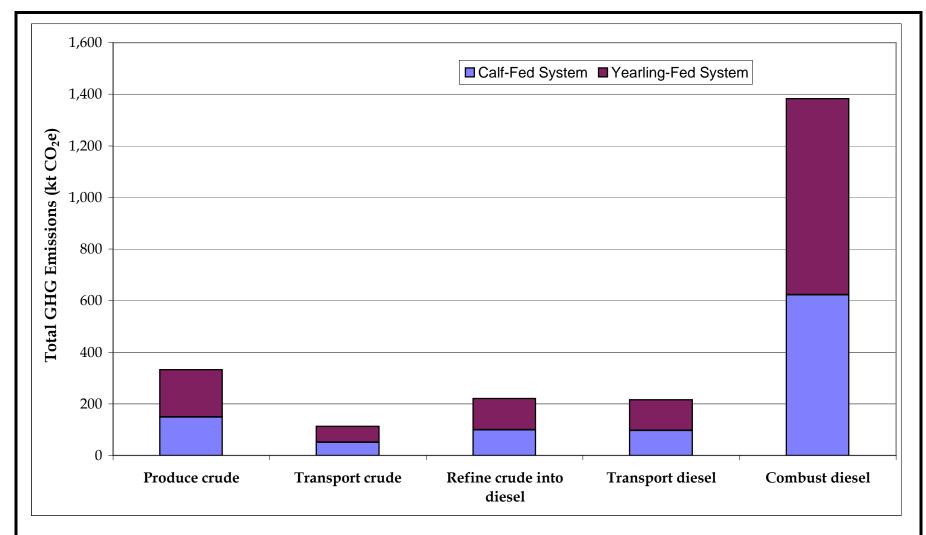


figure 11

Edmonton, Alberta

TOTAL GHG EMISSIONS PER CALF CROP - SUMMARY OF DIESEL SUB-CATEGORIES

LIFE CYCLE ASSESSMENT - BEEF

ALBERTA AGRICULTURE AND RURAL DEVELOPMENT





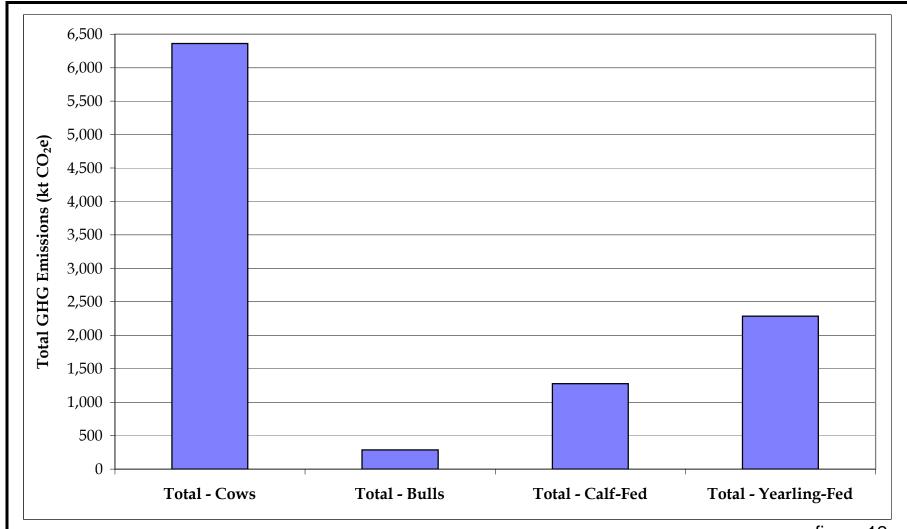


figure 12

TOTAL GHG EMISSIONS FROM ENTERIC FERMENTATION - PER CALF CROP

LIFE CYCLE ASSESSMENT - BEEF

ALBERTA AGRICULTURE AND RURAL DEVELOPMENT

Edmonton, Alberta



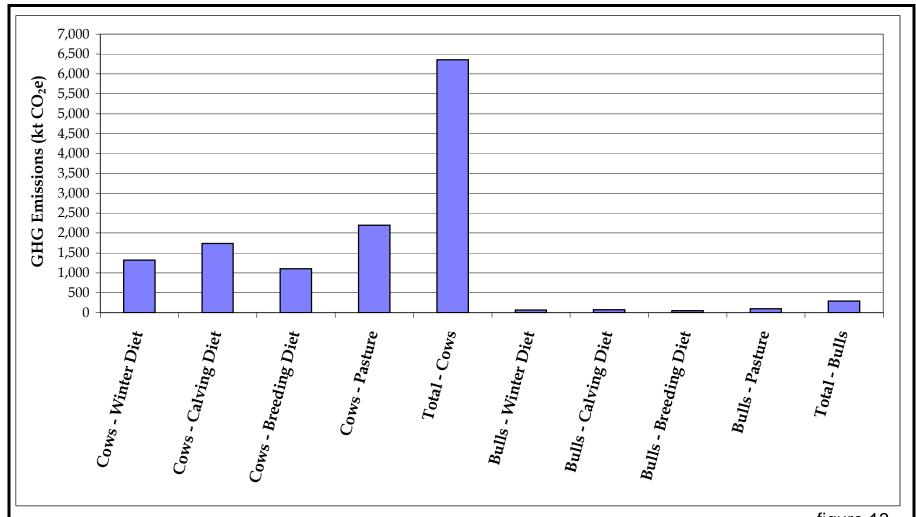


figure 13

TOTAL GHG EMISSIONS FROM ENTERIC FERMENTATION - COWS AND BULLS

PER CALF CROP

LIFE CYCLE ASSESSMENT - BEEF





ALBERTA AGRICULTURE AND RURAL DEVELOPMENT

Edmonton, Alberta

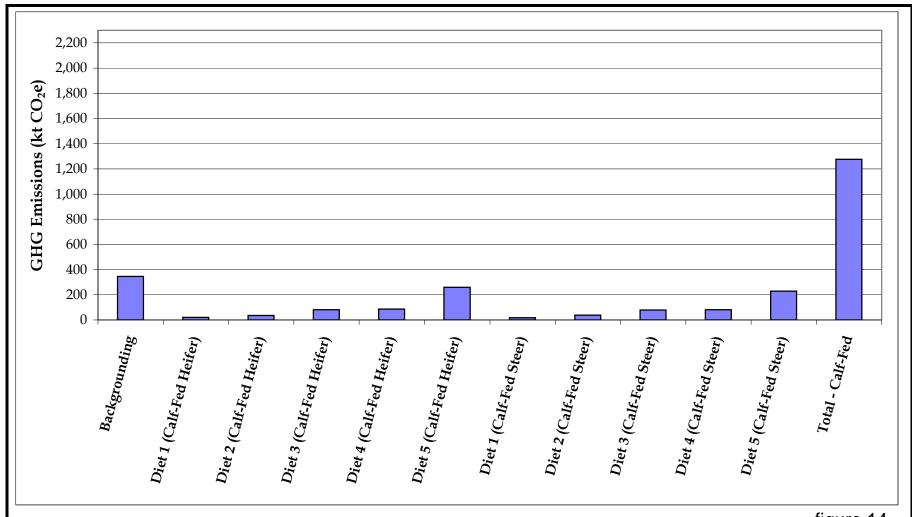


figure 14

TOTAL GHG EMISSIONS FROM ENTERIC FERMENTATION - CALF-FED SYSTEM PER CALF CROP





LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta

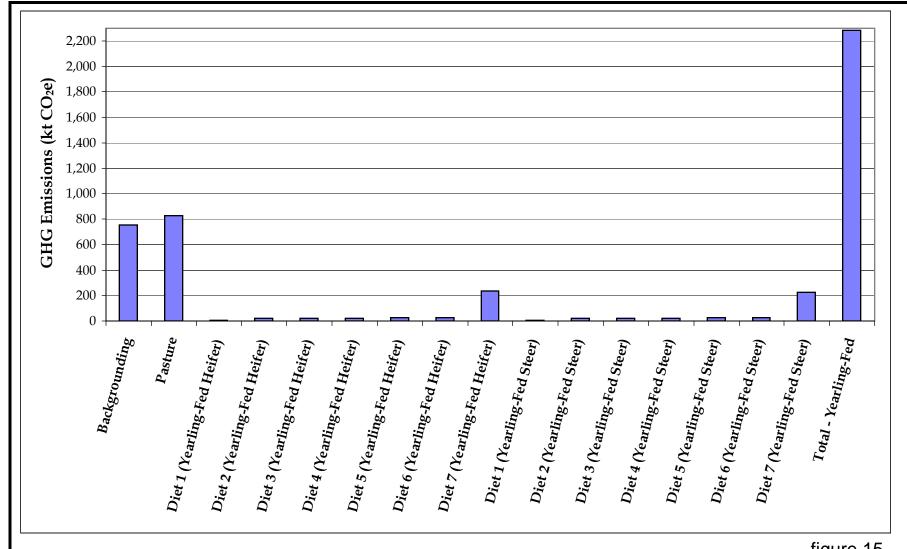


figure 15

TOTAL GHG EMISSIONS FROM ENTERIC FERMENTATION - YEARLING-FED SYSTEM
PER CALF CROP
LIFE CYCLE ASSESSMENT - BEEF

ALBERTA AGRICULTURE AND RURAL DEVELOPMENT





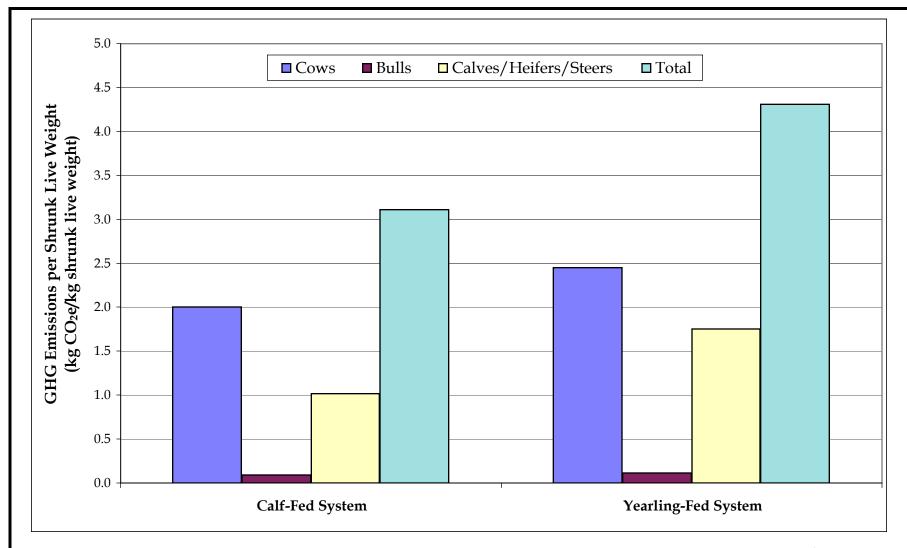


figure 16

Edmonton, Alberta

GHG EMISSIONS FROM ENTERIC FERMENTATION - CALF-FED AND YEARLING-FED
SYSTEMS PER CALF CROP
LIFE CYCLE ASSESSMENT - BEEF
ALBERTA AGRICULTURE AND RURAL DEVELOPMENT





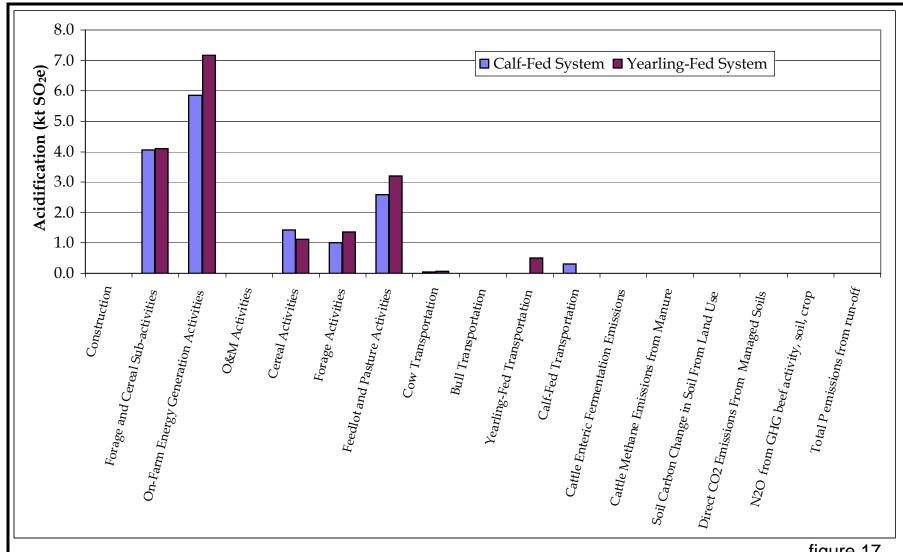
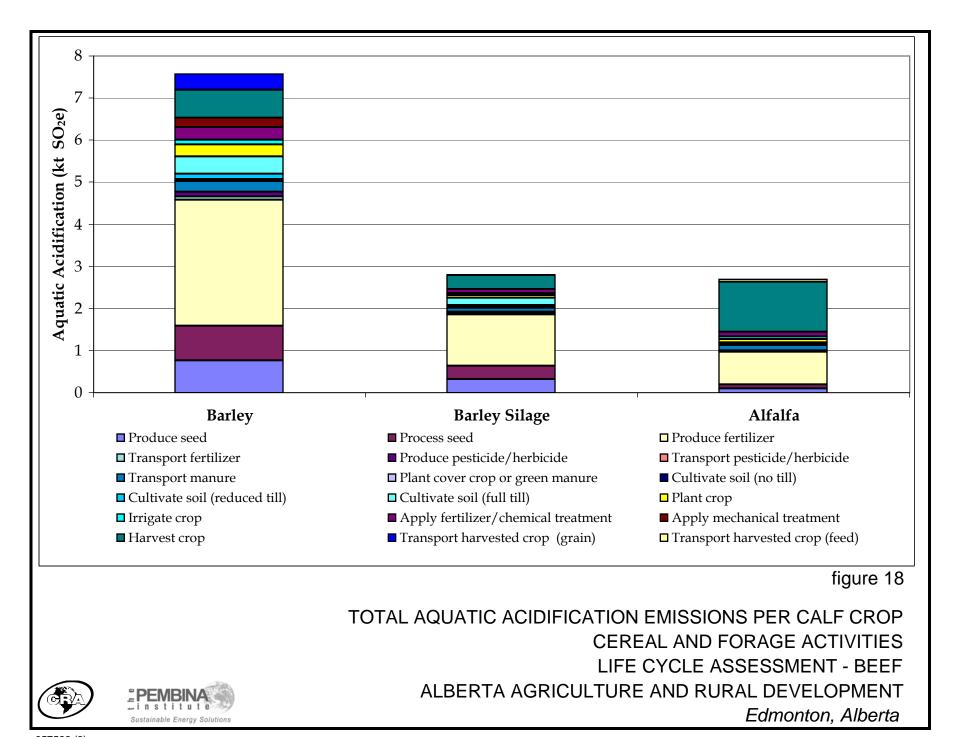


figure 17

CONTRIBUTION OF ACTIVITIES TO AQUATIC ACIDIFICATION EFFECT LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta







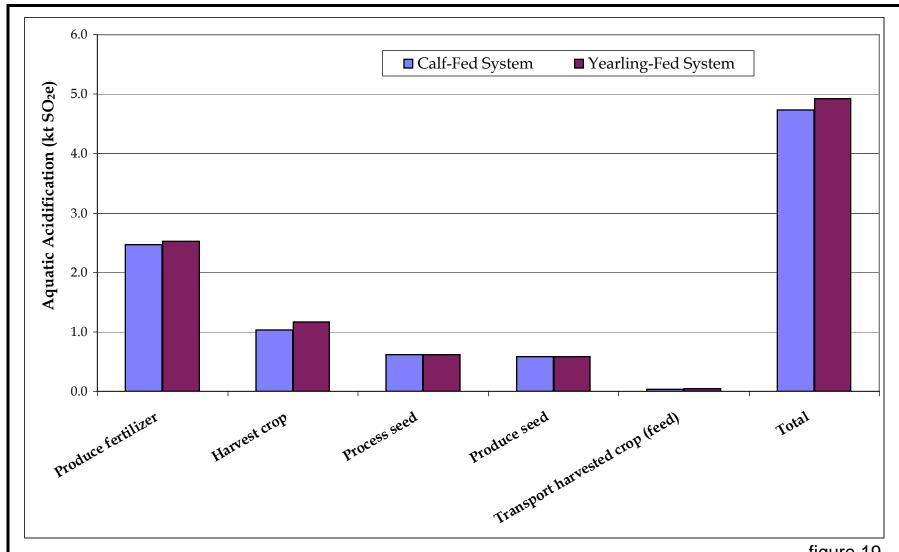


figure 19

AQUATIC ACIDIFICATION EMISSIONS PER CALF CROP - SUMMARY OF
MAJOR CEREAL AND FORAGE ACTIVITIES
LIFE CYCLE ASSESSMENT - BEEF
ALBERTA AGRICULTURE AND RURAL DEVELOPMENT
Edmonton, Alberta





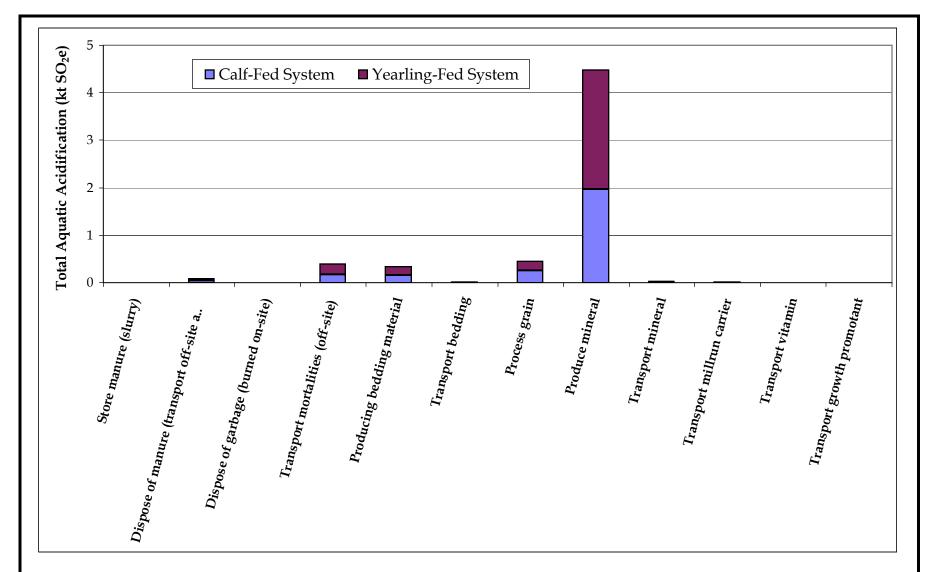
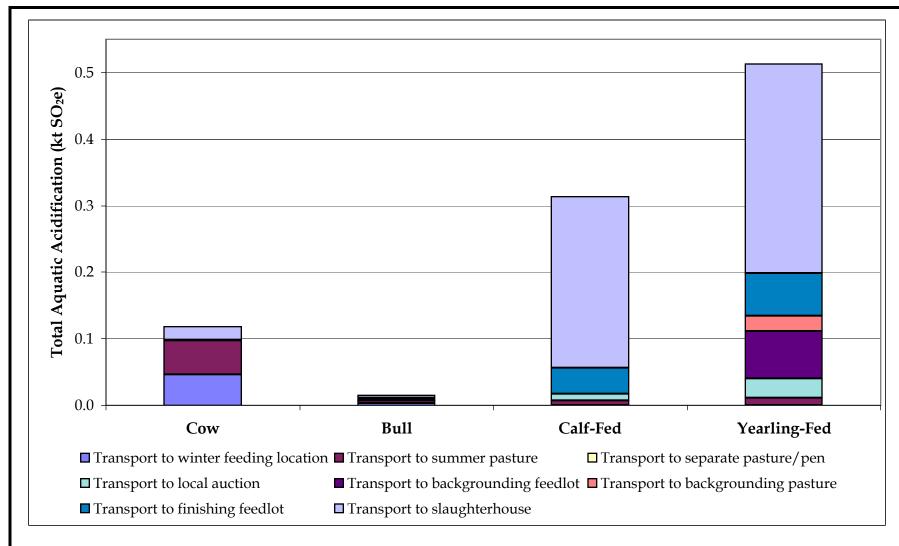


figure 20

TOTAL AQUATIC ACIDIFICATION EMISSIONS PER CALF CROP FEEDLOT AND PASTURE ACTIVITIES LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta



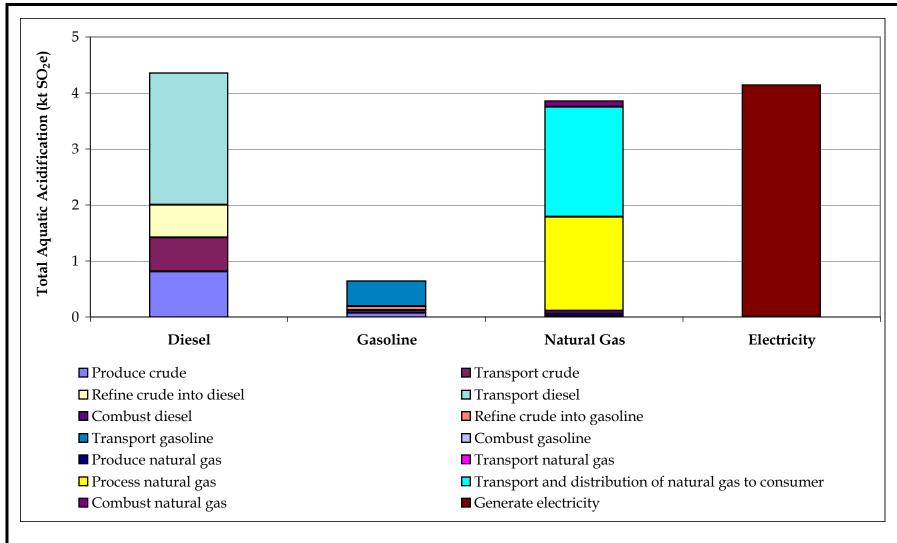




TOTAL AQUATIC ACIDIFICATION EMISSIONS PER CALF CROP
CATTLE TRANSPORTATION
LIFE CYCLE ASSESSMENT - BEEF
ALBERTA AGRICULTURE AND RURAL DEVELOPMENT
Edmonton, Alberta







TOTAL AQUATIC ACIDIFICATION EMISSIONS PER CALF CROP ENERGY CONSUMPTION
LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta





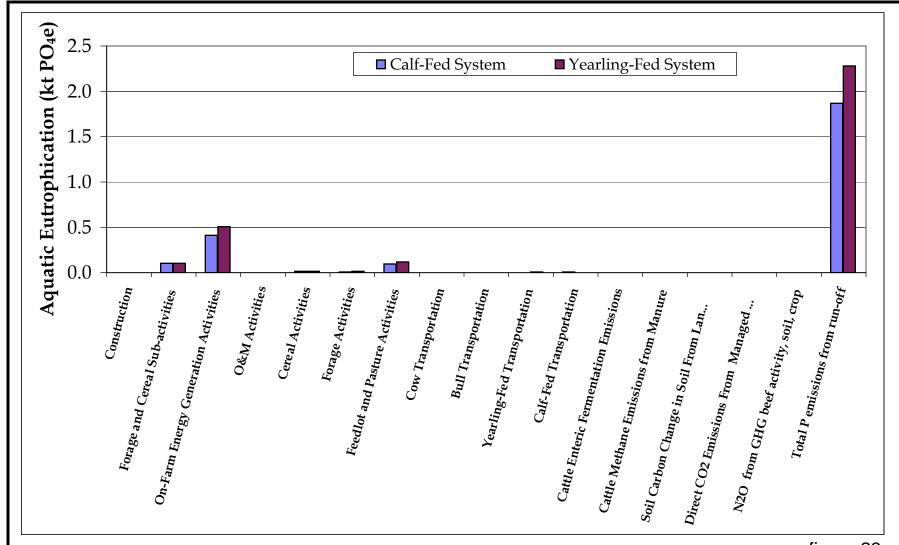
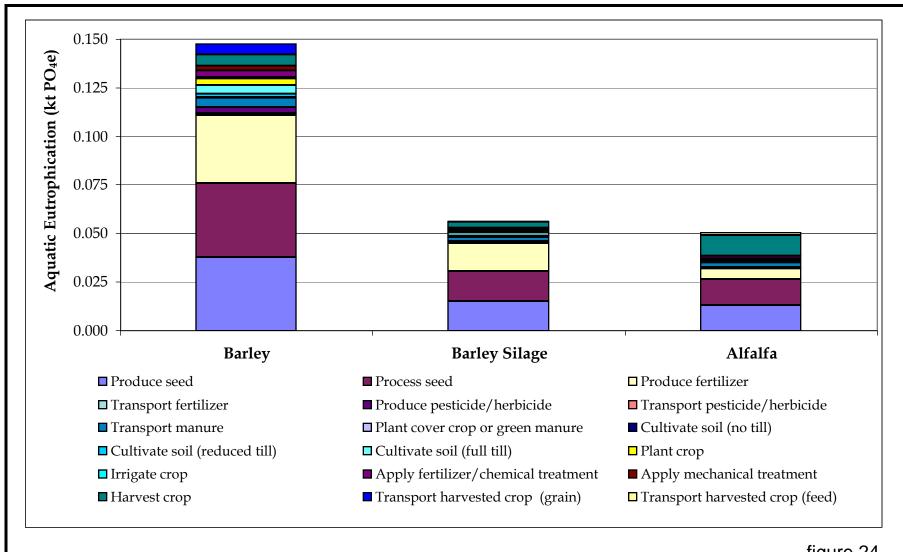


figure 23

CONTRIBUTION OF ACTIVITIES TO AQUATIC EUTROPHICATION EFFECT
LIFE CYCLE ASSESSMENT - BEEF
ALBERTA AGRICULTURE AND RURAL DEVELOPMENT
Edmonton, Alberta







TOTAL AQUATIC EUTROPHICATION EMISSIONS PER CALF CROP

CEREAL AND FORAGE ACTIVITIES

LIFE CYCLE ASSESSMENT - BEEF

ALBERTA AGRICULTURE AND RURAL DEVELOPMENT

Edmonton, Alberta





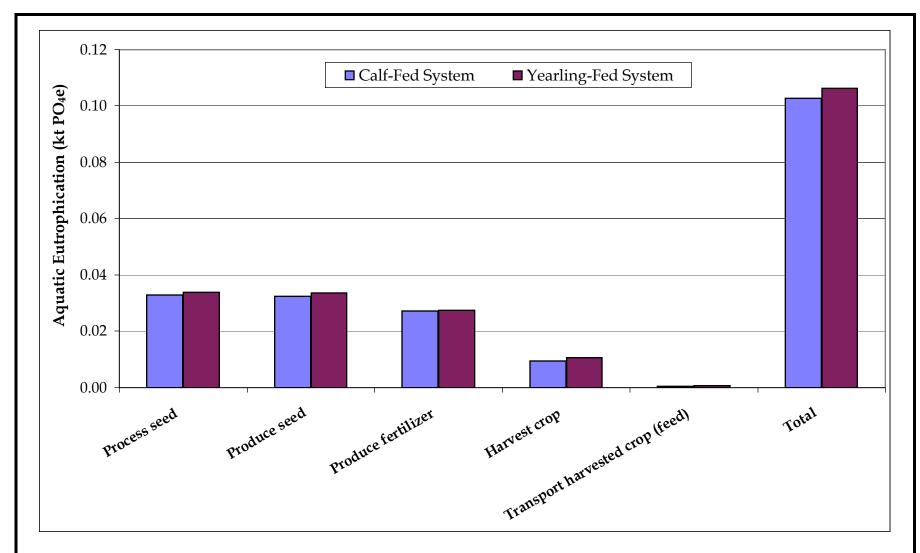


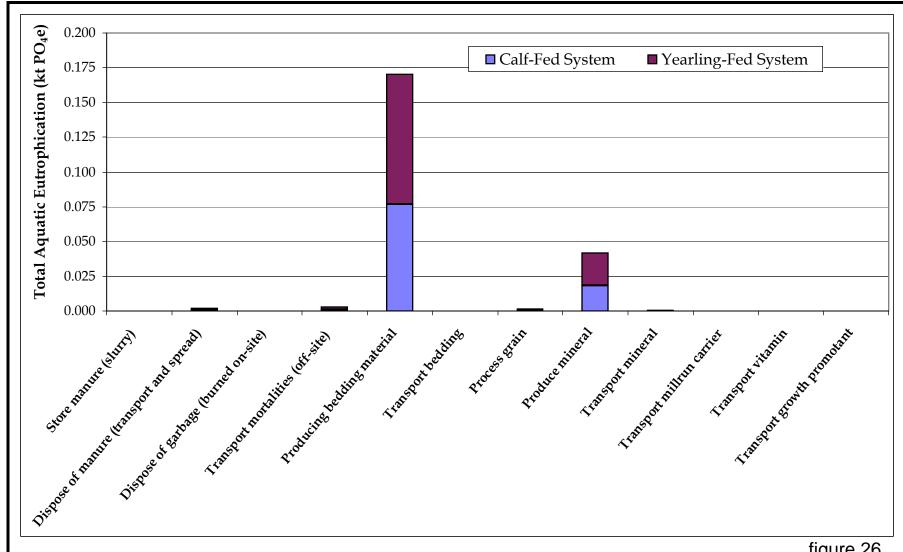
figure 25

Edmonton, Alberta

AQUATIC EUTROPHICATION EMISSIONS PER CALF CROP - SUMMARY OF MAJOR
CEREAL AND FORAGE COMPONENTS
LIFE CYCLE ASSESSMENT - BEEF
ALBERTA AGRICULTURE AND RURAL DEVELOPMENT



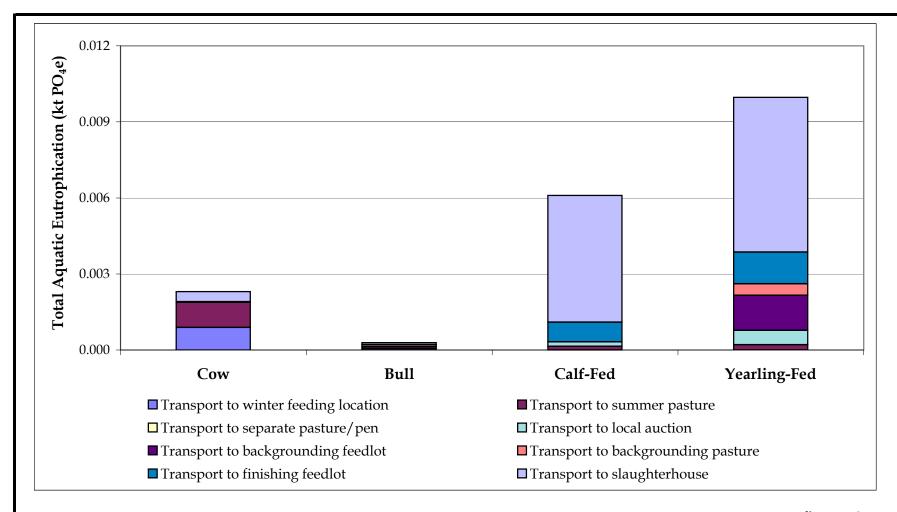




TOTAL AQUATIC EUTROPHICATION EMISSIONS PER CALF CROP FEEDLOT AND PASTURE ACTIVITIES LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta







TOTAL AQUATIC EUTROPHICATION EMISSIONS PER CALF CROP

CATTLE TRANSPORTATION

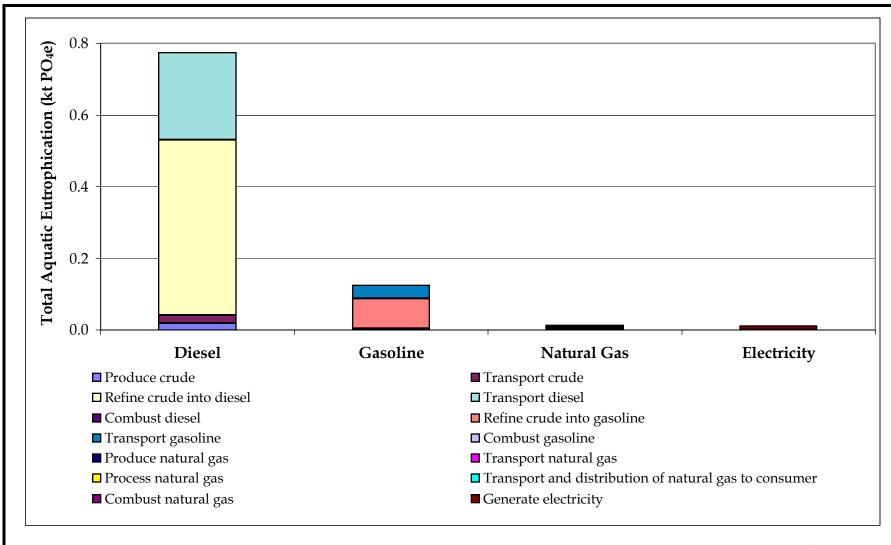
LIFE CYCLE ASSESSMENT - BEEF

ALBERTA AGRICULTURE AND RURAL DEVELOPMENT

Edmonton, Alberta



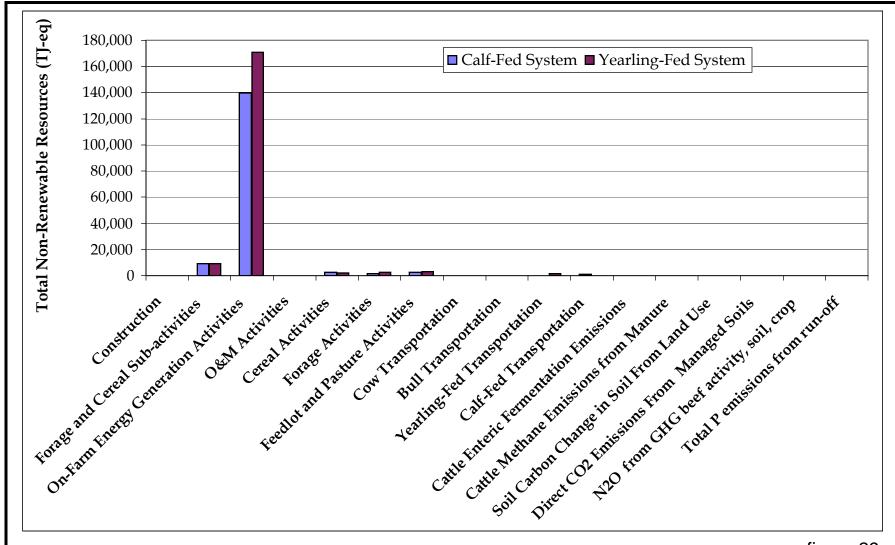




TOTAL AQUATIC EUTROPHICATION EMISSIONS PER CALF CROP ENERGY CONSUMPTION
LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta



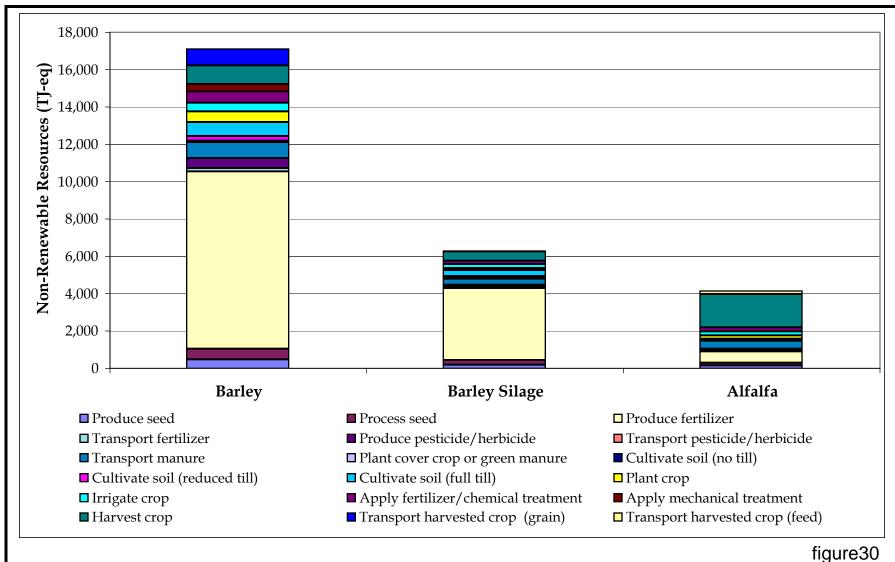




CONTRIBUTION OF ACTIVITIES TO NON-RENEWABLE
ENERGY CONSUMPTION EFFECT
LIFE CYCLE ASSESSMENT - BEEF
ALBERTA AGRICULTURE AND RURAL DEVELOPMENT
Edmonton. Alberta







TOTAL NON-RENEWABLE ENERGY RESOURCES EMISSIONS PER CALF CROP CEREAL AND FORAGE ACTIVITIES LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta





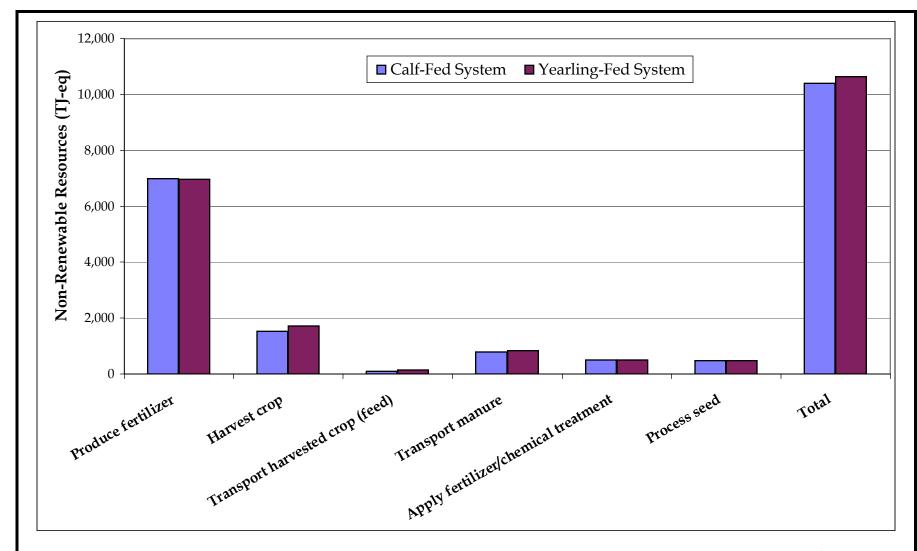
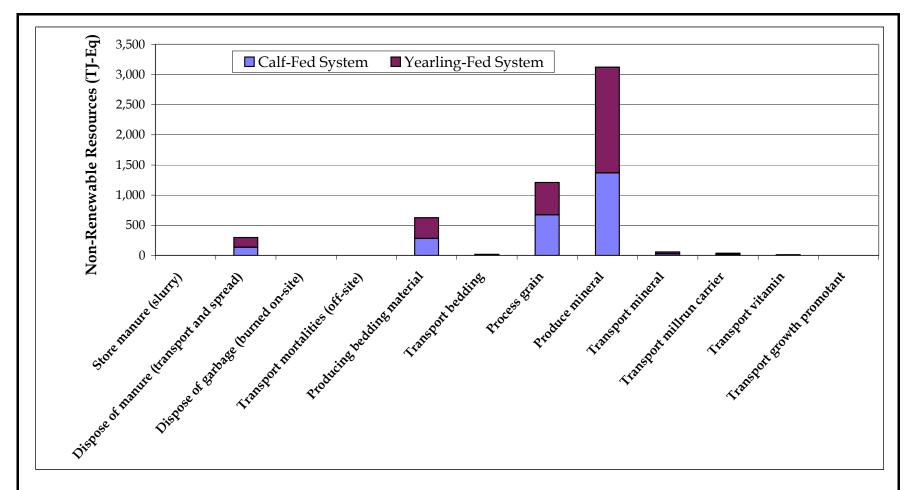


figure 31

NON-RENEWABLE ENERGY RESOURCES EMISSIONS PER CALF CROP SUMMARY OF MAJOR CEREAL AND FORAGE COMPONENTS LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta







TOTAL NON-RENEWABLE ENERGY RESOURCES EMISSIONS PER CALF CROP FEEDLOT AND PASTURE ACTIVITIES LIFE CYCLE ASSESSMENT - BEEF ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta





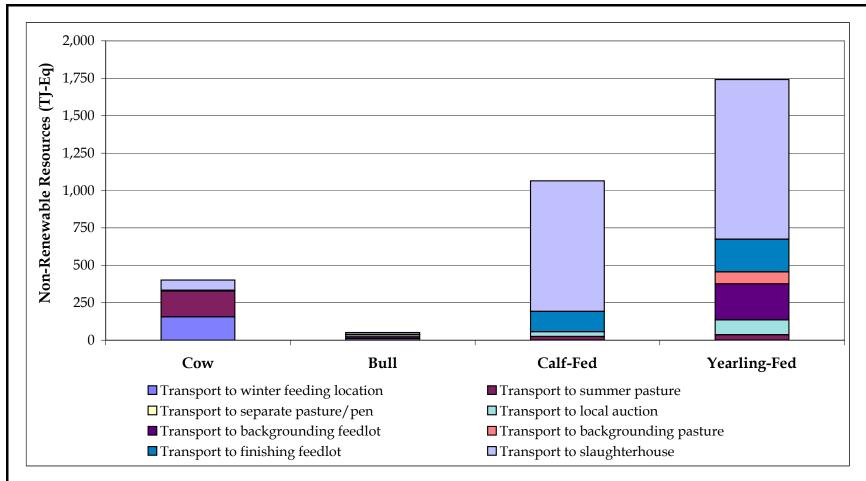
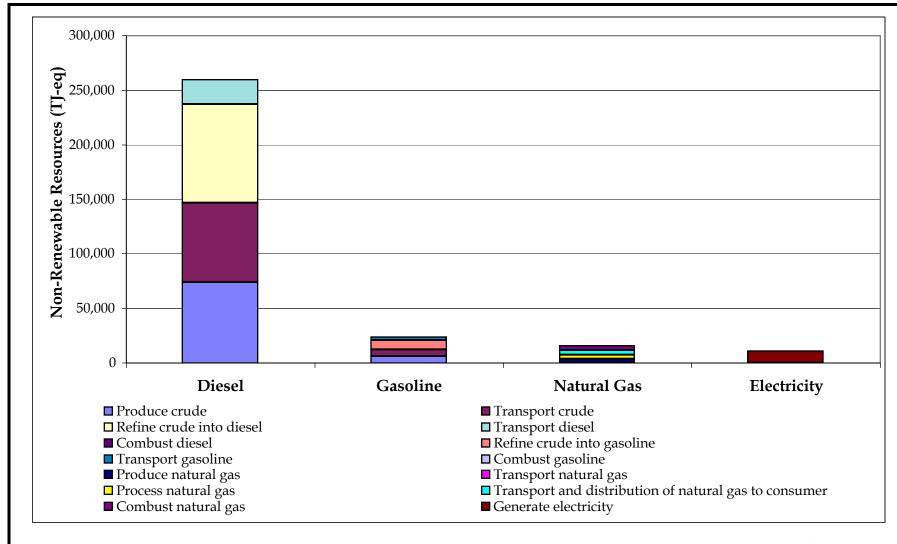


figure 33

TOTAL NON-RENEWABLE ENERGY RESOURCES EMISSIONS PER CALF CROP
CATTLE TRANSPORTATION
LIFE CYCLE ASSESSMENT - BEEF
ALBERTA AGRICULTURE AND RURAL DEVELOPMENT
Edmonton, Alberta







TOTAL NON-RENEWABLE ENERGY RESOURCES EMISSIONS PER CALF CROP
ENERGY GENERATION
LIFE CYCLE ASSESSMENT - BEEF
ALBERTA AGRICULTURE AND RURAL DEVELOPMENT
Edmonton, Alberta





SUMMARY OF LITERATURE REVIEW OF BEEF LCAS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Study | GHG Emissions | Comments |
|-------------------------------|--|--|
| Cederberg et al. (2009) | 28 kg CO ₂ (eq) / kg CWE | Estimated for the average Brazilian beef production in 2005 approximately at the farmgate. The emissions are generated by primary production and do not include emissions from land use changes. |
| Cederberg et al. (2009) | 41 kg CO ₂ (eq)/ kg BFB | Estimated for the entire life cycle of Brazilian beef, from primary production via slaughterhouse and transports to Europe (Stockholm). |
| Ogino et al. (2007) | 4550 kg CO ₂ (eq) | The total contributions of one beef calf throughout its life cycle to global warming. |
| Casey and Holden (2006a) | 13.0 kg CO ₂ (eq)/kg LW beef/yr | The average emissions per kilogram of live weight beef from the conventional farms units. The system was based on the physical limits of the beef units, from crops, to livestock and manure management. |
| Casey and Holden (2006a) | 12.2 kg CO ₂ (eq)/kg LW beef/yr | The average emissions per kilogram of live weight beef from the agri-environmental farms units. The system was based on the physical limits of the beef units, from crops, to livestock and manure management. |
| Casey and Holden (2006a) | 11.1 kg CO ₂ (eq)/kg LW beef/yr | The average emissions per kilogram of live weight beef from the organic farms units. The system was based on the physical limits of the beef units, from crops, to livestock and manure management. |
| Casey and Holden (2006b) | 11.26 kg CO ₂ (eq)/kg LW beef/yr | For the typical suckler-beef production system. |
| Ogino et al. (2004) | 32.3 kg CO ₂ (eq)/kg | Beef gain during the fattening stage of the animal (based on a beef yield of 40%). The estimate did not account for whole system emissions (source cow is excluded). |
| Cederberg and Darelius (2002) | 17 kg CO ₂ (eq)/kg (bone and fat free meat) | For animals supplied from a dairy herd. Most of the feed ingredients were grown on the farm and therefore had no transport or processing. The functional unit encompassed the entire 576 days of an animal's life. |
| Subak (1999) | 7.4 kg CO ₂ (eq)/ kg/ (LW)/ yr | 4396 kg CO_2 (eq) from a US feed lot system producing a 550 kg animal that is equivalent to 7.4 kg CO_2 (eq)/ kg/ (LW)/yr, excluding the cow phase. |

SUMMARY OF LITERATURE REVIEW OF BEEF LCAs ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

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EMISSION FACTORS, AGGREGATION, AND CHARACTERIZATION FACTORS FOR LCIA CATEGORIES ALBERTA AGRICULTURE AND RURAL DEVELOPMENT

EDMONTON, ALBERTA

TABLE 2

| | Environmental Category | Environmental Subcategory | LCIA unit | Eq factor | Eq units |
|---|---------------------------|--|-----------|-----------|--------------------|
| GWP, 100, IPCC 2007 (IPCC 2007) | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO ₂ |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO ₂ |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO ₂ |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO ₂ |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO ₂ |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO ₂ |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO ₂ |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO ₂ |
| Chloroform | air | high population density | kg | 30 | kg CO ₂ |
| Chloroform | air | low population density | kg | 30 | kg CO ₂ |
| Chloroform | air | unspecified | kg | 30 | kg CO ₂ |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO ₂ |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO ₂ |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO ₂ |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO ₂ |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO ₂ |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO ₂ |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO ₂ |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO ₂ |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO ₂ |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO ₂ |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO ₂ |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-11 | air | low population density | kg | 10000 | kg CO ₂ |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO ₂ |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO ₂ |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO ₂ |
| Methane, biogenic | air | high population density | kg | 25 | kg CO ₂ |
| Methane, biogenic | air | low population density | kg | 25 | kg CO ₂ |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO ₂ |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO ₂ |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO ₂ |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO ₂ |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO ₂ |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO ₂ |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO ₂ |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO ₂ |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO ₂ |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO ₂ |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO ₂ |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO ₂ |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO ₂ |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO ₂ |
| Methane, fossil | air | high population density | kg | 25 | kg CO ₂ |
| Methane, fossil | air | low population density | kg | 25 | kg CO ₂ |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO ₂ |

TABLE 2

EMISSION FACTORS, AGGREGATION, AND CHARACTERIZATION FACTORS FOR LCIA CATEGORIES ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Environmental Category | Environmental Subcategory | LCIA unit | Eq factor | Eq units | |
|--|---|-----------------------------------|----------------------------|-----------|------------------------|--|
| Methane, fossil | air | unspecified | kg | 25 | kg CO ₂ | |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO ₂ | |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO ₂ | |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO ₂ | |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO ₂ | |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO ₂ | |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO ₂ | |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO ₂ | |
| Sulfur hexafluoride | hexafluoride air low population density | | kg | 22800 | kg CO ₂ | |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO ₂ | |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO ₂ | |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO ₂ | |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO ₂ | |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO ₂ | |
| 1 Mirogen marine | , | | 1.6 | | 16 002 | |
| Aquatic acidification, IMPACT 2002+ (Jol | iet et al, 2002) | | | L | - | |
| Ammonia | air | high population density | kg | 1.88 | kg SO ₂ -Eq | |
| Ammonia | air | low population density | kg | 1.88 | kg SO ₂ | |
| Ammonia | air | unspecified | kg | 1.88 | kg SO ₂ | |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO ₂ | |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO ₂ | |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO ₂ | |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO ₂ | |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO ₂ | |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO ₂ | |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO ₂ | |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO ₂ | |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO ₂ | |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO ₂ | |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO ₂ | |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO ₂ | |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO ₂ | |
| Sulfur dioxide | air | low population density | | 1 | kg SO ₂ | |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO ₂ | |
| Hydrogen sulfide | water | river | kg | 1.88 | | |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO ₂ | |
| | | | kg | 0.03 | kg SO ₂ | |
| Phosphoric acid | air | low population density | high population density kg | | kg SO ₂ | |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO ₂ | |
| Aquatic eutrophication, IMPACT 2002+ (J | oliet et al, 2002) | | 1 | | <u> </u> | |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4 | |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4 | |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4 | |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4 | |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4 | |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4 | |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4 | |

EMISSION FACTORS, AGGREGATION, AND CHARACTERIZATION FACTORS FOR LCIA CATEGORIES ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Environmental Category | Environmental Subcategory | LCIA unit | Eq factor | Eq units |
|--|---------------------------|---------------------------|-----------------|-----------|----------|
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4 |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4 |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4 |
| Phosphate | water | river | kg | 1 | kg PO4 |
| Phosphorus | water | river | kg | 3.06 | kg PO4 |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4 |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4 |
| Non-renewable resources and energy consump | tion, IMPACT 200 | 2+ (Joliet et al, 2002) | | | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm ³ | 39.8 | MJ |
| Gas, natural, in ground | resource | in ground | Nm ³ | 38.293 | MJ |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ |

Notes:

kg - kilogram

MJ - Megajoules

Nm³ - Normalized cubic metres

CO2 - carbon dioxide

PO4 - phosphate

SO2 - sulphur dioxide

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SUMMARY OF DATA AND REFERENCE YEAR ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Category | Year |
|---|------------------------|
| Alberta Cattle Information | |
| Alberta Cattle Numbers | 2001, 2002 |
| Carcass Weights | 2001, 2008 |
| Cattle Sales Method (%) | 1986, 1989 |
| Cattle Transportation (Imports and Export Numbers) | 2009 |
| Alberta Slaughtered Cattle and Calves | 2001, 2002, 2007, 2008 |
| Feedlot and Slaughterhouse Locations and Capacities | 2008 |
| Forage, Cereal, etc. | |
| Field crops, yield | 2008 |
| Seeding Rates | 2007 |
| Tillage Practices | 2001, 2006 |
| Fertilizer Needs | 2008 |
| Fertilizer Application Methods | 2001 |
| Manure | |
| Manure Generation | 2001 |
| Manure Treatment Methods | 2001 |
| Garbage | |
| Garbage Generation | 2008 |
| Garbage Management Methods | 2008 - 2009 |
| Mortalities | |
| Mortality Rates | 2002 |
| Mortality Disposal Methods | 2009 |
| Energy Usage on Farms | 1997 |
| Bedding | 2004 - 2009 |
| Water Consumption | 2000 |
| Transportation | |
| Cereal and Grain Transportation | 1997/1998, 2008 |
| Forage Transportation | Assumed values |
| Mineral Transportation | |
| Growth promotant Transportation | |
| Pesticide Transportation | |
| Materials Transportation | |
| Bedding Transportation | |
| Mortalities Transportation | |
| Vitamin Transportation | |
| Manure Transportation | 2009 |
| Fertilizer Transportation | 2009 |
| Animal Transportation | 2006 - 2009 |

BREAKDOWN OF BEEF CATTLE POPULATION NUMBERS ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

Breakdown of Cows (2001)

| Cow herd (January) | 2,099,288 |
|-----------------------------------|-----------|
| Replacement heifers | 359,291 |
| Mortalities | 24,586 |
| Dairy cows entering beef system | 4,202 |
| Dairy cow culls to slaughterhouse | 18,364 |
| Exported cows | 23,658 |
| Slaughtered cows | 217,408 |

Breakdown of Bulls (2001)

| Bull herd (January) | 96,200 |
|------------------------------------|--------|
| Replacement bulls | 13,228 |
| Mortalities | 1,094 |
| Dairy bull culls to slaughterhouse | 98 |
| Exported bulls | 16,237 |
| Slaughtered bulls | 4,180 |

Breakdown of Calf-Fed Calves (May 1, 2001 - October 26, 2002)

| Calves born in May 2001 | 951,001 |
|-------------------------------------|---------|
| Calves deemed for replacement | 117,282 |
| Pre-weaning mortalities | 19,600 |
| Backgrounding mortalities | 23,077 |
| Feedlot mortalities | 11,308 |
| Dairy calves to calf-fed system | 1,266 |
| Feedlot imports | 238,973 |
| Feedlot exports | 46,765 |
| Slaughterhouse imports | 8,198 |
| Slaughterhouse exports | 168,064 |
| Slaughtered calf-fed system animals | 959,612 |

Breakdown of Yearling-Fed Calves (May 1, 2001 - January 2, 2003)

| Calves born in May 2001 | 1,162,340 |
|---|-----------|
| Calves deemed for replacement | 143,345 |
| Pre-weaning mortalities | 23,955 |
| Backgrounding mortalities | 28,206 |
| Feedlot mortalities | 13,821 |
| Dairy calves to yearling-fed system | 1,547 |
| Feedlot imports | 292,078 |
| Feedlot exports | 57,158 |
| Slaughterhouse imports | 10,020 |
| Slaughterhouse exports | 205,411 |
| Slaughtered yearling-fed system animals | 1,172,859 |

BREAKDOWN OF BEEF CATTLE POPULATION NUMBERS ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

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TABLE 5

SUMMARY OF SLAUGHTERED CATTLE NUMBERS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Total Number Slaughtered | | | | Weight Leaving Feedlot | Shrunk Live Weight at Slaughterhouse | Total Shrunk Weight at Slaughterhouse | Calf-Fed System Total Shrunk Weight at Slaughterhouse | Yearling-Fed System Total Shrunk Weight at Slaughterhouse |
|----------------------|-----------------------------|---------|------|------|---------------------------|--|---|---|---|
| | 2001 | 2002 | (kg) | (kg) | (kg) | (kg) | (kg) | | |
| Cows | 217,408 | 0 | 606 | 581 | 126,384,484 | 56,873,018 | 69,511,466 | | |
| Bulls | 4,180 | 0 | 998 | 958 | 4,004,386 | 1,801,974 | 2,202,412 | | |
| Calf-Fed Steers | 0 | 442,380 | 658 | 631 | 279,318,695 | 125,693,413 | 153,625,282 | | |
| Calf-Fed Heifers | 0 | 517,232 | 612 | 588 | 304,057,765 | 136,825,994 | 167,231,771 | | |
| Yearling-Fed Steers | 0 | 540,686 | 658 | 631 | 341,389,516 | 153,625,282 | 187,764,234 | | |
| Yearling-Fed Heifers | 0 | 632,172 | 612 | 588 | 371,626,157 | 167,231,771 | 204,394,386 | | |
| TOTAL | | | | | 1,426,781,002 | 642,051,451 | 784,729,551 | | |

Notes

Weight leaving feedlot as provided by ruminant nutritionist based on rations.

It is understood that yearling-fed animals are typically heavier than calf-fed animals at the feedlot, however, the values as calculated by the nutritionist based on the rations have been used.

Shrunk live weight at the slaughterhouse was based on 4% reduction in weight from the feedlot to the slaughterhouse.

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TABLE 6

EXAMPLE CALCULATION OF CATTLE * DAYS FOR COWS ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Stage / Feeding Period | Total # of Cows | Days Per Stage/ Feeding Period | Cattle * Days | |
|---|---------------------------------------|-----------------------------------|---------------|--|
| Winter feeding | 2,458,579 | 59 | 145,056,161 | |
| (cows and replacement heifers) | 2,436,379 | 39 | 143,036,161 | |
| Calving | 2,458,579 | 92 | 226,189,268 | |
| Breeding | 2,458,579 | 61 | 149,973,319 | |
| Transport to summer pasture | 2,458,579 | 1 | 2,458,579 | |
| Summer pasture | 2,458,579 | 121 | 297,488,059 | |
| Transport to winter feeding location | 2,211,291 | 1 | 2,211,291 | |
| Winter feeding | 2,211,291 | 30 | 66,338,730 | |
| Transport to local auction from winter feeding location | 8,623 | 1 | 8,623 | |
| Local Auction | 8,623 | 2 | 17,246 | |
| Transport to finishing feedlot (from auction, directly from winter feeding location, exports, cattle from dairy system) | 12,319 | 1 | 12,319 | |
| Finishing feedlot | 9,952 | 22 | 218,944 | |
| Transport to local auction | 498 | 1 | 498 | |
| Local auction | 498 | 2 | 996 | |
| Transport to slaughterhouse | | | | |
| (from auction, directly from feedlot to slaughterhouse, directly from cow/calf operation to slaughterhouse, exports, and dairy culls) | 220,336 | 2 | 440,672 | |
| Total slaughtered cows in Alberta (2001) | 217,408 | | | |
| TOTAL CATTLE * DAYS | · · · · · · · · · · · · · · · · · · · | I | 890,414,696 | |

TABLE 7

SUMMARY OF TOTAL GHG EMISSIONS FROM ENTERIC FERMENTATION BASED ON DIET ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | | No. of Days on Diet | Average Weight | Methane Emission Factor (kg CH _d / head/day) | Total Methane Emissions (kg CH_4) | Methane Emissions per Shrunk Live Weight (kg CH4/ kg shrunk live weight) | GHG Emissions per Shrunk Live Weight (kg CO2 _{e/} kg shrunk live weight) |
|---------------------------------|---------------|------------------------|----------------|---|--|---|--|
| 0.1.1.6 | | (days) | (kg) | (kg CH ₄ / nead/day) | (kg Cn ₄) | 0 , | |
| Calves before weaning - stage 1 | | 92 | 45 | 0 | 0 | 0.0000 | 0.000 |
| Calves before weaning - stage 2 | | 92 | 130 | 0.08060 | 15,347,240 | 0.0108 | 0.269 |
| Cows | Winter Diet | 90 | 605.55 | 0.24633 | 52,789,081 | 0.0370 | 0.925 |
| | Calving Diet | 90 | 605.55 | 0.30791 | 69,645,466 | 0.0488 | 1.220 |
| | Breeding Diet | 60 | 605.55 | 0.29325 | 43,979,021 | 0.0308 | 0.771 |
| | Pasture | 125 | 605.55 | 0.29325 | 87,958,042 | 0.0616 | 1.541 |
| D # | | 00 | 007.00 | 0.00005 | 9.504.459 | 0.0040 | 0.047 |
| Bulls | Winter Diet | 90 | 997.90 | 0.29325 | 2,706,673 | 0.0019 | 0.047 |
| | Calving Diet | 90 | 997.90 | 0.29325 | 2,952,213 | 0.0021 | 0.052 |
| | Breeding Diet | 60 | 997.90 | 0.29325 | 1,957,446 | 0.0014 | 0.034 |
| | Pasture | 125 | 997.90 | 0.29325 | 3,914,892 | 0.0027 | 0.069 |
| Backgrounding - Calf-Fed | Backgrounding | 96 | 226.80 | 0.12518 | 13,866,766 | 0.0097 | 0.243 |
| Calf-Fed (Heifer) | Diet 3 | 14 | 229.00 | 0.09426 | 804,355 | 0.0006 | 0.014 |
| , , | Diet 4 | 14 | 238.00 | 0.16727 | 1,427,336 | 0.0010 | 0.025 |
| | Diet 5 | 28 | 263.00 | 0.19276 | 3,289,540 | 0.0023 | 0.058 |
| | Diet 6 | 28 | 302.00 | 0.20198 | 3,447,005 | 0.0024 | 0.060 |
| | Diet 7 | 178 | 467.00 | 0.09530 | 10,336,565 | 0.0072 | 0.181 |
| Calf-Fed (Steer) | Diet 3 | 14 | 252.00 | 0.09843 | 718,359 | 0.0005 | 0.013 |
| Call-red (Steer) | Diet 4 | 14 | 263.00 | 0.09843 | 1,553,346 | 0.0003 | 0.013 |
| | Diet 5 | 28 | 293.00 | 0.21264 | 3,156,726 | 0.0022 | 0.027 |
| | Diet 6 | 28 | 336.00 | 0.21627 | 3,277,399 | 0.0022 | 0.057 |
| | Diet 7 | 178 | 508.00 | 0.22454 | 9,150,440 | 0.0023 | 0.160 |
| | Dict? | 170 | 300.00 | 0.07004 | 7,100,110 | 0.0004 | 0.100 |
| Backgrounding - Yearling-Fed | Backgrounding | 144 | 272.16 | 0.14939 | 30,197,219 | 0.0212 | 0.529 |
| Yearling - Pasture | Pasture | 120 | 340.19 | 0.19550 | 33,084,591 | 0.0232 | 0.580 |
| Yearling-Fed (Heifer) | Diet 1 | 3 | 340.00 | 0.11018 | 246,233 | 0.0002 | 0.004 |
| 8 () | Diet 2 | 7 | 343.00 | 0.16303 | 850,137 | 0.0006 | 0.015 |
| | Diet 3 | 7 | 347.00 | 0.15818 | 824,843 | 0.0006 | 0.014 |
| | Diet 4 | 7 | 352.00 | 0.14609 | 761,802 | 0.0005 | 0.013 |
| | Diet 5 | 7 | 358.00 | 0.21265 | 1,108,870 | 0.0008 | 0.019 |
| | Diet 6 | 7 | 367.00 | 0.19854 | 1,035,292 | 0.0007 | 0.018 |
| | Diet 7 | 126 | 492.00 | 0.10073 | 9,451,138 | 0.0066 | 0.166 |
| Yearling-Fed (Steer) | Diet 1 | 3 | 386.00 | 0.11902 | 227,486 | 0.0002 | 0.004 |
| realing rea (otter) | Diet 1 | 7 | 388.00 | 0.17116 | 763,356 | 0.0002 | 0.013 |
| | Diet 2 | 7 | 393.00 | 0.21102 | 941,154 | 0.0007 | 0.013 |
| | Diet 4 | 7 | 400.00 | 0.19465 | 868,115 | 0.0007 | 0.015 |
| | Diet 5 | 7 | 408.00 | 0.19403 | 980,486 | 0.0007 | 0.013 |
| | Diet 6 | 7 | 418.00 | 0.24200 | 1,079,305 | 0.0007 | 0.017 |
| | Diet 7 | 126 | 541.00 | 0.24200 | 8,962,495 | 0.0063 | 0.157 |
| | | | | | | | |
| TOTAL | | | | | 423,660,431 | 0.3 | 7.4 |

Note

Emissions calculated based on IPCC 2006 Tier 2 methodology using ruminant nutritionist information for the dry matter intake of the diet, information from John Basarab for the dry matter intake of calves 3 to 6 months, and IPCC 2006 values for methane conversion factor and energy ensity of the feed. See Appendices D and F for more details.

TABLE 8

ENTERIC FERMENTATION EMISSIONS PER CALF CROP FOR CALF-FED AND YEARLING-FED SYSTEMS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | | Total Methane Emissions | Methane Emissions per Shrunk Live Weight (kg CH₄/ kg shrunk live | GHG Emissions per Shrunk Live Weight (kg CO2 _{e/} |
|---------------------|-----------------------|----------------------------|--|--|
| | | (kg CH ₄) | weight) | kg shrunk live weight) |
| Calf-Fed System | Cows | 114,467,224 | 0.080 | 2.0 |
| | Bulls | 5,189,051 | 0.004 | 0.1 |
| | Calves/Heifers/Steers | 57,934,096 | 0.041 | 1.0 |
| | Total | 177,590,371 | 0.124 | 3.1 |
| Yearling-Fed System | Cows | 139,904,385 | 0.098 | 2.5 |
| | Bulls | 6,342,173 | 0.004 | 0.1 |
| | Calves/Heifers/Steers | 99,823,503 | 0.070 | 1.7 |
| | Total | 246,070,061 | 0.172 | 4.3 |

TABLE 9

TOTAL FEED AND LAND REQUIREMENTS FOR CROPS PER CALF CROP ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | | Barley | | | Barley Silag | e | | Alfalfa | | |
|----------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|--|
| | Total for | Calf-Fed | Yearling-Fed | Total for | Calf-Fed | Yearling-Fed | Total for | Calf-Fed | Yearling-Fed | |
| | Calf Crop | System | System | Calf Crop | System | System | Calf Crop | System | System | |
| | (tonnes) | |
| Total feed required | 4,485,161 | 2,502,055 | 1,983,106 | 7,576,370 | 2,794,761 | 4,781,608 | 6,589,780 | 2,965,401 | 3,624,379 | |
| | | Barley | | Barley Silage | | | Alfalfa | | | |
| | Total for | Calf-Fed | Yearling-Fed | Total for | Calf-Fed | Yearling-Fed | Total for | Calf-Fed | Yearling-Fed | |
| | Calf Crop | System | System | Calf Crop | System | System | Calf Crop | System | System | |
| | (10 ³ ha) | |
| Total land required to grow feed | 1,820 | 1,015 | 805 | 738 | 272 | 466 | 878 | 395 | 483 | |

FERTILIZER REQUIREMENTS FOR GRAIN AND FORAGE ASSUMING NO MANURE ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | | N | P_2O_5 | K_2O | S |
|---------------|-------|-------|----------|--------|------|
| Barley | kg/ha | 82.20 | 33.63 | 9.34 | 4.48 |
| Barley Silage | kg/ha | 82.20 | 33.63 | 9.34 | 4.48 |
| Alfalfa Grass | kg/ha | 0.00 | 15.20 | 0.00 | 0.00 |

References

Comment from ARD during the Life Cycle Analysis of Beef Production in Alberta - Project Kick-Off Meeting. ARD, CRA, and Pembina. September 28, 2009.

Alberta Fertilizer Guide. Revised June 2004. Available at:

 $http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex3894/\$file/541-1.pdf? OpenElement\ Additional\ correspondence\ with\ Alberta\ Agriculture\ and\ Rural\ Development\ and\ Rural\ Berta Agriculture\ and\ Rural\ Ber$

FERTILIZER REQUIREMENTS AS PER ECOINVENT ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Barley | Barley Silage | Alfalfa |
|--|--------------|---------------|--------------|
| | (kilotonnes) | (kilotonnes) | (kilotonnes) |
| Urea, as N | 85.59 | 34.70 | 0.00 |
| Monoammonium phosphate, as P ₂ O ₅ | 67.06 | 27.18 | 0.00 |
| Monoammonium phosphate, as N | 33.28 | 13.49 | 19.13 |
| Ammonium sulphate, as N | 7.81 | 3.16 | 4.49 |
| Ammonia, liquid | 8.52 | 3.46 | 0.00 |

Reference

Ecoinvent. 2003. Ecoinvent data 1.3. Final reports Ecoinvent 2000 NO. 1-15. Ecoinvent Centre. Swiss Centre for Life Cycle Inventories, Uster.

ECOINVENT PROCESSES USED FOR ACTIVITIES ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | AF1 | Comptensed Installer | Ftt | building, hall |
|----------------------------------|------|--|------------------|--|
| - | AF1 | Construct bunkers Construct fences and gates | Ecoinvent | b |
| - | AF3 | Construct lences and gates Construct livestock shelters | Ecoinvent | data gap tied housing system, cattle, construction |
| | AF4 | Construct investock shellers Construct manure storage | Ecoinvent | slurry tanker, production |
| tio | AF5 | Construct manure storage Construct feed storage | Ecoinvent | shed |
| l ŭ - | AF6 | Construct need storage Construct machinery storage | Ecoinvent | building, hall |
| Construction | | , , | | <u> </u> |
| ပိ | AF7 | Construct watering facilities | Ecoinvent | water supply network |
| | AP1 | Construct fences and gates | Ecoinvent | |
| | AP2 | Construct watering facilities | Ecoinvent | water supply network |
| | AP3 | Construct irrigation systems | Ecoinvent | pump station |
| | | | | |
| | B1 | Produce seed (barley, corn, wheat) | Ecoinvent | barley, grains IP, at farm; clover seed IP, at farm |
| SS - | B6 | Transport seed to processing center | Ecoinvent | |
| ļ ji | B10 | Process seed | Ecoinvent | seed barley, clover IP, at regional storehouse, CH |
| F. F. | B12 | Store seed after being processed | Ecoinvent | |
| -a | B13 | Transport seed to regional storehouse | Ecoinvent | 1. |
| ns | B14 | Store seed in the regional storehouse | Ecoinvent | data gap |
| Forage and cereal sub-activities | B2 | Produce fertilizer | Ecoinvent | Urea, as N, urea, as N, at regional storehouse chemicals_organics RER |
| cer | B7 | Transport fertilizer | Ecoinvent | transport, lorry >16t, fleet average, RER |
| pu | B3 | Produce pesticide/herbicide | Ecoinvent | pesticide unspecified, at regional storehouse, CH |
| e a | B8 | Transport pesticide/herbicide | Ecoinvent | transport, lorry >16t, fleet average, RER |
| rag | B4 | Transport manure | Ecoinvent | transport, lorry >32t, EURO4, RER |
| Fo | B9 | Apply manure | Ecoinvent | Solid manure loading and spreading, by hydraulic loader and spreader , CH |
| | B11 | Incorporate manure | Ecoinvent | tillage, cultivating, chiseling |
| | B5 | Irrigate crop | Ecoinvent | Irrigating , CH |
| | E1 | Produce crude | Ecoinvent | proxy of crude oil, at production onshore, RME, see calculations on EF data tab |
| , F | E4 | Transport crude | Ecoinvent | crude oil, at production NO, at long distance transport |
| itie | E7a | Refine crude into diesel | Ecoinvent | proxy of diesel, at refinery, RER, see calculations on EF data tab |
| Energy generation activities | E9a | Transport diesel | Ecoinvent | diesel, at regional storage oil_fuels(deliver to end user)_RER |
| l ac | E7b | Refine crude into coloured diesel | Ecoinvent | proxy of diesel, at refinery, RER, see calculations on EF data tab |
| tioi | E9b | Transport coloured diesel | Ecoinvent | diesel, at regional storage oil_fuels(deliver to end user)_RER |
| era | E2 | Produce natural gas | Ecoinvent (NREL) | proxy of natural gas, unprocessed, at extraction, RNA, see calculations on EF data tab |
| jen - | E5 | Transport natural gas | (/ | transport, natural gas, pipeline, long distance, RER |
| 35 8 | E8 | Process natural gas | Ecoinvent (NREL) | proxy of natural gas, at production, RNA, see calculations on EF data tab |
| ler g | E10 | Combust natural gas | Ecoinvent | proxy of natural gas, burned in industrial furnace >100kW, RER, see calculations on EF |
| Ē | E3 | Generate electricity | Ecoinvent (NREL) | proxy of electricity, low voltage, at grid, US, see calculations on EF data tab |
| | E6 | Transmit electricity | , | Included in E3 above. |
| | | • | | |
| | R1 | Produce materials for replacement | | |
| L | | components | | |
| | R4 | Manufacture replacement components | Ecoinvent | tied housing system, cattle, operation, CH |
| | R7 | Transport replacement components | | |
| | R10 | Install replacement components | | |
| O&M activities | R2 | Remove damaged/worn components | Ecoinvent | Remove damaged steel: disposal, building, reinforcement steel, to recycling waste |
| tivi | R5a | Transport steel to recycle center | Ecoinvent | transport, lorry >32t, EURO4, RER |
| [ac | R8a | Recycle steel components | Ecoinvent | disposal, building, reinforcement steel, to recycling |
| % | R5b | Transport wood to recycle center | Ecoinvent | disposal, building, waste wood, untreated, to final disposal |
| ŏ | R8b | Recycle wood components | | No recycling. Wood is considered waste. See R2 |
| | R5c | Transport concrete for reuse as | Ecoinvent | transport, lorry >32t, EURO4, RER |
| | R3 | aggregate Extract gravel materials | Ecoinvent | mining, gravel / sand+ gravel, crushed, at mine (2 processes) |
| - | R6 | Transport gravel materials | Ecoinvent | transport, lorry >32t, EURO4, RER |
| | R9 | Grade access roads | data gap | tunsport, forry 7 02t, EORO-1, RER |
| | 13.7 | Grade access roads | uata gap | |

ECOINVENT PROCESSES USED FOR ACTIVITIES ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | CC1 | Plant cover crop or green manure | Ecoinvent | not applicable for Alberta agricultural practices | | | | |
|-------------------|-----|------------------------------------|--------------------------------------|--|--|--|--|--|
| | | Cultivate soil | | For adjustment or processes based on fuel consumption see appropriate tabs : C | | | | |
| | | .*** | | Alberta practice - heavy harrow, every four | Ecoinvent proxy tillage, harrowing, by | | | |
| | | no till | | years | spring tine harrow | | | |
| | | | | Alberta practice -3 inch chisel plow, every | Ecoinvent proxy - tillage, cultivating, | | | |
| | | reduced till | | year | chiseling | | | |
| | | | combination of | Alberta practice - heavy harrow, every two | Ecoinvent proxy -tillage, harrowing, by | | | |
| | CC2 | | different processes, | years | spring tine harrow | | | |
| | | | adjusted as proxy | Alberta practice - 3 inch chisel plow, every | Ecoinvent proxy - tillage, cultivating, | | | |
| | | full till | based on fuel | year | chiseling | | | |
| | | | consumption | Alberta practice - field cultivator, multiple | Ecoinvent proxy - tillage, cultivating, | | | |
| | | | | times per year | chiseling | | | |
| | | | | Alberta practice - heavy off-set disk, every | Ü | | | |
| | | | | two years | Ecoinvent proxy - tillage, rotary cultivator | | | |
| | | | combination of | , | | | | |
| | | | different processes, | For director of a constant for the first | ti | | | |
| | | Apply fertilizer (includes manure) | adjusted as proxy | For adjustment or processes based on fuel co | | | | |
| | | , | based on fuel | activi | ty | | | |
| | | | consumption | | | | | |
| | | | For adjustment or | | | | | |
| | | | processes based on | | | | | |
| | | Broadcasting | fuel consumption | Alberta practice - sprayer | Ecoinvent proxy - tillage, rotary cultivator | | | |
| | | | see appropriate | | | | | |
| | CC3 | | tabs | | | | | |
| φ | | | For adjustment or | | | | | |
| itie | | | processes based on | | Essimment many Dodused tillege meterns | | | |
| ctiv | | Injected or knifed in | | Alberta practice - anhydrous applicator | Ecoinvent proxy- Reduced tillage, rotary harrow | | | |
| ıl ac | | | | narrow | | | | |
| Cereal activities | | | tabs | | | | | |
| Ű | | Post-plant Top/Side Dressing | Ecoinvent | Same processes as above, applied after the plant starts growing. Add 50/50% to previou | | | | |
| | | Banded | Ecoinvent | When seeding. Should not require additi | • • | | | |
| | | Applied with Seed | Ecoinvent | When seeding. Should not require additional fuel consumption. Assumption. | | | | |
| | | Other | Ecoinvent | | | | | |
| | | | For adjustment or processes based on | | | | | |
| | CCA | CC4 Plant crop | | A 11 | Endowed annual alastics | | | |
| | CC4 | Plant crop | fuel consumption see appropriate | Alberta practice - air drill, once per year | Ecoinvent proxy- planting | | | |
| | | | tabs | | | | | |
| | CC5 | Irrigate crop_CC | Ecoinvent | Irrigatin | g, CH | | | |
| | | | For adjustment or | | | | | |
| | | | processes based on | | Ecoinyont provy application of plant | | | |
| | CC6 | Apply chemical treatment | fuel consumption | Alberta practice - sprayer, two times per crop | Ecoinvent proxy- application of plant protection products, by field sprayer | | | |
| | | | see appropriate | | protection products, by neid sprayer | | | |
| | | | tabs | | | | | |
| | | | For adjustment or | | | | | |
| | 007 | | processes based on | Alberta practice -spike tooth harrow, once per | Ecoinvent proxy-tillage, currying, by | | | |
| | CC7 | Apply mechanical treatment | fuel consumption | year | weeder | | | |
| | | | see appropriate tabs | | | | | |
| | | | For adjustment or | | | | | |
| | | | processes based on | | | | | |
| | CC8 | Harvest crop (grain and straw) | fuel consumption | Alberta practice -combine (small grain), once | Ecoinvent proxy- combine harvesting | | | |
| | 220 | (gram and straw) | see appropriate | per year | restriction of the second of t | | | |
| | | | tabs | | | | | |
| | CC9 | Transport harvested crop (grain) | Ecoinvent | | | | | |
| | | | | | | | | |

ECOINVENT PROCESSES USED FOR ACTIVITIES ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | FC1 | Cultivate soil (not annually) | Ecoinvent | see above, cultivate soil, CC2 |
|--------------------------------|-------|--|-----------|--|
| es | FC2 | Apply fertilizer | Ecoinvent | see above, apply fertilizer, CC3 |
| viti | FC3 | Plant crop (not annually) | Ecoinvent | see above, planting, CC4 |
| Forage activities | FC4 | Irrigate crops | Ecoinvent | Irrigating, CH |
| e a | FC5 | Apply chemical treatment | Ecoinvent | see above, apply chemical treatment, CC6 |
| rag | FC6 | Harvest crop (multiple times per year) | Ecoinvent | see above, harvesting, CC8 |
| Ρо | FC7 | Transport harvested crop (feed) | Ecoinvent | transport, lorry >32t, EURO4, RER |
| | FC8 | Treat harvested crop (feed) | | no treatment necessary |
| | | | | |
| | FL1 | Deposit manure | | emissions covered under biological activity of cattle |
| | FL2 | Collect manure | | Included in total energy used on beef farms |
| | FL7 | Transfer manure | Ecoinvent | Included in total energy used on beef farms |
| | FL12 | Store manure | Ecoinvent | slurry store and processing , CH |
| | ET 04 | Dispose of manure (not on crops fed to | г | Transport of manure off site+ spreading. Spreading is not accounted for, as the manure |
| | FL24 | beef) | Ecoinvent | leaves the beef production system. |
| | FL3 | Collect garbage | | Included in total energy used on beef farms. |
| | FL8 | Store garbage | | No emissions associated with this activity |
| | FL13 | Transport garbage | Ecoinvent | transport, lorry >32t, EURO4, RER |
| | FL25 | Dispose of garbage | | burned, combustion |
| | FL4 | Collect mortalities (on-site) | | Included in total energy used on beef farms |
| | FL9 | Store mortalities | | No emissions involved in this activity |
| | FL14 | Transport mortalities | Ecoinvent | transport, lorry >16t, fleet average, RER |
| | FL26 | Dispose of mortalities | | Rendering. Emissions from rendering are cut-off. |
| es | FL5 | Produce bedding material | Ecoinvent | straw, from straw areas , CH |
| viti | FL10 | Transport bedding | Ecoinvent | transport, lorry >16t, fleet average, RER |
| ıcti | FL15 | Store bedding | | No emissions involved in this activity |
| re a | FL27 | Bed livestock | | Included in total energy used on beef farms |
| Feedlot and pasture activities | FL6 | Store feed | Ecoinvent | Included in total energy used on beef farms |
| ра | FL11 | Store feed | | Eastwill consumations (course Doub LCA) and calculations on most tab lifeed muscoccined |
| pu | FL16 | Transport feed | | Feedmill consumptions (source Pork LCA), see calculations on next tab "feed processing" |
| ot a | FL28 | Feed livestock | | Included in total energy used on beef farms |
| lp: | F17 | Produce mineral | Ecoinvent | lime, from carbonation, at regional storehouse |
| Fee | FL29 | Transport mineral | Ecoinvent | transport, lorry >16t, fleet average, RER |
| | FL18 | Produce trace mineral | | Included in minerals above (FL29) (minerals comprising of less than 1% of the total |
| | FL30 | Transport trace mineral | Ecoinvent | Not applicable - see FL 18 |
| | FL19 | Produce cobalt (iodized) | | Cobalt Iodized Salt Block - considered within the sodium chloride production |
| | FL31 | Transport cobalt (iodized) | Ecoinvent | Cobalt Iodized Salt Block - considered within the sodium chloride production |
| | FL20 | Produce millrun carrier | | Millrun carrier production is considered outside the boundaries of the system as it is a |
| | FL32 | Transport millrun carrier | Ecoinvent | transport, lorry >16t, fleet average, RER |
| | FL21 | Produce vitamin | | data gap |
| | FL33 | Transport vitamin | Ecoinvent | transport distance Calgary, AB- New York-Paris (estimated from Google Earth) |
| | FL22 | Produce growth promotant | | data gap |
| | FL34 | Transport growth promotant | Ecoinvent | Transport, van <3.5t, RER |
| | FL23 | Produce vaccination/antibiotic | | data gap |
| | FL 35 | Transport vaccination/antibiotic | | data gap |

Ecoinvent

polypropylene, granulate, at plant, RER Included in total energy used on beef farms

Notes

RER Europe CH Switzerland RNA North America

FL39

FL36

Production of plastic

Supply water to livestock

ECOINVENT PROCESSES USED TO DEFINE THE PRODUCTION OF SUPPLEMENTS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Process on the Activity Map | Ecoinvent Proxy | | | |
|-------|--------------------------------|--|--|--|--|
| FL11 | Process (roll) grains | Feed mill data | | | |
| FL16 | Mix feed | reed fillif data | | | |
| FL 17 | Produce mineral | | | | |
| | Lime | Lime, from carbonation, at regional storehouse | | | |
| | Sodium phosphate | Sodium phosphate at plant | | | |
| | Sodium chloride | Sodium chloride, powder, at plant | | | |
| | Potassium Chloride | Potassium chloride, as K2O | | | |
| | Zinc Oxides | Zinc oxide, at plant | | | |
| FL 18 | Produce trace mineral | Included in minerals above (FL29) | | | |
| FL 19 | Produce cobalt (iodized) | Not considered. Very low quantities | | | |
| FL 20 | Produce protein supplement | Not in the diet | | | |
| FL 21 | Produce vitamin | Data gap | | | |
| FL 22 | Produce growth promotant | Data gap | | | |
| FL 23 | Produce vaccination/antibiotic | Data gap | | | |

FUEL CONSUMPTION TABLE ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Machine | | | | No T | ʻill | | | | | Reduce | ed Till | | | | | Full ' | Гill | | |
|-------------|---------------------|-------------------|-----------------|---------------|-------------------|----------------|------------------|----------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|-----------------|--------------------|------------------|----------------|------------------|---------------|
| Description | n | Consumption | Cere | al | Cano | ola | Pea | a | Cere | al | Cano | ola | Pea | 1 | Ce | real | Cano | ola | Pe | :a |
| | | (gallons/acre) (c | perations/acre) | (gallons/acre | (operations/acre) | (gallons/acre) | (operations/acre | (gallons/acre) | (operations/acre) | (gallons/acre) | (operations/acre) | (gallons/acre) | (operations/acre) | (gallons/acre) | (operations/act | re) (gallons/acre) | (operations/acre | (gallons/acre) | (operations/acre | (gallons/acre |
| Plow, 1 | moldboard (8-inch | 1,68 | | 0,00 | | 0,00 | · - | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| * Plow, ch | isel (3-inch depth) | 0,45 | | 0,00 | | 0,00 | | 0,00 | 1 | 0,45 | 1 | 0,45 | 1 | 0,45 | 1 | 0,45 | 1 | 0,45 | 1 | 0,45 |
| Plow, chis | el (3-inch depth) | 1,1 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Disk, | Corn stalks | 0,45 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| tandem | | | | | | | | | | | | | | | | | | | | |
| | Chisel plowed | 0,55 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| | Moldboard plowed | 0,65 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Disk, heav | y offset | 0,95 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | 0,5 | 0,48 | 0,5 | 0,48 | 0,5 | 0,48 |
| Field Cult | ivator | 0,6 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | 1,5 | 0,90 | 1,5 | 0,90 | 1,5 | 0,90 |
| Harrow, h | ieavy | 0,21 | 0,25 | 0,05 | | 0,00 | | 0,00 | 0,5 | 0,11 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Cultivator | , row crop | 1,45 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Rolling cu | | 0,35 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Rotary ho | e | 0,25 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Anhydrou | ıs applicator | 0,65 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Planter, | Conventional | 0,5 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| row crop | No-till | 0,35 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| ** Air dril | | 0,45 | 1 | 0,45 | 1 | 0,45 | 1 | 0,45 | 1 | 0,45 | 1 | 0,45 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Grain dril | 1 | 0,35 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | 1 | 0,35 | 1 | 0,35 | 1 | 0,35 | 1 | 0,35 |
| Corn pick | er | 1,15 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Combine | Small grain | 1 | 1 | 1,00 | 1 | 1,00 | 1 | 1,00 | 1 | 1,00 | 1 | 1,00 | 1 | 1,00 | 1 | 1,00 | 1 | 1,00 | 1 | 1,00 |
| | Soybeans | 1,1 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| | Corn and milo | 1,6 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Mower | Cutterbar | 0,35 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| | Rotary | 0,8 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| | Mow-condition | 0,6 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Swather | | 0,55 | 0,5 | 0,28 | 1 | 0,55 | 0,25 | 0,14 | 0,5 | 0,28 | 1 | 0,55 | 0,25 | 0,14 | 0,5 | 0,28 | 0,75 | 0,41 | 0,25 | 0,14 |
| Rake | | 0,25 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Baler | | 0,45 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| Sprayer | | 0,1 | 2,5 | 0,25 | 3 | 0,30 | 3 | 0,30 | 2 | 0,20 | 2,5 | 0,25 | 2,5 | 0,25 | 1,5 | 0,15 | 2 | 0,20 | 2 | 0,20 |
| Forage | Green chop | 0,95 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| harvester | Haylage | 1,25 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| | Corn silage | 3,6 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 | | 0,00 |
| | | Total | 5,25 | 2,03 | 6 | 2,3 | 5,25 | 1,89 | 6 | 2,48 | 6,5 | 2,70 | 5,75 | 2,19 | 7 | 3,6 | 7,75 | 3,79 | 7,25 | 3,51 |

Reference

ARD, 2009b. Alberta Agriculture & Rural Development (ARD). A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing.

TABLE 15

SUMMARY OF SOIL N2O EMISSIONS FROM CROPPING AND LAND USE ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

Direct N₂O Emissions Per Calf Crop

| Emissions for total N inputs (fertilizer, residue, mineral | kg N ₂ O-N | (kg N2O) |
|--|-----------------------|----------|
| Barley | 517,544 | 813,284 |
| Barley silage | 423,413 | 665,363 |
| Alfalfa grass | 344,520 | 541,388 |
| Emissions for total N inputs (land manure) | kg N ₂ O-N | (kg N2O) |
| Black and grey zone area | 15,627 | 24,556 |
| Brown and dark zone area | 9,376 | 14,734 |
| Emissions from total N $_2$ O-N inputs tillage | $kg N_2 O-N$ | (kg N2O) |
| Barley | -65,462 | -102,869 |
| Barley silage | -53,556 | -84,159 |
| Alfalfa grass | -43,577 | -68,478 |
| Emissions due to soil texture | $kg N_2 O-N$ | (kg N2O) |
| Barley | 0 | 0 |
| Barley silage | 0 | 0 |
| Alfalfa grass | 0 | 0 |
| Emissions due to irrigation | $kg N_2 O-N$ | (kg N2O) |
| Barley | 112,238 | 176,374 |
| Barley silage | 91,824 | 144,295 |
| Alfalfa grass | 74,715 | 117,409 |
| Emissions due to landscape/topography | kg N ₂ O-N | (kg N2O) |
| Barley | 245,510 | 385,801 |
| Barley silage | 200,857 | 315,632 |
| Alfalfa grass | 163,431 | 256,821 |

Indirect N₂O Emissions Per Calf Crop

| Emissions due to leaching and run-off | kg N ₂ O-N | (kg N2O) |
|--|-----------------------|----------|
| Barley | 1,164 | 1,830 |
| Barley silage | 953 | 1,497 |
| Alfalfa grass | 775 | 1,218 |
| Emissions for total N inputs (land manure) | 56 | 88 |
| Emissions due to volatilization | kg N ₂ O-N | (kg N2O) |
| Barley | 518 | 813 |
| Barley silage | 423 | 665 |
| Alfalfa grass | 345 | 541 |
| Emissions for total N inputs (land manure) | 25 | 39 |

TABLE 16

TOTAL QUANTITY OF MANURE GENERATED PER CALF CROP ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Manure Generation Rate | Total Manure Generated |
|---------|------------------------|------------------------|
| | (kg/head/day) | (kilotonnes) |
| Cows | 36.8 | 32,797 |
| Bulls | 42.1 | 1,655 |
| Calves | 11.8 | 5,708 |
| Heifers | 24.4 | 6,874 |
| Steers | 26.3 | 6,341 |
| Total | | 53,374 |

Reference

Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers)

TOTAL MANURE GENERATED BASED ON CALF-FED AND YEARLING-FED SYSTEMS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

TABLE 17

| | | Total Manure Generated (kilotonnes) |
|---------------------|---------|-------------------------------------|
| Calf-Fed System | Cows | 14,758 |
| - | Bulls | 745 |
| | Calves | 1,311 |
| | Heifers | 3,895 |
| | Steers | 3,593 |
| | TOTAL | 24,302 |
| Yearling-Fed System | Cows | 18,038 |
| | Bulls | 910 |
| | Calves | 4,396 |
| | Heifers | 2,979 |
| | Steers | 2,748 |
| | TOTAL | 29,072 |

TABLE 18

METHANE AND GHG EMISSIONS FROM MANURE ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Diet | No. of Animals * Days | Average Dry Matter Intake, DMI | Avonero Dev Metter Intelso DMI | Energy Density of Feed | Cance Emergy Intoles | Ach | DE | Volatile solids | Po | MCF solid | MCF_lagoon | MCF slurry |
|---------------------------------|---------------|-----------------------|--------------------------------|--------------------------------|------------------------|----------------------|----------------------------------|--|-----------------|---|------------------------------|------------------------------|------------------------------|
| | Diet | | | Average Dry Matter Intake, DMI | | Gross Energy Intake | Ash | | | Bo (m ³ CH ₄ /kg VS) | MCF_Solid | MCF_lagoon | MCF_Sturry |
| | | (head * day) | (lbs dry matter/head/day) | (kg dry matter/head/day) | (MJ/kg) | (MJ / head / day) | (%) | (%) | (kg/head/day) | | 4 | | |
| | | | (nutritionist) | | | | mineral content of the manure | digestible energy of the ration | | biodegradability of manure | methane conversion factor | methane conversion factor | methane conversion factor |
| | | | | | | | | expert opinion: Darryl | | | | | |
| | | | | | | | | Gibb, Karen | | | solid storage, cool, 10- | | slurry with natural |
| | | | | | | | | Beauchemin, Sean | eq 3.26, Holos | | 14 Celsius average | lagoon, cool | crust cover, cool |
| | | | | | | | | McGinn, AAFC, Holos, table A4-9, page 102 | | | temperature | | |
| Tour of Autour1 | | | | | | | (IPCC, 2006) | uwie 14-9, page 102 | (IPCC, 2006) | (IPCC, 2006) | (IPCC, 2006) | (IPCC, 2006) | (IPCC, 2006) |
| Type of Animal | | | | | | | (IFCC, 2006) | | (IFCC, 2006) | (IFCC, 2006) | (IFCC, 2006) | (IFCC, 2006) | (IFCC, 2006) |
| Calves before weaning - stage 1 | 0-3 months | 194,427,747 | 0.00 | 0.00 | 18.45 | 0.00 | 8 | 65 | 0.00 | 0.19 | 0.02 | 0.66 | 0.1 |
| Calves before weaning - stage 2 | 3-6 months | 190,420,680 | 8.25 | 3.74 | 18.45 | 69.00 | 8 | 65 | 1.34 | 0.19 | 0.02 | 0.66 | 0.1 |
| Cows | Winter Diet | 214,305,471 | 25.20 | 11.43 | 18.45 | 210.89 | 8 | 65 | 4.10 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Calving Diet | 226,189,268 | 31.50 | 14.29 | 18.45 | 263.62 | 8 | 65 | 5.13 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Breeding Diet | 149,973,319 | 30.00 | 13.61 | 18.45 | 251.06 | 8 | 65 | 4.88 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Pasture | 299,946,638 | 30.00 | 13.61 | 18.45 | 251.06 | 8 | 65 | 4.88 | 0.19 | 0.02 | 0.66 | 0.1 |
| Bulls | Winter Diet | 9,230,053 | 30.00 | 13.61 | 18.45 | 251.06 | 8 | 65 | 4.88 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Calving Diet | 10,067,374 | 30.00 | 13.61 | 18.45 | 251.06 | 8 | 65 | 4.88 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Breeding Diet | 6,675,106 | 30.00 | 13.61 | 18.45 | 251.06 | 8 | 65 | 4.88 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Pasture | 13,350,213 | 30.00 | 13.61 | 18.45 | 251.06 | 8 | 65 | 4.88 | 0.19 | 0.02 | 0.66 | 0.1 |
| Backgrounding - Calf-Fed | Backgrounding | 110,770,800 | 12.81 | 5.81 | 18.45 | 107.18 | 8 | 70 | 1.82 | 0.19 | 0.02 | 0.66 | 0.1 |
| Calf-Fed (Heifer) | Diet 3 | 8,532,928 | 9.64 | 4.37 | 18.45 | 80.71 | 8 | 81 | 0.93 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 4 | 8,532,928 | 17.11 | 7.76 | 18.45 | 143.21 | 8 | 81 | 1.64 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 5 | 17,065,856 | 19.72 | 8.94 | 18.45 | 165.03 | 8 | 81 | 1.89 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 6 | 17,065,856 | 20.66 | 9.37 | 18.45 | 172.93 | 8 | 81 | 1.98 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 7 | 108,459,610 | 21.12 | 9.58 | 18.45 | 176.79 | 8 | 81 | 2.03 | 0.19 | 0.02 | 0.66 | 0.1 |
| Calf-Fed (Steer) | Diet 3 | 7,298,065 | 10.07 | 4.57 | 18.45 | 84.27 | 8 | 81 | 0.97 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 4 | 7,298,065 | 21.77 | 9.88 | 18.45 | 182.23 | 8 | 81 | 2.09 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 5 | 14,596,131 | 22.13 | 10.04 | 18.45 | 185.16 | 8 | 81 | 2.12 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 6 | 14,596,131 | 22.97 | 10.42 | 18.45 | 192.24 | 8 | 81 | 2.20 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 7 | 92,763,625 | 21.86 | 9.92 | 18.45 | 182.98 | 8 | 81 | 2.10 | 0.19 | 0.02 | 0.66 | 0.1 |
| Backgrounding - Yearling-Fed | Backgrounding | 202,133,931 | 15.28 | 6.93 | 18.45 | 127.90 | 8 | 70 | 2.17 | 0.19 | 0.02 | 0.66 | 0.1 |
| Yearling - Pasture | Pasture | 169,233,166 | 20.00 | 9.07 | 18.45 | 167.38 | 8 | 65 | 3.25 | 0.19 | 0.02 | 0.66 | 0.1 |
| Yearling-Fed (Heifer) | Diet 1 | 2,234,814 | 11.27 | 5.11 | 18.45 | 94.33 | 8 | 81 | 1.08 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 2 | 5,214,567 | 16.68 | 7.57 | 18.45 | 139.58 | 8 | 81 | 1.60 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 3 | 5,214,567 | 16.18 | 7.34 | 18.45 | 135.43 | 8 | 81 | 1.55 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 4 | 5,214,567 | 14.95 | 6.78 | 18.45 | 125.08 | 8 | 81 | 1.43 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 5 | 5,214,567 | 21.75 | 9.87 | 18.45 | 182.06 | 8 | 81 | 2.09 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 6 | 5,214,567 | 20.31 | 9.21 | 18.45 | 169.98 | 8 | 81 | 1.95 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 7 | 93,824,961 | 22.33 | 10.13 | 18.45 | 186.86 | 8 | 81 | 2.14 | 0.19 | 0.02 | 0.66 | 0.1 |
| Yearling-Fed (Steer) | Diet 1 | 1,911,398 | 12.18 | 5.52 | 18.45 | 101.90 | 8 | 81 | 1.17 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 2 | 4,459,929 | 17.51 | 7.94 | 18.45 | 146.54 | 8 | 81 | 1.68 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 3 | 4,459,929 | 21.59 | 9.79 | 18.45 | 180.67 | 8 | 81 | 2.07 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 4 | 4,459,929 | 19.91 | 9.03 | 18.45 | 166.65 | 8 | 81 | 1.91 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 5 | 4,459,929 | 22.49 | 10.20 | 18.45 | 188.22 | 8 | 81 | 2.16 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 6 | 4,459,929 | 24.76 | 11.23 | 18.45 | 207.19 | 8 | 81 | 2.38 | 0.19 | 0.02 | 0.66 | 0.1 |
| | Diet 7 | 80,246,863 | 24.76 | 11.23 | 18.45 | 207.18 | 8 | 81 | 2.38 | 0.19 | 0.02 | 0.66 | 0.1 |
| | | | | | | | | | | | | | |

Note: Heifer replacements are included in the calf-fed, yearling-fed, and cow numbers. Based of HOLOS methodology, used for the current model

eq. 3.26 Holos, IPCC 2006
VS=[GE*(1-DE/100)+(0.04*GE)]*(1-ASH/100)*(1/18.45)
VS - volatile solids (kg/head/day)
GE - gross energy intake (MJ/head/day)
DE - Percent digestible energy in feed (Table A4-9, by diet, in Holos)
ASH - ash content of manure (5)
18.45 - conversion factor for gross energy per kg of dry matter (MJ/kg)

eq. 3.27 Holos, IPCC 2006
CH4 manure_rate= VS*B0*MCF*0.67
CH4 manure_rate - manure CH4 emission rate (kg/head/day)
B0 - methane producing capacity
MCF - methane conversion factor (table A4-11, by handling system, in Holos)
0.67 - conversion factor from volume to mass (kg/m3)

eq. 3.28 Holos, IPCC 2006 CH4manure= CH4maure_rate*cattle days CH4manure - manure CH4 emissio (kg CH4) cattle days - numer of cattle and days in period

2006 IPCC Guidelines for National Greenhouse Gas Inventories http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

Little, S., Lindeman, J., Maclean, K., Janzen, H., 2008. HOLOS -A tool to estimate and reduce greenhouse gases from farms. Methodology & algorithms for version 1.1.x http://dsp-psd.pwgsc.gc.ca/collection 2009/agr/A52-136-2008E.pdf

Miller, S.P., Wilton, J.W., Pfeiffer, W.C., 1998, Effects of milk yields on biological efficiency and profit of beef production from birth to slaughter, J. Anim. Sci, 1999. 77:344-352.

kg CH₄

12,559,943

313,998,565

TOTAL

kg CO₂eq

Global Warming Potential of Methane

Source: http://www.ipcc-wg1.unibe.ch/publications/wg1-ar4/ar4-wg1-chapter2.pdf Table 2.14 (100 year)

TABLE 18

METHANE AND GHG EMISSIONS FROM MANURE ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | | | | | CH4 manure rate = VS*Bo*0.67*MCF | Total CH4 manure emission | CH4 manure rate = VS*Bo*0.67*MCF | Total CH4 manure emission | Total CH4 manure emission for solid storage and |
|---|---------------|-----------------------|--------------------------------|---|----------------------------------|------------------------------|----------------------------------|------------------------------|---|
| | Diet | No. of Animals * Days | MCF_pasture | Factor | for solid storage | for solid storage | for pasture/range | for pasture/range | pasture/range |
| | | (head * day) | methane conversion factor | (kg CH ₄ /m ³) conversion factor from volume to mass | (kg/head/day) | kg CH4 | (kg/head/day) | kg CH4 | kg CH4 |
| | | | Pasture/Range/Paddock, cool | | eq 3.27, Holos | | eq 3.27, Holos | eq 3.28, Holos | |
| Type of Animal | | | (IPCC, 2006) | (IPCC, 2006) | (IPCC, 2006) | (IPCC, 2006) | (IPCC, 2006) | (IPCC, 2006) | |
| Calves before weaning - stage 1 | 0-3 months | 194,427,747 | 0.01 | 0.67 | 0.000 | 0 | 0.000 | 0 | 0 |
| Calves before wearing - stage 1 Calves before wearing - stage 2 | 3-6 months | 190,420,680 | 0.01 | 0.67 | 0.003 | 305,770 | 0.002 | 156,138 | 461,907 |
| carves before wearing - stage 2 | 5-6 Holdis | 170,420,000 | 0.01 | 0.07 | 0.003 | 303,770 | 0.002 | 130,130 | 401,707 |
| Cows | Winter Diet | 214,305,471 | 0.01 | 0.67 | 0.010 | 1,051,740 | 0.005 | 537,059 | 1,588,798 |
| | Calving Diet | 226,189,268 | 0.01 | 0.67 | 0.013 | 1,387,577 | 0.007 | 708,550 | 2,096,126 |
| | Breeding Diet | 149,973,319 | 0.01 | 0.67 | 0.012 | 876,213 | 0.006 | 447,428 | 1,323,641 |
| | Pasture | 299,946,638 | 0.01 | 0.67 | 0.012 | 1,752,426 | 0.006 | 894,856 | 2,647,282 |
| | | | | | | | | ,,,,,, | , , , , |
| Bulls | Winter Diet | 9,230,053 | 0.01 | 0.67 | 0.012 | 53,926 | 0.006 | 27,537 | 81,463 |
| | Calving Diet | 10,067,374 | 0.01 | 0.67 | 0.012 | 58,818 | 0.006 | 30,035 | 88,853 |
| | Breeding Diet | 6,675,106 | 0.01 | 0.67 | 0.012 | 38,999 | 0.006 | 19,914 | 58,913 |
| | Pasture | 13,350,213 | 0.01 | 0.67 | 0.012 | 77,998 | 0.006 | 39,829 | 117,827 |
| Backgrounding - Calf-Fed | Backgrounding | 110,770,800 | 0.01 | 0.67 | 0.005 | 240,854 | 0.002 | 122,989 | 363,843 |
| Calf-Fed (Heifer) | Diet 3 | 8,532,928 | 0.01 | 0.67 | 0.002 | 9,451 | 0.001 | 4,826 | 14,277 |
| Can-red (riener) | Diet 4 | 8,532,928 | 0.01 | 0.67 | 0.002 | 16,771 | 0.001 | 8,564 | 25,335 |
| | Diet 5 | 17,065,856 | 0.01 | 0.67 | 0.004 | 38,651 | 0.002 | 19,737 | 58,388 |
| | Diet 6 | 17,065,856 | 0.01 | 0.67 | 0.005 | 40,501 | 0.002 | 20,682 | 61,183 |
| | Diet 7 | 108,459,610 | 0.01 | 0.67 | 0.005 | 263,145 | 0.003 | 134,372 | 397,517 |
| | Dietr | 100/103/010 | 0.01 | 0.07 | 0.000 | 200,110 | 0.000 | 101/072 | 037,017 |
| Calf-Fed (Steer) | Diet 3 | 7,298,065 | 0.01 | 0.67 | 0.002 | 8,441 | 0.001 | 4,310 | 12,751 |
| , | Diet 4 | 7,298,065 | 0.01 | 0.67 | 0.005 | 18,251 | 0.003 | 9,320 | 27,571 |
| | Diet 5 | 14,596,131 | 0.01 | 0.67 | 0.005 | 37,091 | 0.003 | 18,940 | 56,031 |
| | Diet 6 | 14,596,131 | 0.01 | 0.67 | 0.006 | 38,509 | 0.003 | 19,664 | 58,172 |
| | Diet 7 | 92,763,625 | 0.01 | 0.67 | 0.005 | 232,949 | 0.003 | 118,953 | 351,902 |
| | | | | | | | | | |
| Backgrounding - Yearling-Fed | Backgrounding | 202,133,931 | 0.01 | 0.67 | 0.006 | 524,500 | 0.003 | 267,830 | 792,330 |
| | | | | | | | 0.000 | | |
| Yearling - Pasture | Pasture | 169,233,166 | 0.01 | 0.67 | 0.008 | 659,159 | 0.004 | 336,592 | 995,750 |
| Vaculing End (Haifon) | Diet 1 | 2 224 814 | 0.01 | 0.67 | 0.003 | 2,893 | 0.001 | 1,477 | 4,371 |
| Yearling-Fed (Heifer) | | 2,234,814 | 0.01 | 0.67 | | | | | |
| | Diet 2 | 5,214,567 | 0.01 | | 0.004 | 9,989 | 0.002 | 5,101 | 15,090 |
| | Diet 3 | 5,214,567 | 0.01 | 0.67 | 0.004 | 9,692 | 0.002 | 4,949 | 14,641 |
| | Diet 4 | 5,214,567 | 0.01 | 0.67 | 0.004 | 8,951 | 0.002 | 4,571 | 13,522 |
| | Diet 5 | 5,214,567 | 0.01 | 0.67 | 0.005 | 13,029 | 0.003 | 6,653 | 19,682 |
| | Diet 6 | 5,214,567 | 0.01 | 0.67 | 0.005 | 12,164 | 0.002 | 6,212 | 18,376 |
| | Diet 7 | 93,824,961 | 0.01 | 0.67 | 0.005 | 240,604 | 0.003 | 122,862 | 363,466 |
| Yearling-Fed (Steer) | Diet 1 | 1,911,398 | 0.01 | 0.67 | 0.003 | 2,673 | 0.001 | 1,365 | 4,038 |
| remmig-red (oteer) | Diet 2 | 4,459,929 | 0.01 | 0.67 | 0.003 | 8,969 | 0.001 | 4,580 | 13,549 |
| | Diet 3 | 4,459,929 | 0.01 | 0.67 | 0.004 | 11,058 | 0.002 | 5,647 | 16,705 |
| | Diet 4 | 4,459,929 | 0.01 | 0.67 | 0.005 | 10,200 | 0.003 | 5,209 | 15,409 |
| | Diet 5 | 4,459,929 | 0.01 | 0.67 | 0.005 | 11,520 | 0.002 | 5,883 | 17,403 |
| | Diet 6 | 4,459,929 | 0.01 | 0.67 | 0.005 | 12,682 | 0.003 | 6,476 | 19,157 |
| | Diet 7 | 80,246,863 | 0.01 | 0.67 | 0.006 | 228,165 | 0.003 | 116,510 | 344,674 |
| | DICI / | 00,240,003 | 0.01 | 0.07 | 0.000 | 220,100 | 0.005 | 110,510 | J44,074 |
| Note: | | | | | | | | | |

Heifer replacements are included in the calf-fed, yearling-fed, and cow numbers. Based of HOLOS methodology, used for the current model

eq. 3.26 Holos, IPCC 2006
VS=[GE*(1-DE/100)+(0.04*GE)]*(1-ASH/100)*(1/18.45)
VS - volatile solids (kg/head/day)
GE - gross energy intake (MJ/head/day)
DE - Percent digestible energy in feed (Table A4-9, by diet, in Holos)
ASH - ash content of manure (5)
18.45 - conversion factor for gross energy per kg of dry matter (MJ/kg)

eq. 3.27 Holos, IPCC 2006 CH4 manure_rate= VS*B0*MCF*0.67 CH4 manure_rate - manure CH4 emission rate (kg/head/day) B0 - methane producing capacity MCF - methane conversion factor (table A4-11, by handling system, in Holos) 0.67 - conversion factor from volume to mass (kg/m3)

eq. 3.28 Holos, IPCC 2006 CH4manure= CH4manure_rate*cattle days CH4manure - manure CH4 emissio (kg CH4) cattle days - numer of cattle and days in period

2006 IPCC Guidelines for National Greenhouse Gas Inventories http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

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TABLE 19

SUMMARY OF $\rm N_2O$ DIRECT AND INDIRECT EMISSIONS FROM MANURE ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Diet | No. of Days on Diet | | N ₂ O-N Direct Emissions From Solid Storage and Pasture/Range | N ₂ O-N Indirect Emissions Leaching and Volatilization |
|---------------------------------|---------------|---------------------|--------|---|--|
| 1 | | (days) | (kg) | (kg N ₂ O-N) | (kg N ₂ O-N) |
| Calves before weaning - stage 1 | 0-3 months | 92 | 45.00 | 44,654 | 15,526 |
| Calves before weaning - stage 2 | 3-6 months | 92 | 130.00 | 168,525 | 58,596 |
| | Winter Diet | 90 | 605.55 | 457,062 | 158,920 |
| Cows | Calving Diet | 90 | 605.55 | 537,690 | 186,954 |
| | Breeding Diet | 60 | 605.55 | 409,712 | 142,456 |
| | Pasture | 125 | 605.55 | 701,469 | 243,900 |
| | Winter Diet | 90 | 997.90 | 25,216 | 8,767 |
| Bulls | Calving Diet | 90 | 997.90 | 27,503 | 9,563 |
| | Breeding Diet | 60 | 997.90 | 18,236 | 6,341 |
| | Pasture | 125 | 997.90 | 36,471 | 12,681 |
| Backgrounding - Calf-Fed | Backgrounding | 96 | 226.80 | 108,273 | 37,646 |
| | Diet 3 | 14 | 229.00 | 6,497 | 2,259 |
| | Diet 4 | 14 | 238.00 | 9,931 | 3,453 |
| Calf-Fed (Heifer) | Diet 5 | 28 | 263.00 | 21,335 | 7,418 |
| | Diet 6 | 28 | 302.00 | 23,005 | 7,999 |
| | Diet 7 | 178 | 467.00 | 181,242 | 63,017 |
| | Diet 3 | 14 | 252.00 | 5,948 | 2,068 |
| | Diet 4 | 14 | 263.00 | 10,972 | 3,815 |
| Calf-Fed (Steer) | Diet 5 | 28 | 293.00 | 21,461 | 7,462 |
| | Diet 6 | 28 | 336.00 | 23,124 | 8,040 |
| | Diet 7 | 178 | 508.00 | 169,829 | 59,049 |
| Backgrounding - Yearling-Fed | Backgrounding | 144 | 272.16 | 252,928 | 87,943 |
| Pasture - Yearling-Fed | Pasture | 120 | 340.19 | 261,638 | 90,971 |
| | Diet 1 | 3 | 340.00 | 2,368 | 823 |
| | Diet 2 | 7 | 343.00 | 7,240 | 2,517 |
| | Diet 3 | 7 | 347.00 | 6,870 | 2,389 |
| Yearling-Fed (Heifer) | Diet 4 | 7 | 352.00 | 6,453 | 2,244 |
| | Diet 5 | 7 | 358.00 | 8,507 | 2,958 |
| | Diet 6 | 7 | 367.00 | 7,862 | 2,734 |
| | Diet 7 | 126 | 492.00 | 172,642 | 60,027 |
| | Diet 1 | 3 | 386.00 | 2,216 | 771 |
| | Diet 2 | 7 | 388.00 | 6,716 | 2,335 |
| | Diet 3 | 7 | 393.00 | 7,923 | 2,755 |
| Yearling-Fed (Steer) | Diet 4 | 7 | 400.00 | 7,449 | 2,590 |
| | Diet 5 | 7 | 408.00 | 7,993 | 2,779 |
| | Diet 6 | 7 | 418.00 | 8,692 | 3,022 |
| | Diet 7 | 126 | 541.00 | 174,331 | 60,615 |

 Total kg N_2O-N 3,949,979
 1,373,403

 Total kg N_2O 6,207,111
 2,158,205

Note:

See Tables 19a and 19b, for details of calculations for direct and, respectively, indirect of N2O emissions from manure

TABLE 19a

N2O DIRECT EMISSIONS FROM MANURE ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Diet | No. of Animals * Days | s N excretion rate | EF by handling system | N2O-N direct rate from solid storage | N2O-N direct manure from solid storage | N2O-N direct rate from pasture/range | N2O-N direct manure from pasture/range | N2O-N direct manure from solid storage and pasture/range | Total N₂O direct manure |
|---------------------------------|------------------|-------------------------|--|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------------|--|--------------------------------------|--|--|----------------------------|
| | | (head * day) | (kg N / head / day) eq 3.36, Holos, Nat | (kg NO ₂ -N / kg N) | (kg N ₂ O-N / kg N) | kg/head/day | (kg N ₂ O-N) | kg/head/day | (kg N ₂ O-N) | (kg N₂O-N) | (kg N ₂ O) |
| | | | Research Council 2000, from IPCC | Tab A4-11, Holos | eq 3.37, Holos, IPCC 2006 | eq 3.38 Holos, IPCC 2006 | eq 3.37, Holos, IPCC 2006 | eq 3.38 Holos, IPCC 2006 | | |
| | | | 2006 | pasture/range | solid storage | compost-intensive | compost-passive | deep bedding | | | | | | |
| Type of Animal | | | | , 0 | · · | • | , , | , , | | | | | | |
| Calves before weaning - stage 1 | 0-3 months | 194,427,747 | 0.02 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0001 | 8,781 | 0.0004 | 35,873 | 44,654 | 70,171 |
| Calves before weaning - stage 2 | 3-6 months | 190,420,680 | 0.07 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0004 | 33,141 | 0.0015 | 135,384 | 168,525 | 264,825 |
| Cows | Winter Diet | 214,305,471 | 0.18 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0009 | 89,882 | 0.0036 | 367,179 | 457,062 | 718,240 |
| | Calving Diet | 226,189,268 | 0.20 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0010 | 105,738 | 0.0040 | 431,952 | 537,690 | 844,942 |
| | Breeding Diet | 149,973,319 | 0.23 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0011 | 80,571 | 0.0046 | 329,141 | 409,712 | 643,832 |
| | Pasture | 299,946,638 | 0.20 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0010 | 137,946 | 0.0039 | 563,523 | 701,469 | 1,102,308 |
| Bulls | Winter Diet | 9,230,053 | 0.23 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0011 | 4,959 | 0.0046 | 20,257 | 25,216 | 39,624 |
| | Calving Diet | 10,067,374 | 0.23 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0011 | 5,409 | 0.0046 | 22,094 | 27,503 | 43,219 |
| | Breeding Diet | 6,675,106 | 0.23 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0011 | 3,586 | 0.0046 | 14,650 | 18,236 | 28,656 |
| | Pasture | 13,350,213 | 0.23 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0011 | 7,172 | 0.0046 | 29,299 | 36,471 | 57,312 |
| Backgrounding - Calf-Fed | Backgrounding | 110,770,800 | 0.08 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0004 | 21,292 | 0.0016 | 86,981 | 108,273 | 170,143 |
| Calf-Fed (Heifer) | Diet 3 | 8,532,928 | 0.06 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0003 | 1,278 | 0.0013 | 5,219 | 6,497 | 10,209 |
| | Diet 4 | 8,532,928 | 0.10 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0005 | 1,953 | 0.0019 | 7,978 | 9,931 | 15,605 |
| | Diet 5 | 17,065,856 | 0.10 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0005 | 4,196 | 0.0021 | 17,139 | 21,335 | 33,526 |
| | Diet 6 | 17,065,856 | 0.11 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0006 | 4,524 | 0.0023 | 18,481 | 23,005 | 36,150 |
| | Diet 7 | 108,459,610 | 0.14 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0007 | 35,642 | 0.0028 | 145,600 | 181,242 | 284,808 |
| Calf-Fed (Steer) | Diet 3 | 7,298,065 | 0.07 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0003 | 1,170 | 0.0014 | 4,778 | 5,948 | 9,347 |
| | Diet 4 | 7,298,065 | 0.13 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0006 | 2,158 | 0.0025 | 8,814 | 10,972 | 17,242 |
| | Diet 5 | 14,596,131 | 0.12 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0006 | 4,220 | 0.0025 | 17,241 | 21,461 | 33,725 |
| | Diet 6 | 14,596,131 | 0.13 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0007 | 4,547 | 0.0027 | 18,577 | 23,124 | 36,338 |
| | Diet 7 | 92,763,625 | 0.15 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0008 | 33,397 | 0.0031 | 136,432 | 169,829 | 266,874 |
| Backgrounding - Yearling-Fed | Backgrounding | 202,133,931 | 0.10 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0005 | 49,739 | 0.0021 | 203,189 | 252,928 | 397,458 |
| Yearling - Pasture | Pasture | 169,233,166 | 0.13 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0006 | 51,452 | 0.0026 0.0000 | 210,186 | 261,638 | 411,145 |
| Yearling-Fed (Heifer) | Diet 1 | 2,234,814 | 0.09 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0004 | 466 | 0.0000 | 1,902 | 2,368 | 3,721 |
| realing rea (rielier) | Diet 2 | 5,214,567 | 0.12 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0004 | 1,424 | 0.0013 | 5,816 | 7,240 | 11,377 |
| | Diet 3 | 5,214,567 | 0.12 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0006 | 1,351 | 0.0023 | 5,519 | 6,870 | 10,796 |
| | Diet 4 | 5,214,567 | 0.10 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0005 | 1,269 | 0.0022 | 5,184 | 6,453 | 10,140 |
| | Diet 5 | 5.214.567 | 0.14 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0007 | 1.673 | 0.0027 | 6,834 | 8.507 | 13,368 |
| | Diet 6 | 5,214,567 | 0.13 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0006 | 1,546 | 0.0027 | 6,316 | 7,862 | 12,354 |
| | Diet 7 | 93,824,961 | 0.15 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0008 | 33,951 | 0.0023 | 138,692 | 172,642 | 271,295 |
| Voorling End (Stoor) | Diat 4 | 1 014 209 | 0.40 | 0.02 | 0.005 | 0.4 | 0.04 | 0.04 | 0.0005 | 426 | 0.0040 | 1 700 | 2 246 | 2 402 |
| Yearling-Fed (Steer) | Diet 1 | 1,911,398 | 0.10 | 0.02 | 0.005 | 0.1 | 0.01 | 0.01 | 0.0005 | 436 | 0.0019 | 1,780 | 2,216 | 3,483 |
| | Diet 2 | 4,459,929 | 0.13 | 0.02 | 0.005 | 0.1 | 0.01 0.01 | 0.01 | 0.0006 | 1,321 | 0.0025 | 5,395 | 6,716 | 10,554 |
| | Diet 3 Diet 4 | 4,459,929 4,459,929 | 0.15 0.14 | 0.02 0.02 | 0.005 0.005 | 0.1 0.1 | 0.01 | 0.01 0.01 | 0.0007 0.0007 | 1,558 1,465 | 0.0030 0.0028 | 6,365 5,984 | 7,923 7.449 | 12,451 11,705 |
| | Diet 5 | , , | 0.14 | | 0.005 | 0.1 | 0.01 | 0.01 | | 1,572 | | 5,984 6,421 | 7,449 7,993 | |
| | | 4,459,929 | | 0.02 0.02 | | | | | 0.0007 | | 0.0030 | 6,421 6,982 | 7,993 8,692 | 12,561 |
| | Diet 6 Diet 7 | 4,459,929 80,246,863 | 0.16 0.18 | 0.02 | 0.005 0.005 | 0.1 0.1 | 0.01 0.01 | 0.01 0.01 | 0.0008 0.0009 | 1,709 34,283 | 0.0033 0.0036 | 6,982 140,049 | 8,692 174,331 | 13,658 273,949 |
| | DIEL 1 | 00,240,003 | 0.16 | 0.02 | 0.003 | 0.1 | 0.01 | 0.01 | 0.0009 | 34,203 | 0.0030 | | , | |
| | | | | | | | | | | Reduc | ed emissions based on | Total the usage of ionophores | 3,949,979 3,791,980 | 6,207,111 5,958,826 |

TABLE 19a

N2O DIRECT EMISSIONS FROM MANURE ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

Note:

Heifer replacements are included in the calf-fed, yearling-fed, and cow numbers.

Based on expert opinion, the N excretion rate is too high for cattle in feedlots, however, no data was obtained to support this theory.

 N_2O emissions have been decreased based on the assumption that ionophores are given to all cattle.

Manure management (beef data tab)
Unmanaged (left on pasture range and paddock) Stored on farms as solid Stored on farms as liquid

eq. 3.36 Holos, derived from IPCC 2006

Nexcretion_rate= PI/6.25-(PRfetal/6.25+PRlactation/6.38+Prgain/6.25)

Nexcretion_rate - N excretion rate (kg/head/day) 6.25 - conversion from dietary protein to dietary N
6.38 - conversion from milk protein to milk N

eq. 3.37 Holos, IPCC 2006

N2O-Ndirect_rate Nexcretion_rate*EFdirect

 ${\sf N2O-Ndirect_rate-emission~factor~(kg~N2O-N/kg~N)~,~Table~A4-11,~Holos,~by~handling~system}$

eq. 3.38 Holos, IPCC 2006

N2O-Ndirectmanure=N2O-Ndirect_rate*#cattle*#days

N2O-Ndirect manure- manure direct emission (kg N2O-N)

cattle - number of cattle

days = number of days in period

References

2006 IPCC Guidelines for National Greenhouse Gas Inventories

http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

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National Research Council. 2000. Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. National Academy Press, Washington, USA.

TABLE 19b

N2O INDIRECT EMISSIONS FROM MANURE ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Diet | No. of Animals * Days | N excretion rate | Fraction volatilization by handling system | Fraction volatilization by handling system | Fraction volatilization by handling system | EF volatilization by handling system | N2O-N volatilization rate for solid storage | N2O-N volatilization for solid storage | N2O-N volatilization rate for pasture | N2O-N volatilization for pasture | N2O-N volatilization for solid storage and pasture | | Fraction leached by handling system | EF leached by handling system | N ₂ O-N leaching rate | N ₂ O-N leaching | N ₂ O-N indirect manure leaching and volatilization | N ₂ O-N manure (both direct and indirect emissions) | (N : | N land manure available for land plication) |
|--|---------------------|----------------------------|--|--|---|--|--|---|--|---|-------------------------------------|---|--------------|---|----------------------------------|----------------------------------|------------------------------------|---|---|----------------------------|---|
| | | (head * day) | day) eq 3.36, Holos, Nat Research Council 2000, from IPCC | dimensionless | dimensionless | dimensionless | kg N2O-N/kg N | (kg/head/day) | (kg N ₂ O-N) | (kg/head/day) | (kg N ₂ O-N) | (kg N ₂ O-N) | | | (kg N ₂ O-N/kg N) | (kg/head/day) | (kg N ₂ O-N) | (kg N ₂ O-N) | (kg N ₂ O-N) | | kg N |
| Type of Animal | | | 2006 | Table A4-11, Holos pasture/range | Table A4-11, Holos solid storage compost intensive compost passive | Table A4-11, Holos deep bedding | Table A4-11, Holos all handling systems | eq 3.39, Holos, IPCC 2006 | áq 3.40, Holos, IPCC 200 total | 06q 3.39, Holos, IPCC 200 | 6eq 3.40, Holos, IPCC 2006 total | | | all syst, except pasture | | eq 3.41, Holos, IPCC 2006 | eq 3.42, Holos, IPCC 2006 total | eq 3.43, Holos | eq 3.44, Holos | eq 3. | 3.45, Holos |
| Calves before weaning - st Calves before weaning - st | | 194,427,747 190,420,680 | 0.02 0.07 | 0.20 0.20 | 0.45 0.45 | 0.30 0.30 | 0.01 0.01 | 9.E-05 3.E-04 | 7,903 29,827 | 4.E-05 1.E-04 | 3,587 13,538 | 11,490 43,365 | 0.30 0.30 | 0 | 0.0075 0.0075 | 4.32E-05 1.67E-04 | 4,036 15,231 | 15,526 58,596 | 60,180 227,121 | | |
| Cows | Winter Diet | 214,305,471 | 0.18 | 0.20 | 0.45 | 0.30 | 0.01 | 8.E-04 | 80,894 | 4.E-04 | 36,718 | 117,612 | 0.30 | 0 | 0.0075 | 4.02E-04 | 41,308 | 158,920 | 615,982 | | |
| | Calving Diet | | 0.20 | 0.20 | 0.45 | 0.30 | 0.01 | 9.E-04 | 95,164 | 4.E-04 | 43,195 | 138,360 | 0.30 | 0 | 0.0075 | 4.48E-04 | 48,595 | 186,954 | 724,644 | | |
| | Breeding Die | | 0.23 | 0.20 | 0.45 | 0.30 | 0.01 | 1.E-03 | 72,514 | 5.E-04 | 32,914 | 105,428 | 0.30 | 0 | 0.0075 | 5.14E-04 | 37,028 | 142,456 | 552,168 | | |
| | Pasture | 299,946,638 | 0.20 | 0.20 | 0.45 | 0.30 | 0.01 | 9.E-04 | 124,151 | 4.E-04 | 56,352 | 180,504 | 0.30 | 0 | 0.0075 | 4.40E-04 | 63,396 | 243,900 | 945,369 | | |
| Bulls | Winter Diet | 9,230,053 | 0.23 | 0.20 | 0.45 | 0.30 | 0.01 | 1.E-03 | 4,463 | 5.E-04 | 2.026 | 6.489 | 0.30 | 0 | 0.0075 | 5.14E-04 | 2,279 | 8.767 | 33,983 | | |
| bans | Calving Diet | | 0.23 | 0.20 | 0.45 | 0.30 | 0.01 | 1.E-03 | 4,868 | 5.E-04 | 2,209 | 7,077 | 0.30 | 0 | 0.0075 | 5.14E-04 | 2,486 | 9,563 | 37,066 | | |
| | Breeding Die | | 0.23 | 0.20 | 0.45 | 0.30 | 0.01 | 1.E-03 | 3,227 | 5.E-04 | 1,465 | 4,692 | 0.30 | 0 | 0.0075 | 5.14E-04 | 1,648 | 6,341 | 24,576 | | |
| | Pasture | 13,350,213 | 0.23 | 0.20 | 0.45 | 0.30 | 0.01 | 1.E-03 | 6,455 | 5.E-04 | 2,930 | 9,385 | 0.30 | 0 | 0.0075 | 5.14E-04 | 3,296 | 12,681 | 49,152 | | |
| Backgrounding - Calf-Fed | Backgroundin | g 110,770,800 | 0.08 | 0.20 | 0.45 | 0.30 | 0.01 | 4.E-04 | 19,163 | 2.E-04 | 8,698 | 27,861 | 0.30 | 0 | 0.0075 | 1.84E-04 | 9,785 | 37,646 | 145,919 | 2, | 2,342,138 |
| Calf-Fed (Heifer) | Diet 3 | 8,532,928 | 0.06 | 0.20 | 0.45 | 0.30 | 0.01 | 3.E-04 | 1,150 | 1.E-04 | 522 | 1,672 | 0.30 | 0 | 0.0075 | 1.43E-04 | 587 | 2,259 | 8,756 | | |
| | Diet 4 | 8,532,928 | 0.10 | 0.20 | 0.45 | 0.30 | 0.01 | 4.E-04 | 1,758 | 2.E-04 | 798 | 2,555 | 0.30 | 0 | 0.0075 | 2.19E-04 | 898 | 3,453 | 13,384 | | |
| | Diet 5 | 17,065,856 | 0.10 | 0.20 | 0.45 | 0.30 | 0.01 | 5.E-04 | 3,776 | 2.E-04 | 1,714 | 5,490 | 0.30 | 0 | 0.0075 | 2.35E-04 | 1,928 | 7,418 | 28,753 | | |
| | Diet 6 | 17,065,856 | 0.11 | 0.20 | 0.45 | 0.30 | 0.01 | 5.E-04 | 4,072 | 2.E-04 | 1,848 | 5,920 | 0.30 | 0 | 0.0075 | 2.54E-04 | 2,079 | 7,999 | 31,003 | | |
| | Diet 7 | 108,459,610 | 0.14 | 0.20 | 0.45 | 0.30 | 0.01 | 6.E-04 | 32,077 | 3.E-04 | 14,560 | 46,637 | 0.30 | 0 | 0.0075 | 3.15E-04 | 16,380 | 63,017 | 244,259 | | |
| Calf-Fed (Steer) | Diet 3 | 7.298.065 | 0.07 | 0.20 | 0.45 | 0.30 | 0.01 | 3.E-04 | 1.053 | 1.E-04 | 478 | 1,531 | 0.30 | 0 | 0.0075 | 1.53E-04 | 538 | 2.068 | 8.016 | | |
| | Diet 4 | 7,298,065 | 0.13 | 0.20 | 0.45 | 0.30 | 0.01 | 6.E-04 | 1,942 | 3.E-04 | 881 | 2,823 | 0.30 | 0 | 0.0075 | 2.83E-04 | 992 | 3,815 | 14,787 | | |
| | Diet 5 | 14,596,131 | 0.12 | 0.20 | 0.45 | 0.30 | 0.01 | 6.E-04 | 3,798 | 2.E-04 | 1,724 | 5,522 | 0.30 | 0 | 0.0075 | 2.77E-04 | 1,940 | 7,462 | 28,923 | | |
| | Diet 6 | 14,596,131 | 0.13 | 0.20 | 0.45 | 0.30 | 0.01 | 6.E-04 | 4,093 | 3.E-04 | 1,858 | 5,950 | 0.30 | 0 | 0.0075 | 2.98E-04 | 2,090 | 8,040 | 31,164 | | |
| | Diet 7 | 92,763,625 | 0.15 | 0.20 | 0.45 | 0.30 | 0.01 | 7.E-04 | 30,058 | 3.E-04 | 13,643 | 43,701 | 0.30 | 0 | 0.0075 | 3.45E-04 | 15,349 | 59,049 | 228,878 | | |
| Backgrounding - Yearling | FedBackgroundin | g 202,133,931 | 0.10 | 0.20 | 0.45 | 0.30 | 0.01 | 5.E-04 | 44,765 | 2.E-04 | 20,319 | 65,084 | 0.30 | 0 | 0.0075 | 2.36E-04 | 22,859 | 87,943 | 340,870 | 5, | 5,471,278 |
| Yearling - Pasture | Pasture | 169,233,166 | 0.13 | 0.20 | 0.45 | 0.30 | 0.01 | 6.E-04 | 46,307 | 3.E-04 | 21,019 | 67,325 | 0.30 | 0 | 0.0075 | 2.91E-04 | 23,646 | 90,971 | 352,609 | | |
| Yearling-Fed (Heifer) | Diet 1 | 2,234,814 | 0.09 | 0.20 | 0.45 | 0.30 | 0.01 | 4.E-04 | 419 | 2.E-04 | 190 | 609 | 0.30 | 0 | 0.0075 | 1.99E-04 | 214 | 823 | 3,191 | | |
| , | Diet 2 | 5,214,567 | 0.12 | 0.20 | 0.45 | 0.30 | 0.01 | 5.E-04 | 1,281 | 2.E-04 | 582 | 1,863 | 0.30 | 0 | 0.0075 | 2.61E-04 | 654 | 2,517 | 9,758 | | |
| | Diet 3 | 5,214,567 | 0.11 | 0.20 | 0.45 | 0.30 | 0.01 | 5.E-04 | 1,216 | 2.E-04 | 552 | 1,768 | 0.30 | 0 | 0.0075 | 2.48E-04 | 621 | 2,389 | 9,259 | | |
| | Diet 4 | 5,214,567 | 0.10 | 0.20 | 0.45 | 0.30 | 0.01 | 5.E-04 | 1,142 | 2.E-04 | 518 | 1,660 | 0.30 | 0 | 0.0075 | 2.33E-04 | 583 | 2,244 | 8,696 | | |
| | Diet 5 | 5,214,567 | 0.14 | 0.20 | 0.45 | 0.30 | 0.01 | 6.E-04 | 1,506 | 3.E-04 | 683 | 2,189 | 0.30 | 0 | 0.0075 | 3.07E-04 | 769 | 2,958 | 11,465 | | |
| | Diet 6 | 5,214,567 | 0.13 | 0.20 | 0.45 | 0.30 | 0.01 | 6.E-04 | 1,391 | 3.E-04 | 632 | 2,023 | 0.30 | 0 | 0.0075 | 2.84E-04 | 711 | 2,734 | 10,595 | | |
| | Diet 7 | 93,824,961 | 0.15 | 0.20 | 0.45 | 0.30 | 0.01 | 7.E-04 | 30,555 | 3.E-04 | 13,869 | 44,425 | 0.30 | 0 | 0.0075 | 3.46E-04 | 15,603 | 60,027 | 232,669 | | |
| Yearling-Fed (Steer) | Diet 1 | 1,911,398 | 0.10 | 0.20 | 0.45 | 0.30 | 0.01 | 4.E-04 | 392 | 2.E-04 | 178 | 570 | 0.30 | 0 | 0.0075 | 2.18E-04 | 200 | 771 | 2,987 | | |
| 0 . / | Diet 2 | 4,459,929 | 0.13 | 0.20 | 0.45 | 0.30 | 0.01 | 6.E-04 | 1,189 | 3.E-04 | 540 | 1,728 | 0.30 | 0 | 0.0075 | 2.84E-04 | 607 | 2,335 | 9,051 | | |
| | Diet 3 | 4,459,929 | 0.15 | 0.20 | 0.45 | 0.30 | 0.01 | 7.E-04 | 1,402 | 3.E-04 | 637 | 2,039 | 0.30 | 0 | 0.0075 | 3.34E-04 | 716 | 2,755 | 10,678 | | |
| | Diet 4 | 4,459,929 | 0.14 | 0.20 | 0.45 | 0.30 | 0.01 | 6.E-04 | 1,318 | 3.E-04 | 598 | 1,917 | 0.30 | 0 | 0.0075 | 3.14E-04 | 673 | 2,590 | 10,038 | | |
| | Diet 5 | 4,459,929 | 0.15 | 0.20 | 0.45 | 0.30 | 0.01 | 7.E-04 | 1,415 | 3.E-04 | 642 | 2,057 | 0.30 | 0 | 0.0075 | 3.37E-04 | 722 | 2,779 | 10,772 | | |
| | Diet 6 | 4,459,929 | 0.16 | 0.20 | 0.45 | 0.30 | 0.01 | 7.E-04 | 1,538 | 3.E-04 | 698 | 2,237 | 0.30 | 0 | 0.0075 | 3.67E-04 | 786 | 3,022 | 11,714 | | |
| | Diet 7 | 80,246,863 | 0.18 | 0.20 | 0.45 | 0.30 | 0.01 | 8.E-04 | 30,854 | 4.E-04 | 14,005 | 44,859 | 0.30 | U | 0.0075 | 4.09E-04 | 15,755 | 60,615 | 234,946 | | |
| Note: | | | | | | | | | | | | | | | | | Total | 1,373,403 | 5,323,382 | (kg N ₂ O-N) 7, | 7,813,416 kg N |
| Heifer replacements are in | cluded in the calf- | fed, yearling-fed, and cow | numbers. | volatilization | | | | | | | | | | | | | | 2,158,205 | | kg N ₂ O | |
| | | | | mun off | | | | | | | | | | | | | | | | | |

eq. 3.39 Holos, IPCC 2006

N2O-Nvolatilization_rate= Nexcretion_rate*Frac volatilization*EF volatilization

N2O-N volatilization_rate = manure volatilization Nemission rate (kg/head/day)

Frac volatilization - volatilization fraction (Table A4-11, Holos, by handling system)

EF volatilization - emission factor for volatilization (kg N2O-N/kg N) (table A4-11, Holos, by handling system)

eq. 3.40 Holos, IPCC 2006 N2O-N volatilization = N2O-N volatilization_rate*#cattle*#days N2O-N volatilization - manure volatilization N emission (Kg N2O-N)

eq. 3.41 Holos, IPCC 2006
N2O-N leaching_rate= N excretion_rate*Frac leach*EF leaching
N2O-N leaching_rate= N excretion_rate*Frac leach*EF leaching
N2O-N leaching_rate- manure leaching N emission rate (kg/head/day)
Frac leaching_rate relaching fraction (Table A4-11, Holos, by handling system)
EF leaching - emission factor for leaching (kg N2O-N/kg N) (Table A4-11, Holos, by handling system)

eq. 3.42 Holos, IPCC 2006 N2O-N leaching = N2O-N leaching_rate*#cattle*# days N2O-N leaching - manure leaching N emission (kg N2O-N)

eq. 3.43 Holos N2O-N indirectmanure= N2O-N volatilization+ N2O-N leaching N2O-N indirect manure - manure indirect emission (kg N2O-N)

eq. 3.44 Holos N2O-N manure = N2O-N directmanure + N2O-N indirect manure N2O-N manure - manure N emission (kg N2O-N)

eq. 3.45 Holos, IPCC 2006 N landmanure = (N excretion_rate*#cattle*#days)*[1 -(Frac volatilization +Frac leach)] N landmanure - manure available for land application (kg N)

2006 IPCC Guidelines for National Greenhouse Gas Inventories http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

Little, S., Lindeman, J., Maclean, K., Janzen, H., 2008. HOLOS - A tool to estimate and reduce greenhouse gases from farms. Methodology & algorithms for version 1.1.x http://dsp-psd.pwgsc.gc.ca/collection/2009/agr/A52-136-2008E.pdf

National Research Council. 2000. Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. National Academy Press, Washington, USA.

TOTAL ON-FARM ENERGY USAGE FOR ALBERTA BEEF FARMS PER CALF CROP ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Energy (TJ) | % Total Energy | Volume of Fuel (m ³) |
|-------------|-------------|----------------|----------------------------------|
| Diesel | 16,722 | 61.1% | 477,053 |
| Gasoline | 2,845 | 10.4% | 85,902 |
| Natural Gas | 3,564 | 13.0% | 94,706 |
| Electricity | 4,007 | 14.7% | N/A |
| Propane | 210 | 0.8% | 4 |
| Total | 27,348 | 100% | 657,666 |

Reference

Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult

ECOINVENT PROCESSES USED FOR ENERGY PRODUCTION AND CONSUMPTION ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Process on the Activity Map | Ecoinvent Process |
|----------|---|---|
| E1 | Produce crude | proxy of crude oil, at production onshore |
| E4 | Transport crude | crude oil, production, at long distance transport |
| E7a, E7b | Refine crude into diesel/coloured diesel | proxy of diesel, at refinery |
| E9a, E9b | Transport diesel/coloured diesel | Diesel at regional storehouse (transport to end user) |
| E7c | Refine crude into coloured gasoline | proxy of petrol, unleaded, at refinery |
| E9a, E9b | Transport diesel/coloured diesel | Oil fuels (transport to end user) |
| E9c | Transport coloured gasoline | Petrol, unleaded, at regional storage RER |
| E2 | Produce natural gas | proxy of natural gas, unprocessed, at extraction |
| E5 | Transport natural gas | transport, natural gas, pipeline, long distance |
| E8 | Process natural gas | proxy of natural gas, at production. Processing of |
| | | natural gas including sweetening |
| E10 | Transport and distribution of natural gas | Natural gas at consumer |
| E11 | Combust natural gas | Natural gas, burned in industrial furnace >100 kW |
| E3, E6 | Generate and transmit electricity | proxy of electricity, low voltage, at grid |

TOTAL WASTE GENERATED ON ALBERTA BEEF FARMS PER CALF CROP ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Amount Buried (tonnes) | Amount Burned (tonnes) |
|---------------|---------------------------|---------------------------|
| Polypropylene | 344 | 1,031 |
| Polyethylene | 463 | 1,390 |
| Total | 807 | 2,421 |

TABLE 23

TOTAL EMISSIONS FOR THE PRODUCTION AND COMBUSTION OF AGRICULTURAL PLASTICS PER CALF CROP ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Quantity of Plastic Produced | Emissions From Plastics Production | Emissions From Burning Plastics (75%) |
|---------------|------------------------------|---------------------------------------|--|
| | (tonnes) | (tonnes CO ₂ e) | (tonnes CO ₂ e) |
| Polypropylene | 1,374 | 2,721 | 1,858 |
| Polyethylene | 1,854 | 3,429 | 2,505 |
| Total | 3,228 | 6,151 | 4,363 |

Reference

Calculated based on data from Alberta Plastics Recycling Association. Volume 4. Spring 2008. Available at: http://www.recycleyourplastic.ca/pdf/apra_news_spr08.pdf

TOTAL BEDDING REQUIREMENTS FOR ALBERTA BEEF FARMS PER CALF CROP ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Bedding Required (kg/head/day) | Total Bedding (tonnes) |
|---------------------|-----------------------------------|---------------------------|
| Cow/Calf Operations | 0.55 | 509,445 |
| Feedlots | 0.42 | 422,074 |
| Total | 0.97 | 931,519 |

References

Cow/Calf Operations: From conversation with Dale Kaliel with Agriprofit\$; aggregate data, 5 year average for cow-calf operations

Feedlots: From Meeting with ARD and Steering Committee on November 30, 2009.

TABLE 25

SUMMARY OF TOTAL GHG EMISSIONS AND GHG EMISSIONS PER CALF-FED AND YEARLING-FED SYSTEMS
ALBERTA AGRICULTURE AND RURAL DEVELOPMENT
EDMONTON, ALBERTA

| | Total Em | issions | Emissions from C | Calf-Fed System | Emissions from Ye | arling-Fed System |
|---|----------------------|------------|------------------|-----------------|-------------------|-------------------|
| | kt CO ₂ e | % of total | kt CO₂e | % of total | kt CO₂e | % of total |
| Construction | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Forage and Cereal Sub-activities | 1,205 | 5.8 | 600 | 6.6 | 605 | 5.2 |
| On-Farm Energy Generation Activities | 3,846 | 18.6 | 1,730 | 19.1 | 2,115 | 18.2 |
| O&M Activities | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Cereal Activities | 338 | 1.6 | 189 | 2.1 | 149 | 1.3 |
| Forage Activities | 286 | 1.4 | 120 | 1.3 | 166 | 1.4 |
| Feedlot and Pasture Activities | 609 | 2.9 | 282 | 3.1 | 327 | 2.8 |
| Cow Transportation | 25 | 0.1 | 11 | 0.1 | 14 | 0.1 |
| Bull Transportation | 3 | 0.0 | 1 | 0.0 | 2 | 0.0 |
| Yearling-Fed Transportation | 108 | 0.5 | 0 | 0.0 | 108 | 0.9 |
| Calf-Fed Transportation | 66 | 0.3 | 66 | 0.7 | 0 | 0.0 |
| Cattle Enteric Fermentation Emissions | 10,592 | 51.1 | 4,440 | 49.0 | 6,152 | 52.8 |
| Cattle Methane Emissions from Manure | 314 | 1.5 | 127 | 1.4 | 178 | 1.5 |
| Soil Carbon Change in Soil From Land Us | -236 | -1.1 | -105 | -1.2 | -131 | -1.1 |
| Direct CO ₂ Emissions From Managed Soi | 189 | 0.9 | 84 | 0.9 | 105 | 0.9 |
| N ₂ O from GHG beef activity, soil, crop | 3,374 | 16.3 | 1,519 | 16.8 | 1,856 | 15.9 |
| Total P emissions from run-off | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Total Emissions | 20,718 | 100.0 | 9,065 | 100.0 | 11,645 | 100.0 |
| Total Emissions Per Functional Unit (kg CO ₂ e/kg shrunk live weight) | 14.521 | | 14.118 | | 14.840 | |
| Total Emissions Per Functional Unit without Soil Carbon Change (kg CO ₂ e/kg shrunk live weight) | 14.687 | | 14.281 | | 15.007 | |

SUMMARY OF N_2O EMISSIONS FROM MANURE MANAGEMENT AND SOIL CROPPING ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | kg N2O-N | kg N2O |
|---|-----------|------------|
| Direct N2O Emissions From Manure Management | 3,791,980 | 5,958,826 |
| Indirect N2O Emissions From Manure Management | 1,373,403 | 2,158,205 |
| N2O emissions from cropping and land use | 2,040,662 | 3,206,754 |
| Total N2O emissions | 7,206,045 | 11,323,785 |

Total kg CO2e 3,374,487,812

CONTRIBUTION OF ACTIVITIES TO AQUATIC ACIDIFICATION EFFECT ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Total Acidification | | Calf-Fed Syste | m Acidification | Yearling-Fed System Acidification | | |
|--|----------------------|------------|----------------|-----------------|-----------------------------------|------------|--|
| | kt SO ₂ e | % of total | kt SO₂e | % of total | kt SO₂e | % of total | |
| Construction | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | |
| Forage and Cereal Sub-activities | 8.2 | 24.9 | 4.1 | 26.5 | 4.1 | 23.4 | |
| On-Farm Energy Generation Activities | 13.0 | 39.5 | 5.9 | 38.3 | 7.2 | 40.8 | |
| O&M Activities | 0.0 | 0 | 0.0 | 0.0 | | 0 | |
| Cereal Activities | 2.6 | 7.8 | 1.4 | 9.3 | 9.3 | | |
| Forage Activities | 2.4 | 7.2 | 1.0 | 6.5 | 1.4 | 7.8 | |
| Feedlot and Pasture Activities | 5.8 | 17.7 | 2.6 | 17.0 | 3.2 | 18.2 | |
| Cow Transportation | 0.1 | 0.4 | 0.1 | 0.3 | 0.1 | 0.4 | |
| Bull Transportation | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| Yearling-Fed Transportation | 0.5 | 1.6 | 0.0 | 0 | 0.5 | 2.9 | |
| Calf-Fed Transportation | 0.3 | 1.0 | 0.3 | 2.1 | 0.0 | 0 | |
| Cattle Enteric Fermentation Emissions | 0.0 | | 0.0 | 0 | 0.0 | 0 | |
| Cattle Methane Emissions from Manure | 0.0 | | 0.0 | 0 | 0.0 | 0 | |
| Soil Carbon Change in Soil From Land Use | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | |
| Direct CO ₂ Emissions From Managed Soils | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | |
| N ₂ O from GHG beef activity, soil, crop | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | |
| Total P emissions from run-off | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | |
| Total Aquatic Acidification | 32.8 | 100 | 15.3 | 100 | 17.5 | 100 | |
| Total Acidification Per Functional Unit (kg SO_2e/kg shrunk live weight) | 0.0230 | | 0.0238 | | 0.0224 | | |

CONTRIBUTION OF ACTIVITIES TO AQUATIC EUTROPHICATION EFFECT ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Total Eutrophication | | Calf-Fed System Eutrophication | | Yearling-Fed System Eutrophication | |
|---|----------------------|------------|--------------------------------|------------|------------------------------------|------------|
| | kt PO ₄ e | % of total | kt PO ₄ e | % of total | kt PO₄e | % of total |
| Construction | 0.000 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Forage and Cereal Sub-activities | 0.203 | 3.6 | 0.100 | 4.0 | 0.103 | 3.4 |
| On-Farm Energy Generation Activities | 0.920 | 16.6 | 0.415 | 16.5 | 0.508 | 16.7 |
| O&M Activities | 0.000 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Cereal Activities | 0.028 | 0.5 | 0.015 | 0.6 | 0.012 | 0.4 |
| Forage Activities | 0.024 | 0.4 | 0.010 | 0.4 | 0.014 | 0.4 |
| Feedlot and Pasture Activities | 0.218 | 3.9 | 0.098 | 3.9 | 0.121 | 4.0 |
| Cow Transportation | 0.002 | 0 | 0.001 | 0.0 | 0.001 | 0 |
| Bull Transportation | 0.000 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Yearling-Fed Transportation | 0.010 | 0 | 0.000 | 0.0 | 0.010 | 0 |
| Calf-Fed Transportation | 0.006 | 0 | 0.006 | 0.2 | 0.000 | 0 |
| Cattle Enteric Fermentation Emissions | 0.000 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Cattle Methane Emissions from Manure | 0.000 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Soil Carbon Change in Soil From Land Use | 0.000 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Direct CO ₂ Emissions From Managed Soils | 0.000 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| N ₂ O from GHG beef activity, soil, crop | 0.000 | 0 | 0.000 | 0.0 | 0.000 | 0 |
| Total P emissions from run-off | 4.146 | 74.6 | 1.866 | 74.3 | 2.281 | 74.8 |
| Total Aquatic Eutrophication | 5.56 | 100.0 | 2.51 | 100.0 | 3.05 | 100.0 |
| Total Eutrophication Per Functional Unit (kg PO ₄ e/kg shrunk live weight) | 0.00389 | | 0.00391 | | 0.00388 | |

TABLE 29

CONTRIBUTION OF ACTIVITIES TO NON-RENEWABLE ENERGY CONSUMPTION EFFECT ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Total Energy | | Calf-Fed System Energy | | Yearling-Fed System Energy | |
|---|--------------|------------|------------------------|------------|----------------------------|------------|
| | TJ-eq | % of total | TJ-eq | % of total | TJ-eq | % of total |
| Construction | 0 | 0 | 0 | 0 | 0 | 0 |
| Forage and Cereal Sub-activities | 18,373 | 5.3 | 9,186 | 5.8 | 9,188 | 4.9 |
| On-Farm Energy Generation Activities | 310,298 | 89.6 | 139,634 | 88.9 | 170,664 | 90.1 |
| O&M Activities | 0 | 0 | 0 | 0 | 0 | 0 |
| Cereal Activities | 4,988 | 1.4 | 2,782 | 1.8 | 2,205 | 1.2 |
| Forage Activities | 4,182 | 1.2 | 1,761 | 1.1 | 2,421 | 1.3 |
| Feedlot and Pasture Activities | 5,383 | 1.6 | 2,517 | 1.6 | 2,865 | 1.5 |
| Cow Transportation | 402 | 0.1 | 181 | 0.1 | 221 | 0 |
| Bull Transportation | 51 | 0 | 23 | 0 | 28 | 0 |
| Yearling-Fed Transportation | 1,741 | 0.5 | 0 | 0 | 1,741 | 0.9 |
| Calf-Fed Transportation | 1,065 | 0.3 | 1,065 | 1 | 0 | 0 |
| Cattle Enteric Fermentation Emissions | 0 | 0 | 0 | 0 | 0 | 0 |
| Cattle Methane Emissions from Manure | 0 | 0 | 0 | 0 | 0 | 0 |
| Soil Carbon Change in Soil From Land Use | 0 | 0 | 0 | 0 | 0 | 0 |
| Direct CO ₂ Emissions From Managed Soils | 0 | 0 | 0 | 0 | 0 | 0 |
| N ₂ O from GHG beef activity, soil, crop | 0 | 0 | 0 | 0 | 0 | 0 |
| Total P emissions from run-off | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Non-Renewable Energy (TJ-eq) | 346,483 | 100 | 157,149 | 100 | 189,334 | 100 |
| Total Energy Per Functional Unit (MJ-eq/kg shrunk live weight) | 7/17 0 | | 244.8 241.3 | | | |

COMPARISON OF ENTERIC FERMENTATION EMISSIONS TO EXISTING LITERATURE ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Alberta | Peters et al (2009) 1 | Beauchemin and McGinn (2005) ² | DeRamus et al (2003) ³ | Johnson and Johnson (1995) ⁴ | Guan et al (2006) ⁵ | Basarb et al (2005) ⁶ | <i>Basarb et al</i> (2005) ⁷ | Basarb et al (2005) ⁸ |
|----------------|---------|-----------------------|--|--------------------------------------|--|-----------------------------------|-------------------------------------|---|-------------------------------------|
| Average | 0.184 | - | - | - | 0.322 | - | 0.220 | 0.180 | 0.159 |
| Cows and Bulls | 0.289 | - | - | 0.230 | - | - | 0.346 | 0.327 | 0.242 |
| Calf-Fed | 0.157 | 0.180 | 0.108 | - | - | - | 0.177 | 0.133 | 0.125 |
| Yearling-Fed | 0.169 | 0.180 | 0.185 | - | - | 0.123 | 0.210 | 0.147 | 0.159 |

NOTES:

All values in kilograms of methane per head*day (kg CH₄ head⁻¹ d⁻¹)

- 1 Value reported from cattle yielding 200-250 kg Hot Standard Carcass Weight (HSCW)
- 2 Values for barley backgrounding and finishing diets.
 Values adjusted to account for reduced feed intake during the study.
- 3 Average value for mature Simbah cows
- 4 Value reported for a "typical beef animal"
- 5 Average value for Angus yearling steers fed high- and low-concentrate diets
- 6 Values based on those presented in Table 5 (CowBytes)
- 7 Values based on those presented in Table 4 (Western Canada literature)
- 8 Values based on those presented in Table 3 (IPCC Tier 2)

References

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DeRamus, H. Alan, Clementa, Terry C., Giampolaa, Dean D. and Dickison, Peter C., 2003. Methane Emissions of Beef Cattle on Forages, Efficiency of Grazing Management Systems, Journal of Environmental Quality 32:269-277 (2003).

Guan, H., Wittenberg, K. M., Ominski, K. H. and Krause, D. O., 2006. Efficacy of ionophores in cattle diets for mitigation of enteric methane, J. Anim Sci. 2006. 84:1896-1906. doi:10.2527/jas.2005-652 Johnson, K. A. and Johnson, D. E.,. 1995. Methane emissions from cattle, Journal of Animal Science, Vol 73, Issue 8 2483-2492.

Peters, G.M., Rowley, H.V., Wiedemann, S., Tucker, R., Short, M.D., Shulz, M. Red Meat Production in Australia: Life Cycle Assessment and Comparison with Overseas Studies, Environmental Science & Technology. Published January 22, 2010.

APPENDIX A

TECHNICAL MEMORANDUM PREPARED BY CONESTOGA-ROVERS & ASSOCIATES FOR ALBERTA AGRICULTURE AND RURAL DEVELOPMENT, ENTITLED "LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION LITERATURE REVIEW",

DATED NOVEMBER 25, 2009



651 Colby Drive, Waterloo, Ontario, Canada N2V 1C2 Telephone: (519) 884-0510 Fax: (519) 884-0525

www.CRAworld.com

TECHNICAL MEMORANDUM

To: Emmanuel Laate, Alberta Agriculture and Rural

Ref. No.: 057586

Development

FROM: Monica Radulescu/Stephen Ball/Tej Gidda (CRA)/cb/1

DATE: November 25, 2009

RE: Life Cycle Assessment of Alberta Beef Production

Literature Review

Alberta Agriculture and Rural Development Economics and Competitiveness Division

1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) and the Pembina Institute (Pembina) (Project Team) have been retained by Alberta Agriculture and Rural Development (ARD) to perform a first approximation of the carbon footprint intensity and other environmental impacts including water and nutrients, such as nitrogen and phosphorus, of the beef production industry in Alberta using Life Cycle Analysis (LCA). The study will identify the environmental impacts of beef production in Alberta per functional unit.

This technical memorandum is part of Phase 1 of the project – Literature Review and is structured within five sections, as follows:

- 1.0 Introduction
- 2.0 Overview of LCA methodologies on beef production
- 3.0 Case studies
- 4.0 Recommendations
- 5.0 References

A glossary has also been included at the end of this literature review to explain some of the terms that are present in literature sources. CRA notes that terminology utilized in literature sources has been described in this review without interpretation or translation, in order to be consistent with the original studies. The glossary has been added to explain the various important terms that are present in the literature. It should also be noted that, in some cases, the objectives of these other studies are different from those of this assignment, and thus some comparators or items may be raised in this review that are not directly pertinent to the present study.

The main topics of the present memo are:

• Literature review and database identification



 Compilation of GHG parameters and processes, where inputs and outputs for all processes of beef production are identified

Identification and documentation of standardized Beef LCA approaches

The literature review addressed the most recent and significant published scientific articles, conference papers and grey literature documenting LCA advances of beef production.

Firstly, a comprehensive overview of the state-of-the-art LCA literature on food production, with special emphasis on beef production, was performed. The literature review was used as a base to compile knowledge about current LCA methodologies, including:

- Definition of the goal and scope of the LCA
- Setting-up of the system boundaries
- Definition of the functional unit
- Selection of a co-product allocation method (when necessary)
- Building of the life cycle inventory based on primary and secondary data resources
- Implementation of the life cycle impact assessment methodologies

Secondly, specific LCA of beef production studies were reviewed. The selection of the reviewed LCA case studies encompassed a variety of beef production systems, mainly from cradle-to-farm gate, performed in different geographic locations (Japan, Ireland, Switzerland, and Brazil). Overall conclusions were summarized, including:

- Identification of methodological inconsistencies between the different LCA studies
- Presentation of the numerical results of greenhouse gases (GHG) emissions
- Identification of the hot-spots during the life cycle of beef production, from cradle-to-farm gate

Finally, based on the knowledge presented in the literature review and the Project Team's experience with greenhouse gas analysis, agricultural knowledge including the livestock industry and LCA expertise, a summary of recommendations for the current LCA of beef production in Alberta was presented. The recommendations included definition of goal and scope of the study, delineation of the system boundaries, selection of the functional unit, identification of data needs and database resources (including primary and secondary data) as part of the life cycle inventory (LCI), and assessment of the available life cycle impact assessment (LCIA) methods that will fit best the nature of data acquired during the LCI.

1.1 Background

Provision of food has always been a basic human need. With the development of the society and industrialization, the traditional extensive food production systems have been replaced by intensive strategies, in an attempt to meet the growing demands of a growing population. However, the shift towards intensive strategies is made on the expense of the depletion of natural resources and pollution (Kramer et al., 1999, Nonhebel 2004, Tukker et al., 2005).

The traditional human work force used in the past has been replaced by mechanical power, which leads to increased use of nonrenewable fossil energy resources. Inputs to the agricultural farms and livestock production are often imported from different production systems. Fertilizers, manure and feed are purchased outside the farm, resulting in increased transportation and production of by-products that cannot be used by the farm. Outputs from the farm system are transported to the market or handled as waste. Economic feasibility considerations have shifted the tradition of mixed crop to monoculture. All of the above-mentioned factors are translated into increased environmental loads.

In light of public concerns and legislative requirements, Life Cycle Analysis (LCA) becomes an increasingly used tool in improving the environmental performance of products and production systems. LCA studies address the environmental aspects and potential impacts throughout a product's life from raw material acquisition through production, use, and disposal (ISO 14040, 1997). Given the wide range of processes involved in the life cycle of a certain product and the versatility of the LCA as an environmental assessment tool, LCA is widely used in product development and improvement, strategic planning, environmental performance indicator selection and marketing (ISO 14040, 2006).

Based on the recent development of LCA methodologies, the use of LCA in agricultural and livestock food production presents a rapidly increasing trend. This trend is emphasized by the need for reliable and comprehensive environmental information, used further by the policy makers, producers and consumers for the selection of the most sustainable agricultural products. The LCA of food products brings information about the production system, identification of the hot-spots during the life-cycle of the product, short-term optimization plans and long-term strategic planning (Ceuterick et al, 1998).

To date, several reviews have documented the advance of agricultural and livestock LCA studies (Foster et al., 2006; Boer, 2002; Ekvall and Finnveden, 2001; Adisa, 1999; Andersson et al., 1994, Poritosh et al., 2009). Specific LCA studies have also addressed the environmental impacts created by agricultural and livestock production (Cederberg and Stadig, 2003, Cederberg and Darelius, 2002, Ogino et al, 2004, Ogino et al, 2007, Casey and Holden, 2006a,b).

A review of the LCA literature indicates that the agricultural and livestock production is the hot-spot in the life cycle of food products.

2.0 OVERVIEW OF LCA METHODOLOGIES ON BEEF PRODUCTION

At a time when international trade on food products, including beef and other meat, continue to increase, the LCA methodology is applied more and more often to agricultural and livestock products and processes. Various LCA studies carried out so far involved agricultural and livestock products, specifically beef production. LCA studies on beef production seldom extended beyond the beef production stage. Studies which cover more of the life cycle indicate that agricultural production is an important source of impacts in the life cycle of meat products, including beef (Foster et al., 2006, Roy et al., 2008).

Several of the reviewed LCA studies, of particular interest to the LCA beef production, are listed below and also referenced though the text:

• Evaluating environmental impacts of the Japanese beef cow-calf system by the life cycle assessment method, Ogino et al, 2007

 Greenhouse Gas Emissions from Conventional, Agri-Environmental Scheme, and Organic Irish Suckler-Beef Units, Casey and Holden, 2006a

- Quantification of GHG emissions from sucker-beef production in Ireland, Casey and Holden, 2006b
- Comparative life cycle assessment of beef, pork and ostrich meat: a critical point of view, Núñez et al.,
 2005
- Environmental impacts of the Japanese beef-fattening system with different feeding lengths as evaluated by a life cycle assessment method, Ogino et al., 2004
- System expansion and allocation in life cycle assessment of milk and beef production, Cederberg and Stadig, 2003
- Life cycle assessment of Japanese beef-fattening system: influence of feeding length on environmental loads, Ogino et al., 2002
- Using LCA methodology to assess the potential environmental impact of intensive beef and pork production, Cederberg and Darelius, 2002

2.1 System Boundaries

In LCA, the system boundary should ideally be set where nature ends and the technological system proceeds. However, for food production, the choice of system boundaries is problematic because the inclusion of biological processes renders the distinction between technological systems and nature unclear (Berlin and Uhlin 2004, Berlin 2002). Two aspects have to be taken into account when setting the system boundaries:

- Where to set the system boundaries between the system under study and other man-made systems
- Where to set the system boundaries between the technosphere (as part of the physical environment affected through building or modification by humans) and nature

The boundaries between technosphere and nature are of particular interest especially at the beginning of the food life cycle, because the life cycle of food products is tightly interlinked with nature.

Ideally, LCA should include all phases of the food life cycle, from raw materials to consumption and waste disposal. To date, only a few studies have attempted to cover the entire life cycle of a food product. The majority of the LCA research studies cover only those aspects of the product life cycle that are considered most significant. Figure 2.1 depicts the general life cycle of most products. For food products, the production phase represents agricultural and livestock activity.

While the LCA studies of beef product usually omit the beef consumption and waste handling phases, Jungbluth et al. (2000) showed that the direct environmental impact of the consumption and waste handling phases were of minor importance relative to the production phase. However, the minimization of product loss in the consumption phase is important because all the environmental impact in the life cycle is related to the product which is actually consumed (Poritosh et al., 2009).

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2.2 The Functional Unit

The primary function of food is to satisfy the human body's need for nutrition, followed by other functions, such as providing energy and nutrients for the body and maintaining a good quality over time. The functional unit can reflect one or several of these aspects.

In LCA of beef production, the most common, one-dimensional functional unit is based on mass (1 kg) alone. The mass is a simple measurement of the quantity of the product and is often used to quantify the price of the product.

When the functional unit is based on mass, the water content of the beef product can be crucial (Schau and Fet, 2008). Water adds both mass and volume to the beef product while other functions or quality aspects, like nutrients, energy and protein content remain the same or similar. If the functional unit is based on mass of the beef product, than the quantity of water in the product can have an important significance. Using the total dry mass as a basis for the functional unit could be used to compare the same products with different preservation techniques (dried or fresh). Using mass as the basis for the functional unit, as is the case for the majority of the LCA's of beef production, is straightforward and easy to understand, but ignores an important function of beef products.

However, other functional units can be used for beef as a product. Essentially, it is important to find a common unit that the environmental impact of the products can be evaluated against.

The functional unit can be chosen to reflect the quality of the beef product described by the nutrient content, based on a range of factors like the amount of carbohydrate, essential amino acids, fat and protein in the beef. Marshall (2001) used the nutrient content as the functional unit in three different ways:

- Amount to provide 1 kilogram of a nutrient
- Amount to provide the daily recommended dietary intake (RDI) for a nutrient
- Amount to provide the summation of the amounts that provide the daily RDI for each nutrient

The functional unit can also be based solely on energy content of the food. Martin and Seeland (1999) related the emission of nitrogen (N), phosphorus (P) and methane (CH₄) to the protein output for human consumption from beef production systems. Energy content is usually presented together with the content of fat and protein. One possible explanation why energy content alone is rarely used as a functional unit in LCA may be that the fat content which influences the energy content varies for some beef products between different locations and seasons. Such variations make energy content as a functional unit more complex to use compared to mass.

The protein content is also a main physical function of food. The protein content of beef depends on breed of cattle and diet. The choice of diet affects the environmental impact of the system; as a result, using protein content as a functional unit may be useful (Schau and Fet, 2008).

Köllner (2003) mentions the possibility of basing the functional unit on biodiversity. Land use, in addition to serving as a basis for the functional unit, is increasingly used as an impact category in many studies. The development of a land use impact category is described in Lindeijer 2000, Lindeijer et al. 2002, and Udo de Haes 2006.

A functional unit based on mass, such as the annual beef consumption per person or typical portion or packaging, is relatively easy to understand but can vary according to personal behavior of people and product packaging. As meals are usually different from day to day, the most appropriate functional unit for food can be reflected by the one-year consumption.

Ideally, the economic value used as functional unit should allow comparisons between ranges of different products. However, the difference in prices for beef products with the same function can create rebound effects and using only economic value as the functional unit may not be sufficient for a buying decision.

Another approach to the value of the product is the so-called "emotional value" (Dutilh and Kramer, 2000). The emotional value is reflected by the price of the product and, in the meantime, is independent of the nutritional components and the energy requirements. Given these considerations, the emotional value as the functional unit is strongly related to the economic value. Using the emotional value as the functional unit avoids supplementary considerations related to quality and nutritional facts. Quality aspects depend on the storage conditions, on time and on preparation mode, while the nutritional values of some nutrients depend on the choice of complimentary foods (Andersson et al. 1994).

2.3 Co-Product Allocation Procedures

The co-product allocation strongly influences the result of an LCA. The ISO 14044 standard presents a systematic way of dealing with the co-product allocation for food products. One of the strategies for the LCA of food products is the economic co-product allocation; however, this approach should always be used with care.

The most usual functional unit in the LCA of beef production studies, mass (1 kg), eliminates in the vast majority of the cases the co-product allocation problem.

The outstanding co-product allocation issues are solved according to the priorities in ISO 14044, taking into account that, in beef production, biological causality should be placed on the same level with physical causality (Schau and Fet, 2008).

As beef production is characterized by closely interlinked subsystems (Cederberg and Stadig 2003, Ceuterick et al. 1998), the co-production in LCA of beef is a common issue. For example, in the production of milk and beef "The two production schemes are closely interlinked; surplus calves and meat from culled dairy cows are an important base for beef production" (Cederberg and Stadig 2003, p. 350). When processes result in more than one economic output, ISO 14044 (2006) suggests three approaches:

- Allocation is avoided by separating multifunctional processes into sub-processes or through system expansion
- Allocation is performed according to physical relationships between the environmental burdens and the functions
- Impacts are allocated according to the relationships (i.e. economic) between environmental burdens and functions

Cederberg and Stadig (2003) performed an LCA study of milk and beef production systems based on the system expansion approach and compared the result to economic allocation. The system of combined milk and meat production was expanded by the alternative production of meat through suckling cows which

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deliver meat and calves for meat production, but no milk. By subtracting the result from the milk only production LCA from that of the combined milk and beef production LCA, the environmental impact of beef alone can be found. Cederberg and Stadig (2003) conclude that the most reliable results are obtained when system expansion is preferred over economic allocation.

The biological causality between the amount and quality of the feed and the output milk and meat, in addition to allocation based on economic value and mass, was used by Cederberg and Mattsson (2000). Another biological causality used to allocate between milk and meat (Eide, 2002) is the demand for fodder needed for lactation, body maintenance and recruiting of cows' calves. The use of biological causality is illustrated by a hypothetical example, as follows: based on food composition type A, a cow produces 5,000 litres of milk and 600 kg meat and emits 50 kg methane. If the milk production has to increase by one litre while keeping the meat production constant, this can be done by changing the food composition to food type B, which will increase the methane emissions by 0.005 kg. In this manner, the methane emissions can be allocated as follows: 0.005 kg methane per kg milk allocates 25 kg of methane to the milk (5000×0.005 kg = 25 kg), while the remaining 25 kg of methane are allocated to the meat (Schau and Fet, 2008).

Another strategy used to avoid the allocation issue is to subdivide the unit process; however, subdividing the unit requires more detailed information on the processes, on the expense of increased costs and/or data research. In light of the sub-divided unit, it can be argued that Cederberg and Mattsson (2000), by using a biological causality for fodder demand and the production of milk, calves and meat, actually sub-divide the unit process. On the other hand, Ekvall and Finnveden (2001) argue that in order to sub-divide a process, that process should be separated in space or time, which is not the case for milk and beef production in a cow. Based on this consideration, Ekvall and Finnveden (2001) conclude that the allocation problem is solved very rarely by subdividing.

Various LCA practitioners argue that the use of system expansion generates more reliable results than the ones obtained by using any other co-product allocation procedure. One of the downsides of system expansion is that the method is more complex, and needs more data from other systems. In addition, when the system expansion is applied without substituting the additional function, the functional unit encompasses more than intended. For example, in a beef production system that also produces milk, system expansion without substituting leads to a system with a function of delivering both milk and beef, which belongs to the product category of food, but not to milk or meat. A system expansion with subtracting of the additional function, also called "avoided burden approach", already applied by Thrane (2006) for LCA of fish products, solved this problem.

The ISO 14044 standard gives references to the handling of co-product allocation based on physical causality, but not on biological causality. Because food production usually includes biological processes, allocation according to biological causalities is quite appropriate. In the case of beef production, biological causality should be equal to physical causality, as long as the different products and functions "reflect the way in which the inputs and outputs are changed by quantitative changes in the products or functions delivered by the system" (ISO 14044, 2006). For example, the amount of greenhouse gas (GHG) methane emissions (output) can be reduced by changes in the fodder composition (input) for cows (Giger-Reverdin et al., 2003, Ward et al., 1993). The changes in the fodder composition are also important for the quantity and quality of milk and meat, as products delivered by the system (Berlin, 2002, Cederberg and Mattsson, 2000).

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The most used approach in the LCA studies is economic co-product allocation, based on two motivations:

- The economic value of the product is the driving force of the producer (Ziegler and Hansson, 2003)
- Economic co-product allocation is often the easiest way to perform the allocation if economic data are easily obtained

Although ISO 14044 (2006) mentions the economic value as a basis for allocation, it also states that: "The inventory is based on material balances between input and output. Allocation procedure should therefore approximate as much as possible such fundamental input/output relationship and characteristics". Because most studies use mass or volume as a relevant measure of the system's performance, by choosing a functional unit related to mass or volume, the mass or volume should also be relevant for allocation. Economic value used as the basis for the allocation involves prices, which for food production systems are sensitive to subsidies (FAO Media Office 2003, Schrank 2003). Therefore, using an economic based allocation could lead to loss of information or double counting.

A good measure of the correct use of allocation is the following: using economic allocation when the functional unit is based on mass (volume) should give the same result as when using a functional unit based on economic value together with an allocation based on mass or volume.

2.4 <u>Databases and Life Cycle Inventory</u>

In addition to primary data, which is not always available, LCA practitioners often use secondary data from databases embedded in commercially available LCA software. The sources of inventory data used in LCA are clearly stated so as to understand uncertainties attached to the results. The sources of inventory are also linked to quality of interpretation and conclusions from LCA studies. Databases of food products – covering fish, crops, dairy, livestock, fruits and vegetables – are currently available.

The following presents the databases that have been identified as being potentially helpful during the completion of the current LCA study of beef production.

LCA Databases

- U.S. Life Cycle Inventory Database (http://www.nrel.gov/lci/). The database consists of categories such as:
 - Animal production
 - Crop production
 - Fabricated metal product manufacturing
 - Food manufacturing
 - Nonmetallic mineral product manufacturing
 - Oil and gas extraction
 - Petroleum and coal products manufacturing
 - Primary metal manufacturing
 - Transportation equipment manufacturing
 - Truck transportation

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- Utilities
- Waste management
- Wood product manufacturing
- Chalmers Life Cycle Inventory Data (http://www.cpm.chalmers.se/CPMDatabase/). The database is
 organized in the following categories:
 - Processes excluding transports
 - Transports
 - Aggregated processes
- Economic Input-Output Life Cycle Assessment (EIO-LCA) Carnegie Mellon (http://www.eiolca.net/). The database is an on-line LCA model that will act as a tool to check some calculations during the LCA study with respect to greenhouse gas and conventional air pollutants emissions.
- Ecoinvent Centre (http://www.ecoinvent.ch/). The Ecoinvent Centre offers science-based, industrial, international life cycle assessment and life cycle management (LCM) data and services. Ecoinvent is available either through the purchase of the database itself, or through the purchase of the SimaPro LCA software.
- Pembina LCA Database (www.lcva.ca). Pembina's LCA database is a resource that can provide relevant and up-to-date data for the LCA.
- University of Washington, College of Engineering (http://faculty.washington.edu/cooperjs/Research/database%20projects.htm) LCA Database Projects. This website provides links to database such as:
 - University of Waterloo Canadian Raw Materials Database
 - The European Union's European Reference Life Cycle Data System ELCD (including database categories such as end-of-life treatment, energy carriers and technologies, materials production, systems, and transport services)
 - Australian LCA Network Australian and international LCA database information
 - Denmark LCA Food Database Database information for industrial processing (slaughtering of cattle, livestock feed production, and fertilizer production)
- Environment Canada, National Inventory Report 1990-2006 Greenhouse Gases Sources and Sinks in Canada (http://www.ec.gc.ca/pdb/ghg/inventory_report/2008_trends/trends_eng.cfm)
 - Electricity intensity tables
- IPCC Intergovernmental Panel on Climate Change (2006) Guidelines for National Greenhouse Gas Inventories (http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html)
 - Volume 2 Energy
 - Volume 3 Industrial Processes and Product Use
 - Volume 4 Agriculture Forestry and Other Land Use
 - Volume 5 Waste
- USEPA, Technology Transfer Network, Clearinghouse for Inventories & Emissions Factors (http://www.epa.gov/ttn/chief/ap42/) - Emissions Factors & AP 42
 - Materials and animal production emission factors

- Natural Resources Canada Canadian Vehicle Survey 2005, Summary Report (http://oee.nrcan.gc.ca/Publications/statistics/cvs05/index.cfm?attr=0)
- Technology Early Action Measures Sector Specific Protocol: GHG Protocol for Grid-Connected Renewable Energy Baselines in Canada
- Technology Early Action Measures Emission Factor Database including the following categories:
 - Electricity production and transmission
 - Fuel combustion
 - Manufacturing and industry
 - Upstream emission factors (fuel)
 - Agriculture emission factors

The website below offers a more detailed list of life cycle databases that can be used as an alternative resource if any data gaps are recognized during the project: http://lca.jrc.ec.europa.eu/lcainfohub/databaseList.vm

Agriculture Databases

- Canfax (http://www.canfax.ca/Main.aspx). Provides information pertaining to Canada's cattle market information
- Statistics Canada (http://www.statcan.gc.ca/start-debut-eng.html). Provides Canadian statistical information pertaining to general agriculture, crops, farms and farm operators, land use, and livestock
- Government of Alberta Agriculture and Rural Development Fertilizer Guide (http://www1.agric.gov.ab.ca/\$Department/deptdocs.nsf/all/agdex3894)
- Canadian Fertilizer Institute (http://www.cfi.ca/)
- University of Missouri, Columbia Fuel Requirement Estimates for Selected Field Operations (http://www.todaystractors.com/articles/art1.html)
- Intervet and Texas Tech University North American TBA Implant Database (http://www.depts.ttu.edu/afs/implantdb/dbhome/default.htm). Provides information on implants and drugs/growth stimulants
- Foragebeef.ca Technical Information for the Canadian Forage Beef Industry (http://www.foragebeef.ca/app33/foragebeef/index_body.jsp). Provides a wide range of information in cows, calves, and forage

Based on the access to databases and collection of primary, site-specific and secondary, generic, raw data, a life cycle inventory (LCI) is produced. The LCI quantifies all the energy, raw materials requirements, atmospheric emissions, waterborne emissions, solid wastes and other releases for the entire life cycle of the product.

2.5 Environmental Impact Assessment

Life Cycle Impact Assessment (LCIA) methods connect the life cycle inventory to its potential environmental damages. The initial LCI results offer just an inventory of the environmental input-output data in the system; emissions are classified further into impact categories; the category indicator can be

located at any place between the LCI-results and the category endpoint (Jolliet et al., 2003). Based on this format, two main schools of methods have been developed (Pre Consultants, 2008):

- Classical impact assessment methods (CML method: Guinée et al., 2002, EDIP method: Hauschild and Wenzel, 1997) which group LCI results in midpoint categories, according to common mechanisms (climate change-global warming) or commonly accepted grouping (ecotoxicity)
- Damage oriented methods such as Ecoindicator 99 (Goedkoop and Spriensma 2000) or EPS
 (http://eps.esa.chalmers.se/download.htm), which try to enhance relevance by modeling (sometimes
 with high uncertainties) the cause-effect chain up to the endpoint or damage

Figure 2.2 presents a general overview of the structure of an impact assessment method (Pre Consultants, 2008). The LCI results are characterized to produce a number of impact category indicators. The environmental relevance of each indicator is documented by describing the link to the endpoints.

Several impact assessment methods are available, based on different principles and measurements resulting in different sets of impact categories. These methods are enumerated below and also presented in Table 2.1 (lcinitiative.unep.fr):

- CML 2000
- Ecopoints 97
- Eco-Indicator 99
- EDIP97 & EDIP2003
- EPS 2000d
- (Dutch) Handbook on LCA
- IMPACT 2002+
- JEPIX Japan Environmental Policy Priorities Index
- LIME
- Swiss Ecoscarcity Method (Ecopoints)
- The Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI)

A review of the available literature on LCA of beef production did not reveal a unitary approach regarding the life cycle impact method used to assess the environmental impacts based on the inventory data. Usually, the choice of environmental impact assessment method for each case study depends on the type of information required for further application as well as on the specific impacts associated with the product being studied, including beef. An accurate and detailed comparison of food products from different LCA studies can be done only if the same impact assessment methodology is used (Baumann and Tillman, 2004).

3.0 CASE STUDIES

Several case studies referenced in the literature and focusing directly on the LCA of beef production are presented below. The selection of the presented case studies was made based on their relevance and similarities with the current project.

3.1 Life Cycle Greenhouse Gas Emissions from Brazilian Beef Exported to Europe

Christel Cederberg, Daniel Meyer, Anna Flysjö, 2009. SIK Report No 792, The Swedish Institute for Food and Biotechnology, Gothenburg, Sweden, ISBN 978-91-7290-283-1

The goal of the study was to estimate the life cycle greenhouse gas (GHG) emissions and the use of energy and land from beef produced in Brazil and exported to Europe (Stockholm, Sweden) through LCA methodology. Increased knowledge of the environmental impact of beef production under tropical conditions where pastureland is the main resource was gained during this study. The livestock production systems under temperate climate conditions are significantly different from systems in the tropics, which are based on continuous grazing all year around. Since land use changes are of great importance for GHG emissions and habitat destruction caused by the livestock sector in South America (Steinfeld et al., 2006), a deeper analysis of deforestation related to Brazilian beef production was performed in the study.

Scope and Boundaries of the Study

The production system was divided into two phases:

- First phase describes the production system of Brazilian beef production, starting from cradle and ending-up as carcass weight equivalent (CWE) at the farm-gate, before transportation to the slaughterhouse. Figure 3.1 describes the first phase of the production system. The study addressed all the phases shown in Figure 3.1, including production of materials and energy used. GHG emissions from land-use transformation caused by the expansion of pasture into forestland were also included. Production for the year 2005 was studied.
- Second phase starts when the beef cattle are ready for slaughter. This phase includes the transportation from the farm-gate to a slaughterhouse, followed by slaughter of the cattle, beef processing and beef transport to its final consumption in Europe (Stockholm). The study ends up before the beef (one kg of bone-free meat) goes for consumption. Figure 3.2 describes the production system for the second phase of Brazilian beef ending up as one kg of bone-free meat exported to Europe.

In the analysis of transports, the use of energy and production of infrastructure (production of capital goods) are included.

The following processes were excluded from the study:

- Production of farm buildings and machinery, as the beef production is based on all-year grazing and thereby has a very small use of capital goods in production
- The production, use and emissions from medicines and pesticides
- The production of seed for renewing pastures

Functional Unit

Two functional units were used:

 Functional Unit No. 1 - one kg of Brazilian beef at the farm-gate, before transportation to the slaughterhouse, as carcass weight equivalent (CWE). The farm-gate includes all emissions until the livestock is ready to be delivered to slaughter.

• Functional Unit No. 2 - one kg of Brazilian beef exported to Europe for consumption (Stockholm, Sweden), as bone-free beef (BFB). Functional Unit No. 2 (bone-free beef) was calculated as: 1 kg carcass weight (meat with bone) = 0.70 kg bone-free beef.

Allocation

The studied beef production system generates meat, hides and intestines. The study allocates all environmental impacts to meat and none to the by-products of hides and intestines.

The allocation between beef and milk production was avoided by distributing all environmental impacts from the dairy cows to milk production and none of the impacts from the dairy cows to the meat production. In contrast, the environmental impacts from the rearing of the replacement heifers headed for milk production was only distributed to the meat production and nothing to the milk production.

Life Cycle Inventory

Information about the beef from separate states in Legal Amazon was taken from AliceWeb database information system (http://aliceweb.desenvolvimento.gov.br/) and from the Brazilian Institute of Geography and Statistics (IBGE, 2007).

Fertilizer application, mineral feed, and pasture renovation data was based on Ecoinvent database (Ecoinvent, 2003). Feed production data was based on a database of feed production in Sweden (Flysjö et al., 2008) and the Ecoinvent database (Ecoinvent, 2003).

Data for emissions from transports were taken from the Ecoinvent database (Ecoinvent, 2003).

Life Cycle Impact Assessment

The following environmental impact categories were analyzed:

- Climate change, as the main focus in the study is on GHG emissions from Brazilian beef
- Land use in Brazilian beef production, as land management and land transformation are major sources of GHG emissions in South America (Steinfeld et al., 2006; McAlpine et al., 2009)
- Impact on biodiversity caused by land transformation

Eutrophication and acidification were not considered, since these have not been recognized as major environmental impacts caused by livestock production in Brazil.

Results

The GHG emissions from primary production (not including emissions from land use changes) for the average Brazilian beef production in 2005 were estimated at approximately 28 kg CO₂ equivalents (eq) per kg CWE at the farm-gate. Methane from enteric fermentation represents approximately 76% of these emissions, and nitrous oxides approximately 22%. CO₂ emissions from the use of fossil fuels are of little significance to the result.

The overall life cycle of Brazilian beef, from primary production via slaughterhouse and transports to Europe (Stockholm), generates a GHG emission of about 41 kg CO₂ equivalents per kg BFB. Methane from enteric fermentation is the pre-dominant source and represents approximately 75% of total emissions.

Emissions of fossil CO₂, including transports of the beef to Europe (Stockholm), are less significant (around 2.5% of total emissions).

The energy use in the primary production is low, about 4 MJ per kg CWE at the farm-gate. The overall energy use for the whole life cycle of BFB exported to Europe is about 17 MJ per kg BFB. 80% of this energy is non-renewable fossil energy while the remaining 20% is renewable energy, consisting mostly of hydro power for electricity used in the slaughterhouses. The use of energy in the whole life cycle up to the end destination in Stockholm, where the bone-free beef is transported, can be divided up as 30% livestock production (farms), 35% transports, and 35% slaughterhouses.

Land used for beef production in Brazil in 2005 was calculated at approximately 175 m² per kg carcass weight X yr and approximately 250 m² per kg bone-free beef X yr for beef exported to Europe.

Conclusions

The GHG emissions in the primary production of Brazilian beef (not including land-use changes) are at least 30-40% higher than the current European production. Nitrous oxide emissions from the manure of the grazing cattle have a significant contribution to the overall GHG emissions of the beef. CO₂ emissions from land use transformation caused by deforestation in favor of pasture area are significant. CO₂ emissions due to overseas transports are insignificant.

High emissions of methane in the primary production of Brazilian beef are explained by high slaughter ages and long calving intervals (Lima et al, 2007), and also because the majority of beef is produced in cow-calf systems, not as by-products from milk production. Methane emissions can be reduced by improving livestock performance, such as shortening calving intervals, lowering slaughter age and improving pasture management. Poor pasture management is an important environmental hot-spot in Brazilian beef production. Pasture degradation can be prevented by maintenance fertilization and avoidance of high stocking rates, especially in dry periods (Boddey et al, 2004).

The use of energy in Brazilian beef production is very low, approximately a tenth of European production.

3.2 Evaluating Environmental Impacts of the Japanese Beef Cow-Calf System by the Life Cycle Assessment Method

Ogino, A., Orito, H., Shimada, K., Hirooka, H., 2007, Animal Science Journal 78, 424-432.

The Japanese beef production system is comprised of cow-calf production and fattening production. Ogino et al. (2007) performed an LCA study of the Japanese beef cow-calf system, with the following goals:

- To assess the environmental impacts of the beef cow-calf system
- To compare the results with those of the beef-fattening system
- To assess the results of the whole beef production system by combining the results of the beef cow-calf and beef-fattening systems
- To investigate the effects of two scenarios on reducing environmental impacts, by shortening calving intervals and, respectively, increasing the number of calves per cow

The System Boundary

The processes associated with the cow-calf life cycle, such as feed production, feed transport, animal management, the biological activity of the animal and the treatment of cattle waste were included in the system boundary. The system analyzed in this study is presented in Figure 3.3.

Functional Unit

The functional unit was defined as one marketed beef calf.

A growth curve for the cow was obtained from data for Japanese Black (Wagyu) cows, while the growth curve for the calves was assumed based on data for Japanese Black (Wagyu) steers and heifers from the same literature source (Agriculture, Forestry and Fisheries Research Council Secretariat, MAFF 2000). The growing curves were used to calculate the nutrient requirements and amounts of nitrogen and carbon excreted as manure. The cow diet was designed on the basis of nutrient requirements and the management manual for beef cow–calf production (Japan Livestock Industry Association, 1976). The calf diet was designed using mixed feed on the basis of nutrient requirements and the above-mentioned manual. The amount of nutrients required for a cow and her calves were calculated using the feeding standard (Agriculture, Forestry and Fisheries Research Council Secretariat, MAFF 2000) from respective weight and daily gain based on the growth curves.

<u>Life Cycle Inventory</u>

Data from the literature were used for specific activities for cow-calf production, while databases of the LCA software JEMAI-LCA (Japan Environmental Management Association for Industry 2000) and SimaPro (PRE Consultants 2003) were used for general activities such as production and combustion of fossil fuels and feed transport.

Life Cycle Impact Assessment

The contribution of the beef cow-calf system to the following environmental impact categories was examined: global warming, acidification, eutrophication and energy consumption. The global warming

potential, an index for estimating the global warming contribution due to atmospheric emission of greenhouse gases, was computed according to CO₂ equivalent factors by IPCC (2001). The acidification potential was computed according to SO₂ equivalent factors (Heijungs et al., 1992). The eutrophication potential was computed according to the PO₄ equivalent factors derived from Heijungs et al. (1992). Normalization and weighting were not conducted in the study.

The following scenarios were used for the LCA analysis:

- Shortening calving intervals: calving intervals were defined as 14 months, followed by alternative scenarios which shortened calving intervals to 13 or 12 months. As a result, in the alternative scenarios, the cows culled after seven parturitions were 7 months younger as the calving intervals were 1 month shorter.
- Increasing the number of calves per cow: in the basic system the number of calves was defined as seven; in the alternative scenario cows were culled after eight or nine parturitions while maintaining calving intervals of 14 months. Consequently, in the case of eight and nine calves, the cows were culled at 127 and 141 months, respectively.

Results

The results showed that:

- The total contributions of one beef calf throughout its life cycle to global warming, acidification, eutrophication and energy consumption were 4550 kg of CO₂ equivalents, 40.1 kg of SO₂ equivalents, 7.0 kg of PO₄ equivalents and 16.1 GJ, respectively. The contribution of each process to the total environmental impact in each environmental impact category showed a similar tendency to the contribution of each process in each environmental category reported in the case of the beef-fattening system as a whole.
- Shortening calving intervals by 1 month reduced environmental impacts by 5.7–5.8% in all the environmental impact categories.
- Increasing the number of calves per cow reduced environmental impacts in all the environmental
 impact categories, although the effects were smaller compared to the scenario of shortening calving
 intervals.

3.3 Greenhouse Gas Emissions from Conventional, Agri-Environmental Scheme, and Organic Irish Suckler-Beef Units

Casey, J., W., and Holden, N., M., 2006a. Journal of Environmental Quality 35:231–239.

A life cycle assessment method was performed to estimate emissions of CO_2 equivalent per kilogram of live weight (LW) of beef (Bos taurus) leaving the farm gate per annum (kg CO_2 /kg LW beef/yr) and per hectare (kg CO_2 /ha/yr). Fifteen suckler-beef production units (five conventional, five in an Irish agrienvironmental scheme, and five organic units) were evaluated for emissions per unit product and area, to assess whether moving toward more extensive methods of production could reduce GHG emissions per kilogram of live weight leaving the farm and per area used for production.

The System Boundary

The system boundary was defined from "cradle-to-farm gate", gate meaning up to the point of transportation from the beef-suckler unit. The GHG emissions associated with live weight production up to the point of transportation away from the suckler-beef unit were calculated. The system (Figure 3.4) included the physical limits of the beef units and the corresponding activities, as follows:

- The emissions associated with the individual ingredients of the concentrate feed production, transport, and processing
- Emissions associated with N fertilizer production, transportation, and application
- Emissions associated with livestock and related manure management
- Emissions associated with electricity used, and diesel fuel for agricultural operations (fertilizer and manure application, forage production)

The following emissions were excluded:

- Emissions associated with the production of medicines, insecticides, machines, buildings, and roads, due to lack of data (Cederberg and Mattsson, 2000)
- Direct N₂O emissions from cattle, as these are known to be negligible (Tiedje, 1988)
- CO₂ from enteric fermentation, as this is generally regarded as recycling from sustainably-produced plant matter and makes no net addition to the atmosphere (IPCC, 1993)

Geopolitical boundaries are not considered limits to the system.

Functional Unit

The functional unit defined for the study was the production of 1 kg of live weight during 1 year. By scaling emissions relative to a functional unit of live weight and scaling to a 1 year time frame, an accurate picture of both the emissions and the potential for emissions reduction (Casey and Holden, 2006b) is acquired.

<u>Allocation</u>

Based on the chosen functional unit, allocation to by-products was not necessary because the live weight of animals leaving the production unit are subject to the production of by-products after post-processing, which is outside the system boundary of the study.

Life Cycle Inventory

15 suckler-beef production units in the southern half of Ireland provided suitable quality data for specific activities for beef production.

Enteric methane emission was estimated using an IPCC methodology (IPCC, 1996a), unlike previous studies of Irish livestock systems (Casey and Holden, 2005a, 2005b), when enteric methane emissions were estimated using IPCC standard values. The calculation was based on required daily dry matter intake, metabolizable energy, and gross energy, determined using RUMNUT (RUMNUT, 2004), a nutrition

software package used to estimate a diet based on surveyed livestock performance. RUMNUT is based on relationships defined by a range of protein systems and it uses the metabolizable protein system, revised from 1992 standards (Agricultural and Food Research Council AFRC, 1992).

Life Cycle Impact Assessment

The global warming potential (GWP) index was used to determine contribution to the greenhouse effect. The emissions are measured in terms of CO₂ as reference gas (IPCC, 1996b).

Results

The average emissions per kilogram of live weight beef were as follows:

- 13.0 kg CO₂/kg beef/yr from the conventional units
- 12.2 kg CO₂/kg beef/yr from the agri-environmental scheme units
- 11.1 kg CO₂/kg beef/yr from the organic units

The average emissions per unit area were as follows:

- 5,346 kg CO₂/ha/yr from the conventional units
- 4,372 kg CO₂/ha/yr from the agri-environmental scheme units
- 2,302 kg CO₂/ha/yr from the organic units

The results of the study indicated that moving from conventional suckler-beef production to an agri-environmental scheme unit production system would reduce GHG emissions in terms of both product and area. An even greater reduction in emissions could be achieved by organic suckler-beef production but at the cost of a large drop in kg of live weight production per hectare.

3.4 Quantification of GHG Emissions from Sucker-Beef Production In Ireland

Casey, J.W., Holden, N.M., 2006b, Agricultural Systems 90, 79-98.

LCA was used to quantify and analyze the GHG emissions from Irish suckler-beef production and to evaluate a number of alternative production management scenarios. The developed scenarios examined both beef-bred animals (Charolais, Simmental and Limousin) and dairy-bred animals (Holstein–Fresian).

In Ireland, beef production systems are predominantly grass-based. Weather permits 190–240 days of grazing. The most common system operated with 20 cows producing calves for replacements and beef consumption.

The System Boundary

The system boundary is defined by the GHG emissions associated with Irish beef production from "cradle-to-farm gate", up to the point of transportation of the animals from the beef-suckler unit. Transportation of the animals from the gate of the beef-suckler unit is not included in the study. Consequently, the system (Figure 3.4) included the physical limits of the beef unit and its activities:

 The emissions associated with the individual ingredients of the concentrate feed production, transport and processing

- Emissions associated with N fertilizer production, transportation and application
- Emissions associated with livestock and related manure management
- Emissions associated with electricity and diesel for agricultural operations (fertilizer and manure application, forage production)

The following emissions were excluded from the study:

- Emissions associated with the production of medicines, pesticides, machines, buildings and roads, due to lack of data (Cederberg and Mattsson, 2000)
- Direct N₂O emissions from cattle, as these are known to be negligible (Tiedje, 1988)
- CO₂ from enteric fermentation, as this is generally regarded as recycling from sustainably produced plant matter, and makes no net addition to the atmosphere (IPCC, 1993)

Geopolitical boundaries are not considered as limits to the system (in contrast to IPCC level 1 assessment, IPCC, 1996a,c).

Functional Unit

A mass or volume measure for the functional unit is appropriate for GHG emissions because it is applicable on a global scale (Haas et al., 2000). The functional unit was defined as the production of 1 kg of live weight (LW) over one year. By scaling total GHG emissions relative to a functional unit of live weight per year (kg CO_2 /kg LW beef/yr), it was possible to estimate both the emissions and the potential for emissions reduction by adopting alternative management.

<u>Allocation</u>

Allocation of some of the GHG emissions to by-products was not necessary with the chosen functional unit because the live weight of animals leaving the production unit are subject to the production of by-products after post-processing, which is outside the system boundary of the study. Allocation into the system from dairy production was considered where relevant. The specific fraction was taken from an analysis by Casey and Holden (2005a) which indicated mass allocation of 96.6% to milk and 3.4% to meat based on the weight at sale of surplus calves, culled cows and 24 month male animals.

<u>Life Cycle Inventory</u>

National Farm Survey (Heavy et al., 1998; Burke and Roche, 1999, 2000, 2001; Connolly et al., 2002) data for the years 1997–2001 outlined the most common beef production system processes. Animal weight data used for calculations in the study were recorded from a random sample of greater than 1,500 animals worth of market data recorded at weekly livestock sales, and then crosschecked with Teagasc (Irish Agriculture and Food Development Authority) data (Drennen, 1999).

Life Cycle Impact Assessment

Global warming potential was used to determine the contribution of CO_2 , CH_4 and N_2O to the greenhouse effect. The emissions are measured in terms of CO_2 as reference gas (IPCC, 1996b). The total greenhouse gas emissions were determined as kg CO_2 equivalents (Heijungs et al., 1992; Casey and Holden, 2005a). The impact is expressed as kg CO_2 (eq)/kg LW beef/yr.

Several scenarios for GHG emissions reduction were developed, examining using beef-bred animals with castrated males (Charolais, Simmental and Limousin) and dairy-bred animals (Holstein-Fresian). The system was then modified for a shorter life and a feedlot system with non-castrated males. The scenarios included the contribution from the source-cow unless the beef animal was supplied from the dairy sector, in which case a mass allocation of emissions from the newborn calf supplied by the dairy herd was used (Casey and Holden, 2005a). The assumed supplements, the feed rates and target production were calculated.

Results

The typical suckler-beef system was estimated to produce $11.26 \text{ kg CO}_2/\text{kg LW beef/yr}$. For beef-bred animals the cow contributed a large amount to the total emissions and had the greatest impact when attenuated. For dairy-bred beef production the allocation from the cow was much less. In terms of dietary supplementation for GHG emissions reduction, a broad range of supplement combinations were evaluated and showed no major reduction potential compared to, or within, the grass-dominated system.

3.5 Life Cycle Assessment (LCA) of Two Beef Production Systems

Chassot, A. Philipp, A., and Gaillard, G. 2005, Agroscope Liebefeld-Posieux Research Station ALP, PUB 2005/2840.

The objective of the study was to determine the environmental impacts of two contrasting beef production systems by LCA. An extensive beef production system of Limousine Simmental crossbred steers based on grass (EXT) was compared to an intensive beef production system of Simmental bulls (INT).

System Boundaries

The boundaries of the extensive, respectively intensive systems are presented in Figures 3.5 and 3.6.

<u>Functional Unit</u>

The functional unit of the system was defined as the production of 1 kg of beef carcass.

The characteristics of the beef production systems were as follows:

Extensive beef production system:

- The Limousine x Simmental crossbred steers had two grazing periods, the second one on an unfertilized mountain meadow, at low stocking rate. The winter ration was formed by low-quality hay and grass silage (1:1).
- The Limousine x Simmental crossbred steers were slaughtered at 20 months of age

Intensive beef production system:

• The Simmental bulls were continuously fed indoors with a ration composed of grass, maize silages (1:2), and concentrates (soybean meal and barley, 1,5:1)

The Simmental bulls were slaughtered at 13 months of age

Life Cycle Inventory

The production data were based on experiments and the Swiss Agricultural Life Cycle Assessment (SALCA) database.

Life Cycle Impact Assessment

Various environmental impact categories were defined, as follows: depletion of non-renewable (fossil) energy resources, global warming potential, formation of ozone at ground level (summer smog), human toxicity, aquatic ecotoxicity, terrestrial ecotoxicity, total eutrophication, aquatic eutrophication, terrestrial eutrophication, and acidification.

The environmental impacts were quantified by using the software TEAMTM (Tools for Environmental Analysis and Management).

Figure 3.7 presents the results of the environmental impacts per kg of carcass of an extensive (EXT) beef production system compared to an intensive (INT) beef production system.

Results and Conclusions

- The environmental impacts of the extensive beef production system were similar or lower than those of the intensive beef production system
- The largest differences between the two systems were found in toxic effects on aquatic and terrestrial ecosystems
- The amount and type of fertilizers used to produce the feed were the main source of difference between the two systems

The extensive use of grasslands for beef production has the potential to reduce the environmental impacts per kg of carcass; especially if the animals reach desired slaughter maturity on the pasture (no intensive finishing period is required).

3.6 Environmental Impacts Of The Japanese Beef-Fattening System With Different Feeding Lengths As Evaluated By A Life-Cycle Assessment Method

Ogino, A., Kaku, K., Shimada, K., 2004. Journal of Animal Science 82, 2115–2122.

Ogino et al. (2004) evaluated the environmental impacts of a beef-fattening system using the LCA, investigated the effects of feeding length on the LCA results and discussed strategies to reduce them. The analyzed system is presented in Figure 3.8.

Functional Unit

The functional unit was defined as one animal, and the stages associated with the beef-fattening life cycle, such as feed (concentrate and roughage) production, feed transport, animal management, animal body (biological activity of cattle), and the treatment of cattle wastes, were included in the system boundary.

Scope and Boundaries of the System

The environmental impacts of a beef-fattening system were investigated, including the effects of feeding length on the environment. The system boundary started with the fattening stage, after purchasing of steer calves (8 months of age) and ended with the marketing of finished steers (26 to 28 months of age), before transportation to the slaughterhouse. A growth curve calculated from data on 367 Japanese Black (Wagyu) steers was used to calculate the amounts of N and C excreted into the manure, and a feeding system adopted in the experimental station located in the production region of the cattle was used for cattle diet. Environmental loads of transport of calves from the calf market and of finished steers to the carcass market were excluded. Finished compost was regarded as organic fertilizer and placed out of the system. The environmental loads associated with production of capital goods, such as cattle barn and front loader, were not taken into account.

Life Cycle Inventory

Data from the literature were used for specific activities for beef-fattening. For general activities, such as the production and combustion of fossil fuels and feed transport, the database of the LCA software JEMAI-LCA (JEMAI, 2000) was used.

<u>Life Cycle Impact Assessment</u>

The environmental effects of the beef-fattening system were examined through several environmental impact categories, such as: global warming, acidification, eutrophication, and energy consumption. The global warming potential, an index for estimating the global warming contribution due to atmospheric emission of greenhouse gases, was computed according to the CO₂ equivalent factors given by IPCC (2001). The acidification potential of the different trace gases was computed according to the SO₂ equivalent factors, derived from Heijungs et al. (1992). The eutrophication potential was computed according to the PO₄ equivalent factors derived from Heijungs et al. (1992). Normalization and weighting were not conducted in the study.

Results

The results suggested that:

- Enteric or gut CH₄ emissions of cattle were the major source in the impact category of global warming (2,851 kg of CO₂ equivalents), whereas NH₃ emissions from cattle waste were the major source in the impact categories of acidification (35.1 kg of SO₂ equivalents) and eutrophication (6.16 kg of PO₄ equivalents)
- In a previous study, Ogino et al. (2004) suggested for the reduction of the GHG environmental impact generated by the Japanese beef-fattening system are a strategy based on dietary control for enteric CH₄

emissions, adjustment of compost pile scales for greenhouse gas emissions from waste treatment, and utilization of biofiltration for NH_3 emissions from cattle barns and compost plants

- Feed production contributed significantly to all environmental impact categories
- A shorter feeding length resulted in lower environmental impacts in all the environmental impact
 categories, such as global warming and acidification, although there was a difference in effect of
 reducing environmental impacts among the categories

3.7 Greenhouse Gas Emissions from the Canadian Beef Industry

Vergé, X.P.C., Dyer, J.A., Desjardins, R.L., Worth D., 2008, Agricultural Systems 98: 126–134.

This study does not represent a complete LCA of the beef production system; however, it provides a very well documented estimate of the GHG emissions budget for the Canadian beef industry. A detailed description of the methodology can be found in a related study, addressing the GHG inventory of the Canadian dairy sector (Vergé et al., 2007). The methodology used for this study is particularly useful for setting up a specific working flow when dealing with inventory of emissions from the beef production. The main step of the study consisted of:

- Definition and quantification the beef crop complex (BCC)
- Quantification of feedlot population
- Quantification of nitrous oxide, methane, energy based CO₂ emissions
- Calculation of emission intensity indicators

Quantification and interpretation of results is a key point, referencing the significant share of the total agricultural GHG emissions coming from the beef production. The GHG emissions budget presented in the study is the best means of both projecting future GHG emissions and assessing relative trends in emissions from Canadian beef production. Soil carbon sequestration was not taken into account in this study.

Several conclusions were drawn, as follows:

- Beef cattle have their largest impact through their contribution of enteric methane
- Beef cattle were the source of 76% of the total enteric methane emissions in Canada
- Over a third of the total N₂O emitted from Canadian agriculture can be attributed to the beef industry
- The beef industry's share of fossil energy CO₂ emissions from agriculture is small mainly because of high reliance on forage crops, compared to non-ruminants and the grains and oilseeds farms
- The total emission intensity indicator for the Canadian beef industry is similar to the indicator recently developed for the Irish beef industry (Casey and Holden, 2006)

3.8 Summary of LCA Methodologies and Results

An overall review of the most up-to-date studies of LCA beef production shows that the system boundaries, the functional unit and allocation procedures are closely interlinked.

System boundaries: Beef as a product system is the result of closely interlinked nature and technosphere. System boundaries descriptions in the reviewed studies are usually described in a clear manner, with a diagram showing which parts of the life cycle are included in the analyses. The choice of system boundaries strongly influences the results; therefore, there is a need for a determined set of rules to delineate the system boundaries in such a manner that comparison of the environmental impacts between different beef products is possible. To date, such rules are not established.

A summary of the typical activities that were usually included in the reviewed LCA of beef production studies is presented below:

- The emissions associated with the individual ingredients of the concentrate feed production, transport, and processing (Casey and Holden, 2006a,b)
- The emissions associated with electricity used, and diesel fuel for agricultural operations (N fertilizer application, transportation, and application, manure application and related manure management, forage production) (Casey and Holden, 2006a,b)
- The stages associated with the beef-fattening life cycle: feed production, feed transport, animal management, biological activity of cattle, treatment of cattle wastes (Ogino et al., 2004, 2007)
- Use of energy and production of infrastructure (production of capital goods) in the analysis of transports (Cederberg et al., 2009)

The following activities were excluded from the reviewed LCA of beef production studies:

- Production of seed for renewing pastures (Cederberg et al., 2009);
- Production of farm buildings and machinery (Cederberg et al., 2009)
- Emissions associated with the production and use of medicines, pesticides, machines, buildings, and roads (Casey and Holden, 2006a,b)
- Land use changes (Cederberg et al., 2009)
- The production and use of complementary feed (in addition to pasture), including harvested fodder (Cederberg et al., 2009)
- CO₂ from enteric fermentation (Casey and Holden, 2006a,b)
- Direct N₂O emissions from cattle (Casey and Holden, 2006a,b)
- The finished compost regarded as organic fertilizer (Ogino et al., 2007)
- The environmental loads of transporting the calves to the calf market and of finished steers to the carcass market (Ogino et al., 2007)

The functional unit: The reviewed LCA beef studies use the mass as functional unit (1 kg of mass, live weight or carcass). Because the function of beef as food is more than just to fulfill the basic feeding needs (mass), the functional unit of beef product LCA could also be based on quality aspects and economic value. A quality corrected functional unit accounting for nutrient content of the food in addition to the mass is currently used only for milk products, an option that could also be considered for further LCA beef studies.

<u>Co-product allocation</u>: The co-product allocation method is directly related to the system boundaries and functional unit. The review of the literature showed that the choice of the functional unit can solve the co-product allocation problem. Mass is most often used as a basis for the allocation of beef product, while

quality or economic value of the product (i.e. nutrient content) could be used in the future as a basis for the allocation.

The allocation issue can be avoided through system expansion. For the LCA of beef production case studies presented above, allocation to by-products was avoided by choosing as functional unit the production of 1 kg of live weight, because the live weight of animals leaving the farm is potentially generating by-products outside the boundaries of the system.

<u>Life cycle inventory</u>: A variety of international, regional, economic and academic databases as sources of data are available, several of them with special focus on food products, including livestock. As long as it is feasible within the constraints of the LCA study, primary data is always the best option compared to generic, secondary data.

<u>Life cycle impact assessment</u>: Environmental impacts especially relevant for beef and chosen for the reviewed case studies are as follows:

- Single impact categories, like energy or global warming potential
- More site-specific impact assessment, like eutrophication and acidification
- Direct ecosystem effects

Currently, for land use, a variety of assessment methods are used, however without a standard methodology.

There are no commonly accepted rules on how to define the system boundaries, the functional unit, and allocation procedures, making the comparison of different LCAs results difficult (Casey and Holden, 2006b). Also, geographical differences in the cattle production make comparison of LCA studies for beef production even more difficult. Despite the fact that a variety of LCA beef studies have been published by now, making it easier to check if the results of an LCA are of a reasonable magnitude or not, true validation of the LCA models will never be possible. Additionally, uncertainties in emission calculations reported for different practices within the system influence the LCA results. The quantification of the GHG emissions for several LCA of beef production studies are summarized below:

| Study | GHG emission | Comments |
|------------------|-------------------------------|---|
| Cederberg et al. | 28 kg | Estimated for the average Brazilian beef production in 2005 |
| (2009) | CO ₂ (eq) / kg CWE | approximately at the farm-gate. The emissions are generated by primary production and do not include emissions from land use changes. |

| Study | GHG emission | Comments |
|---------------------|------------------------------|---|
| Cederberg et al. | 41 kg | Estimated for the entire life cycle of Brazilian beef, from primary |
| (2009) | CO ₂ (eq)/ kg BFB | production via slaughterhouse and transports to Europe |
| , , | . 2 | (Stockholm). |
| Ogino et al. (2007) | 4550 kg CO ₂ | The total contributions of one beef calf throughout its life cycle to |
| | (eq) | global warming. |

| Study | GHG emission | Comments |
|-----------------------------|--|--|
| Casey and Holden (2006a) | 13.0 kg CO ₂ (eq)/kg LW beef/yr | The average emissions per kilogram of live weight beef from the conventional farms units. The system was based on the physical limits of the beef units, from crops, to livestock and manure management. |
| Casey and Holden (2006a) | 12.2 kg CO ₂ (eq)/kg LW beef/yr | The average emissions per kilogram of live weight beef from the agri-environmental farms units. The system was based on the physical limits of the beef units, from crops, to livestock and manure management. |
| Casey and Holden (2006a) | 11.1 kg CO ₂ (eq)/kg LW beef/yr | The average emissions per kilogram of live weight beef from the organic farms units. The system was based on the physical limits of the beef units, from crops, to livestock and manure management. |
| Casey and Holden (2006b) | 11.26 kg CO ₂ (eq)/kg LW beef/yr | For the typical suckler-beef production system. |
| Ogino et al. (2004) | 32.3 kg CO ₂ (eq)/kg | Beef gain during the fattening stage of the animal (based on a beef yield of 40%). The estimate did not account for whole system emissions (source cow is excluded). |
| Cederberg (2002) | 17 kg CO ₂ (eq)/kg (bone and fat free meat) | For animals supplied from a dairy herd. Most of the feed ingredients were grown on the farm therefore had no transport or processing. The functional unit encompassed the entire 576 days of animal life. |
| Subak (1999) | 7.4 kg CO ₂ (eq)/ kg/ (LW)/ yr | 4396 kg CO_2 (eq) from a US feed lot system producing a 550 kg animal that is equivalent to 7.4 kg CO ₂ (eq)/ kg/ (LW)/yr, excluding the cow phase. |

In addition to the final results of the LCA of beef production studies, expressed as quantification of the GHG emissions, the review of specific LCA of beef literature also revealed the following:

- The enteric or gut CH₄ emission from livestock and N₂O emission from feed (crops) production are major contributors to global warming for beef production. Beef production in combination with milk production (surplus calves) can be carried out with fewer animals than in sole beef production systems, reducing the environmental burdens per product unit (Cederberg and Stadig, 2003).
- The increase in specialization of the dairy and the beef sectors make it difficult to reduce GHG emissions (Casey and Holden, 2006). The advantages of less intensive and combined systems are obvious for (sub)tropical animal production systems, where a combination of milk and beef production is very frequent and livestock needs to be seen in the context of larger livelihood systems (Cederberg et al., 2009, Sumberg, 2002).
- Organic farming reduces pesticide use but requires more land and leads to higher global warming impacts than non-organic systems in UK conditions (Williams et al., 2006).
- The environmental impacts of beef-fattening systems are dependent on the feeding length, feed production and type of feed, animal housing and manure storage (Ogino et al., 2002, 2004; Núñez et al., 2005, Williams et al., 2006; Nemecek, 2006). A shorter feeding length lowers the environmental impacts. The feeding stage is the most important factor for environmental impacts; the infrastructure is also relevant, especially for energy consumption and human toxicity (Erzinger et al., 2003; Núñez et al., 2005).

4.0 RECOMMENDATIONS

Based on the international leading experience acquired with the LCA of beef products, as described in the literature review and the Project Team's experience with greenhouse gas analysis, ISO environmental management standards, agricultural knowledge including the livestock industry, LCA expertise, and projects of comparable scale and complexity, the current LCA study of beef production industry in Alberta will address the following:

Goal and scope of the study

The goal and scope of the study is to quantify the GHG emissions generated during all stages of beef production, starting with production of cattle feed and ending with the production of beef at the door of the slaughterhouse. Two scenarios will be used: Yearling-fed system and, respectively, Calf-fed system. The environmental impacts associated with the life cycle of beef production for both scenarios will be presented and analyzed. Hot-spots in terms of carbon intensive stages will be identified. A sensitivity analysis will follow, looking for the best strategies for reduction of the carbon footprint at the identified hot-spots.

Boundaries of the system

Boundaries of the current study will describe the beef production system from "cradle-to-gate", where "gate" means the door of the slaughterhouse. The study will include processes associated with the cow-calf life cycle, such as production of cattle feed, feed transport, cattle feeding strategy, and livestock related activities (cattle management, storage of organic fertilizers, finishing, transport, litter). The biological activity of the animal and the treatment of cattle waste will also be included in the system boundary. The life cycle includes transportation from the finishing feedlot to local auction and slaughterhouse (meat packaging plant) and ends at the entrance door of the slaughterhouse. The activities associated with beef production will be summarized into an activity map. Further expansion of the system, to include the slaughterhouse, will be performed depending on the availability of already existent specific data. So far, a review of the specific LCA of beef production revealed that the majority of the studies end at the gate of the farm, in front of the slaughterhouse.

A recently published study (Cederberg et al., 2009) quantifying the greenhouse gas emissions and use of land and energy in Brazilian beef production, extended the boundary of the system beyond the gate of the farm to include the export of Brazilian beef to European markets. Data for energy use at the slaughterhouse was taken from a Swedish study on LCA of beef (Anonymous, 2002), where 2.4 MJ electricity and 2 MJ fossil fuel were used per kg of bone free meat. However, caution should be exercised when using data specific for systems that have a significantly different geographic and economic context compared to the system involved in the current study.

The functional unit

Despite the fact that consumption and trade of beef meat is often presented as carcass weight equivalents (meat with bone), and consumption data are given as meat including bones, the vast majority of LCA of beef production studies end in front of the slaughterhouse. As a result of this practice, the functional unit defined for the LCA studies is usually the production of 1 kg of live weight of beef leaving the farm gate. For the current study, the functional unit of 1 kg of live weight of beef leaving the farm gate has been selected. Depending on the reliability of the LCA literature data regarding processes at the slaughterhouse, the functional unit might be expanded to 1 kg of beef after the slaughterhouse, as carcass weight equivalent.

Life cycle inventory

The carbon life cycle assessment is based on a detailed quantitative life cycle inventory of the inputs and outputs quantified at the boundaries of the system. The database resources and references presented in Section 2.4 include public, academic and international resources and will be utilized by the Project Team to collect all relevant data for this project. The LCI will gather, as much as possible, specific raw data from the crop, feed and beef industries in Alberta, Canada and North America. Any data gaps identified at the time of the inventory, such as missing or incomplete data sources, will be completed through hypothesis and use of secondary data (usually generic or theoretical data available from specific literature and international LCA databases).

Life cycle impact assessment

Several LCIA methodologies are available for the assessment of the potential environmental impacts associated with the inventoried emissions. Previous LCA of food (pork and beef) production used the Impact 2002+ and Ecoindicator -99 as LCIA methodologies. Based on the results of the inventory, the assessment of the environmental impacts will be customized and the most appropriate LCIA method will be used.

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Glossary

Activity map A depiction of the inputs and outputs of a system and how they are

connected.

Allocation Partitioning the input or output flows of a unit process to the product

of interest.

By-products An incidental product deriving from a manufacturing process or

chemical reaction, and not the primary product or service being produced. A byproduct can be useful and marketable, or it can have

negative ecological consequences.

Co-product A product produced together with another product.

Functional unit The unit of comparison that assures that the products being compared

provide an equivalent level of function or service.

natural resource consumption and waste releases associated with an

actual or proposed action.

Impact categories Classifications of human health and environmental effects caused by a

product throughout its life cycle.

Life Cycle Analysis A cradle-to-grave approach for assessing industrial systems that

evaluates all stages of a product's life. It provides a comprehensive

view of the environmental aspects of the product or process.

Life Cycle Inventory The identification and quantification of energy, resource usage, and

environmental emissions for a particular product, process, or activity.

Normalization Normalization is a technique for changing impact indicator values

with differing units into a common, unitless format by dividing the value(s) by a selected reference quantity. This process increases the

comparability of data among various impact categories.

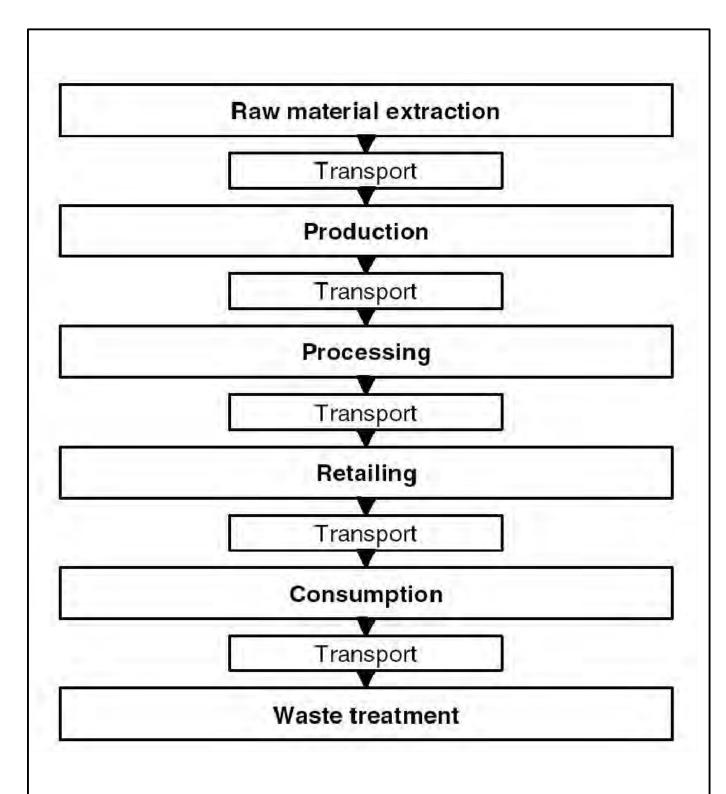
Weighting The act of assigning subjective, value-based weighting factors to the

different impact categories based on their perceived importance or

relevance.

Technosphere Part of the physical environment affected through building or

modification by humans.



SOURCE: PRE CONSULTANTS, 2008, INTRODUCTION TO LCA WITH SIMAPRO 7, IN: INTRODUCTION TO LCA. PRE CONSULTANTS B.V., AMERSFOORT.

figure 2.1



GENERAL LIFE CYCLE OF PRODUCTS LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta

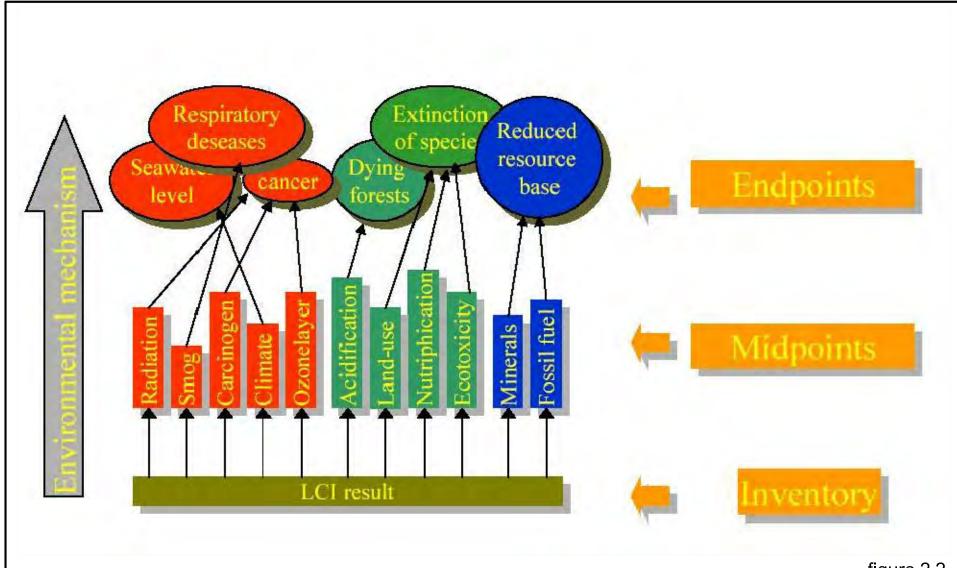
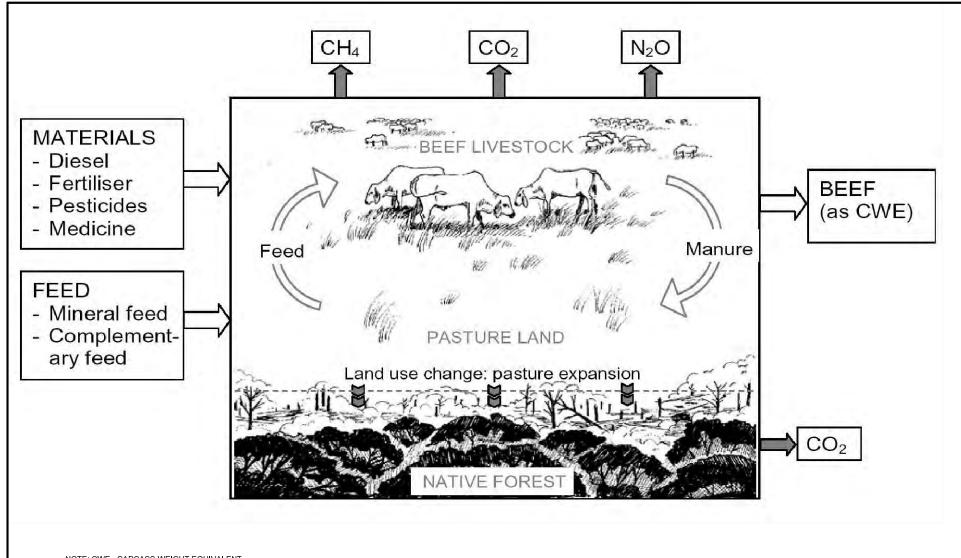


figure 2.2

GENERAL OVERVIEW OF THE STRUCTURE OF AN IMPACT ASSESSMENT METHOD LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION ALBERTA AGRICULTURE AND RURAL DEVELOPMENT SOURCE: PRE CONSULTANTS. 2008. INTRODUCTION TO LCA WITH SIMAPRO 7. IN: Edmonton, Alberta



INTRODUCTION TO LCA. PRE CONSULTANTS B.V., AMERSFOORT,



NOTE: CWE - CARCASS WEIGHT EQUIVALENT

figure 3.1

PRODUCTION SYSTEM OF THE FIRST PHASE OF BRAZILIAN BEEF PRODUCTION LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION ALBERTA AGRICULTURE AND RURAL DEVELOPMENT SOURCE: CEDERBERG, C., MEYER, D., FLYSJÖ, A., JUNE 2009. LIFE CYCLE Edmonton, Alberta



INVENTORY OF GREENHOUSE GAS EMISSIONS AND USE OF LAND AND ENERGY IN BRAZILIAN BEEF PRODUCTION, SIK REPORT NO 792.

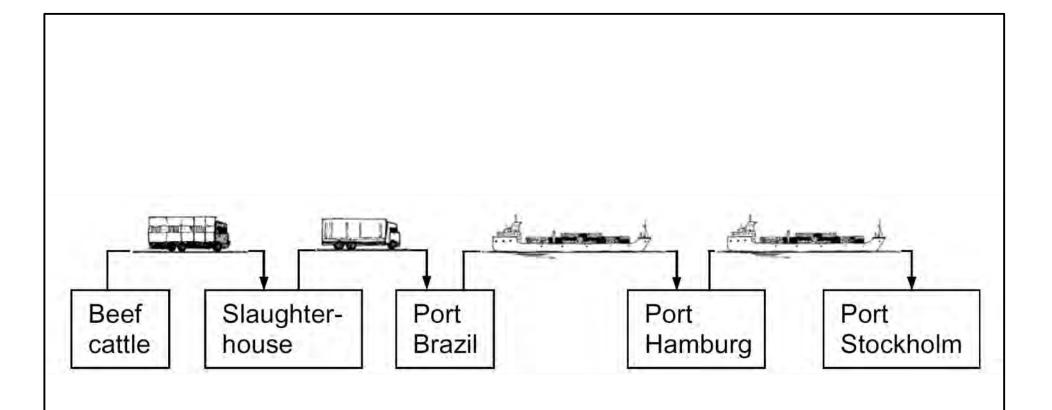
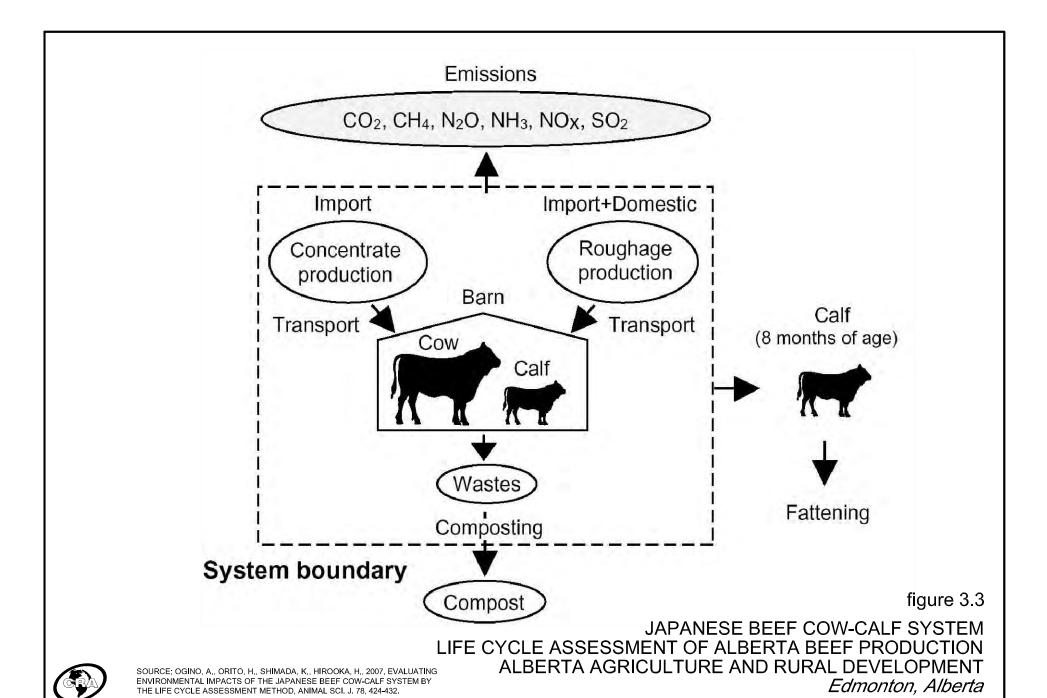


figure 3.2

PRODUCTION SYSTEM OF THE SECOND PHASE OF BRAZILIAN BEEF PRODUCTION LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta



INVENTORY OF GREENHOUSE GAS EMISSIONS AND USE OF LAND AND ENERGY IN BRAZILIAN BEEF PRODUCTION, SIK REPORT NO 792.



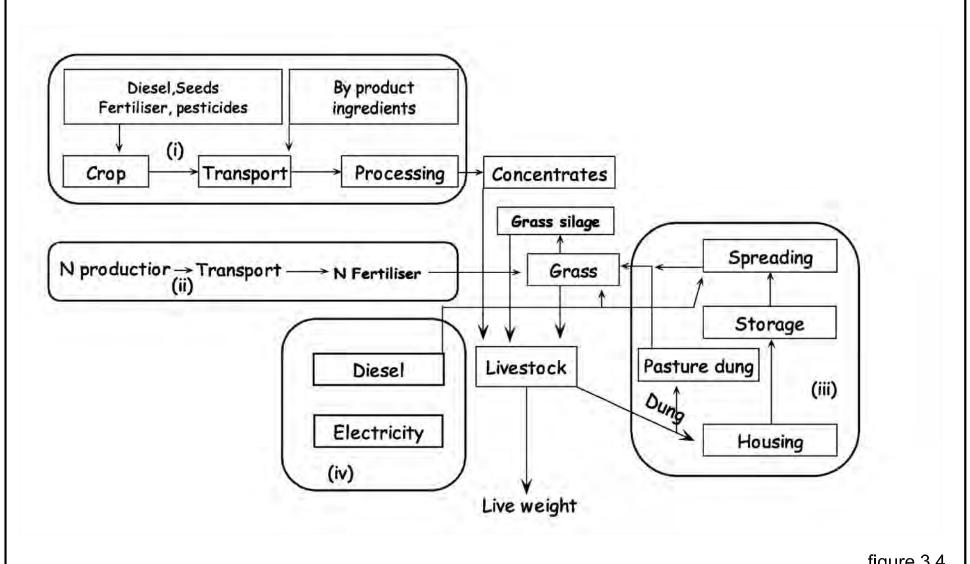


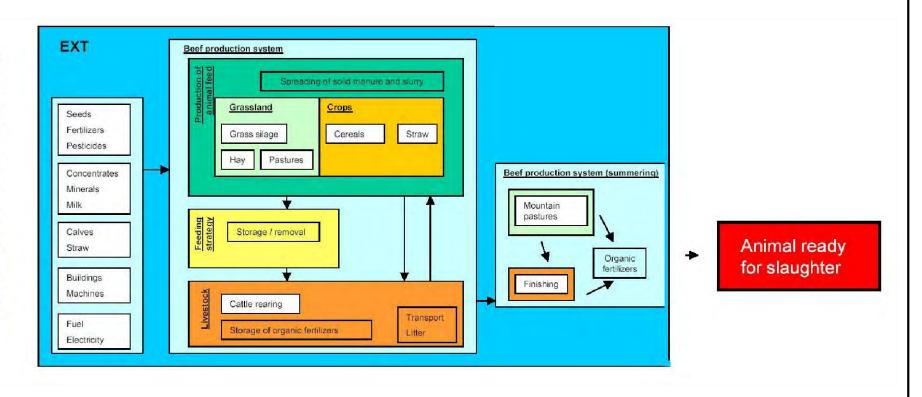
figure 3.4

FLOWCHART OF THE CRADLE TO FARM GATE BEEF PRODUCTION SYSTEM LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta



SOURCE: CASEY, J., W., AND HOLDEN, N., M., 2006. GREENHOUSE GAS EMISSIONS FROM CONVENTIONAL, AGRI-ENVIRONMENTAL SCHEME, AND ORGANIC IRISH SUCKLER-BEEF UNITS, J. ENVIRON. QUAL. 35:231-239.

System boundary



NOTE: EXT - EXTENSIVE FATTENING SYSTEM

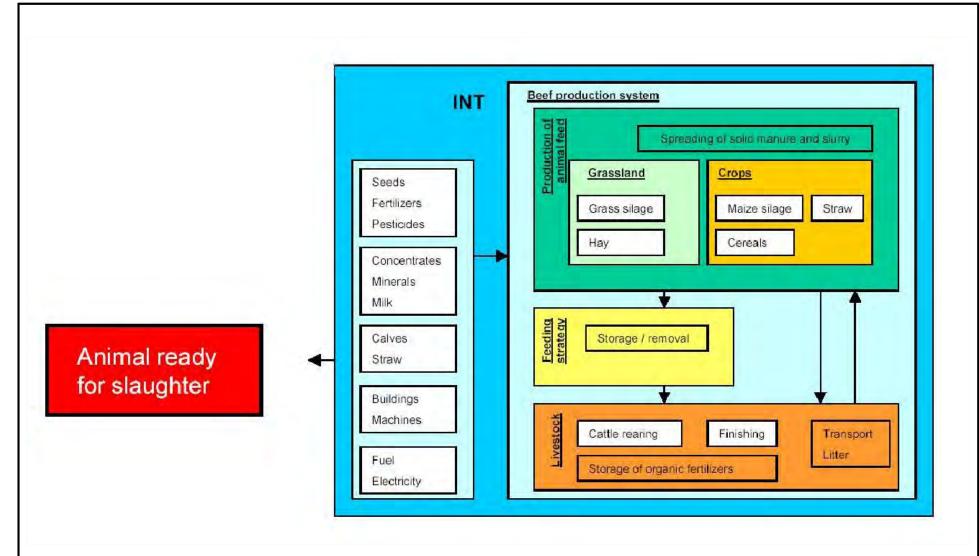
figure 3.5



LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION ALBERTA AGRICULTURE AND RURAL DEVELOPMENT SOURCE: CHASSOT, A. PHILIPP, A., GAILLARD, G., 2005. LIFE CYCLE ASSESSMENT (LCA) OF TWO BEEF PRODUCTION SYSTEMS, AGROSCOPE LIEBEFELD-POSIEUX RESEARCH STATION ALP, PUB 2005/2840*.

Edmonton, Alberta

FLOWCHART OF AN EXTENSIVE FATTENING SYSTEM



NOTE: INT - INTENSIVE FATTENING SYSTEM

figure 3.6

FLOWCHART OF AN INTENSIVE FATTENING SYSTEM LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta



SOURCE: CHASSOT, A. PHILIPP, A., GAILLARD, G., 2005. LIFE CYCLE ASSESSMENT (LCA) OF TWO BEEF PRODUCTION SYSTEMS, AGROSCOPE LIEBEFELD-POSIEUX RESEARCH STATION ALP, PUB 2005/2840*.

RESULTS Environmental impacts per kg of carcass of an extensive (EXT) compared to an intensive beef production system (INT)^a Impact of EXT Impact categories 20% 60% 80% (INT = 100%)INT Depletion of non-renewable 116% (fossile) energy ressources EXT INT Global warming potential 111% EXT over 100 years INT Global warming potential 112% EXT over 500 years INT Formation of ozone at 111% EXT ground level (summer smog) < 67% Very positive INT Human toxicity 107% Positive 67 - 80% EXT Similar 80 - 1259 INT Aquatic ecotoxicity 52% Negative 125 - 150 EXT Very negative > 150% INT 46% Terrestrial ecotoxicity EXT INT Grazing 77% Total eutrophication EXT ■ Feed INT 84% Aquatic eutrophication □ Calves EXT INT 97% ☐ Fuel Terrestrial eutrophication EXT Machinery INT 101% Acidification Buildings EXT

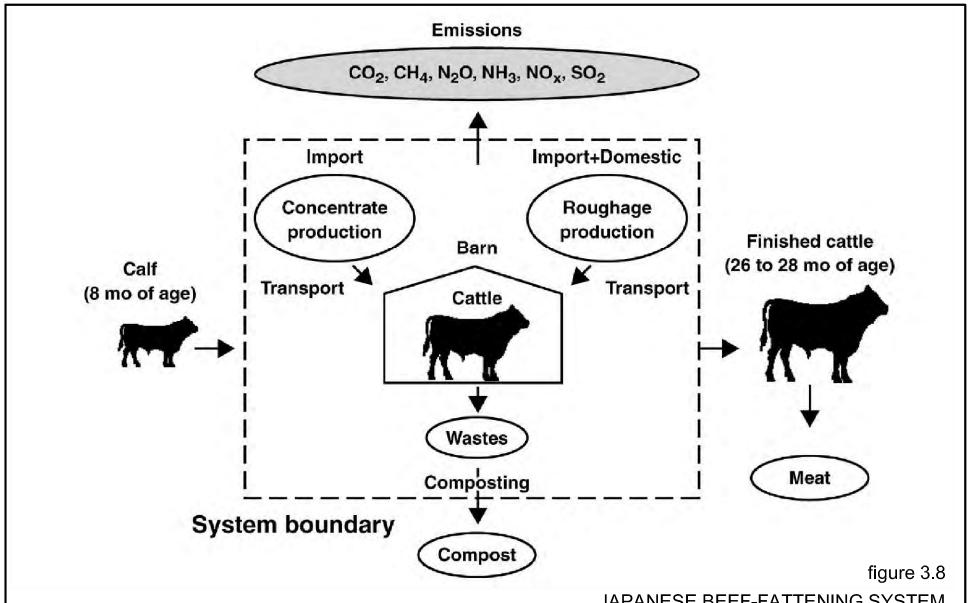
NOTE: INT - INTENSIVE FATTENING SYSTEM
EXT - EXTENSIVE FATTENING SYSTEM

figure 3.7

ENVIRONMENTAL IMPACTS PER KILOGRAM OF CARCASS LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION ALBERTA AGRICULTURE AND RURAL DEVELOPMENT Edmonton, Alberta



SOURCE: CHASSOT, A. PHILIPP, A., GAILLARD, G., 2005. LIFE CYCLE ASSESSMENT (LCA) OF TWO BEEF PRODUCTION SYSTEMS, AGROSCOPE LIEBEFELD-POSIEUX RESEARCH STATION ALP, PUB 2005/2840*.



JAPANESE BEEF-FATTENING SYSTEM
LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION
GOF THE ALBERTA AGRICULTURE AND RURAL DEVELOPMENT
AS Edmonton, Alberta

SOURCE: OGINO, A., KAKU, K., SHIMADA, K., 2004. ENVIRONMENTAL IMPACTS OF THE JAPANESE BEEF FATTENING SYSTEM WITH DIFFERENT FEEDING LENGTHS AS EVALUATED BY A LIFE CYCLE ASSESSMENT METHOD. J. OF ANIMAL SCI. 82, 2115-2122.

SUMMARY OF THE CURRENTLY AVAILABLE LCIA METHODS LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION AARD

TABLE 2.1

Edmonton, Alberta

| | | Edmonton, Alberta | | | |
|---|---|--|---|--|---|
| LCIA METHODOLOGY | Eco-indicator 99 | EDIP97 | EDIP2003 | EPS 2000d | (Dutch) LCA Handbook |
| Method description | Damage approach, including Normalization and default weighting sets | Midpoint method with normalization | Midpoint method with normalization | Category indicators at damage level + weighting as WTP to avoid damage | Midpoint method with normalization |
| MIDPOINT CATEGORIES | 1 | | | | |
| Releases | | | | | |
| Climate change | (DALYs/kg emission) | kg CO2-eq./kg emitted | kg CO2-eq./kg emitted | - | kg CO2-eq./kg emitted |
| Stratospheric ozone depletion | (DALYs/kg emission) | kg CFC-11-eq./kg emitted | kg CFC-11-eq./kg emitted | - | kg CFC-11-eq./kg emitted |
| Human toxicity, including workplace and indoor pollutants | (DALYs/kg emission) | m3 air/g emitted to air, water or soil; m3 water/g emitted to air, water or soil; m3 soil/g emitted to air, water or soil | person | - | kg 1,4-DCB-eq. emitted to air/kg emitted |
| Ionizing radiation | (DALYs/kg emission) | - | - | - | yr.kBq ⁻¹ ; Sv.m ³ .Bq ⁻¹ .yr ⁻¹ |
| Non-ionizing radiation | - | - | - | - | - |
| Accidents | - | - | - | - | - |
| Photo oxidant formation | (DALYs/kg emission) | kg ethylene-eq./kg emitted | m2 ecosystem*ppm*hours/g emitted; pers*ppm*hours/g emitted | - | kg ethylene-eq./kg emitted; kg formed ozone/kg emitted |
| Noise | (DALYs/Pa^2.s) | | pers*sec | - | (Pa^2.s) |
| Acidification | (PDF/m3/yr) | kg SO2-eq. /kg emitted | m2 unprotected ecosystem/g emitted; | - | kg SO2-eq. in Switzerland/kg emitted; kg SO2-eq./kg emitted |
| Eutrophication | (DALYs/kg emission) | kg NO ₃ -eq./kg emitted; kg N-eq/kg emitted; kg P-eq/kg emitted | m2 unprotected ecosystem/g emitted; | - | kg PO ₄ ³⁻ -eq./kg emitted; kg NOx-eq. in Switzerland/kg emitted |
| Ecotoxicity (Fate, exposure and effects) | (PDF/m3/yr)/kg emission | m3 water/g emitted to air, water or soil; m3 soil/g emitted to air, water or soil | m3 water/g emitted to air, water or soil; m3 soil/g emitted to air, water or soil | - | kg 1,4-DCB-eq. emitted to fresh water, sea water or industrial soil/kg emitted |
| Resource use | | | | | |
| Land use & habitat losses | - | - | - | - | m2.yr |
| Energy extractions | | - | - | - | - |
| Mineral extractions | | - | - | - | - |
| Water resource use | - | - | F | - | - |
| Soil quality | - | - | - | - | - |
| Biotic resource use | - | - | - | - | - |
| DAMAGE ASSESSMENT CATEGORIES | | | | | |
| Human health Human health | (DALYs) | _ | - | (years) | Ī |
| Biotic and Abiotic natural environment | (DALIS) | <u>-</u> | <u>-</u> | (years) | <u> </u> |
| Biotic natural environment | (PDF/m2/yr)/kg emission | - | - | Unitless | - |
| Abiotic natural environment | - | - | - | - | - |
| Abiotic and biotic natural resources | | | | | |
| Abiotic natural resources | - | - | - | kg / kg reserves | |
| Biotic natural resources | | - | - | kg / kg reserves | |
| Abiotic and biotic man-made environment | | | | | |
| Abiotic man-made environment | | - | - | - | - |
| Biotic man-made environment | | - | - | - | - |

SUMMARY OF THE CURRENTLY AVAILABLE LCIA METHODS LIFE CYCLE ASSESSMENT OF ALBERTA BEEF PRODUCTION AARD

TABLE 2.1

Edmonton, Alberta

| | | Edmonton, Alberta | | | |
|---|--|--|---|---|---|
| LCIA METHODOLOGY | IMPACT 2002(+) | LIME | (SWISS) ECOSCARCITY | JEPIX | TRACI |
| Method description | Midpoint+damage including normalization | Midpoint+Damage assessment+Weighting; practitioner can choose the step of LCIA based on the aim of LCA. | Weighting method, based on environmental policy goals, to be used for midpoint categories and selected emissions/interventions | Weighting method, based on distance- to-target of environmental policy. Providing regionalized weighting factors based on specific environmental quality. | Midpoint method with normalization |
| MIDPOINT CATEGORIES | | | | | |
| Releases | | | | | |
| Climate change | kg CO2equ | M: kg CO2eq./kg emitted, D: DALYs/kg emitted, JY/kg emitted | CO2-eq / kg emission | CO2-eq / kg emission, weighting EIP/kg emission EIP=Environmental Impact Points | CO2-e / kg emission |
| Stratospheric ozone depletion | kg CFC-11 equ into air | M: kg CFC-11eq./kg emitted, D: DALYs/kg emitted, NPP/kg emitted, JY/kg emitted | CFC-11-eq / kg emission | CFC-11-eq / kg emission, weighing EIP/kg emission | CFC-11-e / kg emission |
| Human toxicity, including workplace and indoor pollutants | kg chloroethylene into air equ into air (cancer & non cancer) kg PM2.5equ into air (respiratory inorg.) | M: kg Benzene-eq. emitted to air/kg emitted, D: DALYs/kg emitted | g | kg 1,4-DCB-eq. emitted to air, fresh water, marine water, agricultural soil, industrial soil, weighting EIP/kg emission | Benzene-e/kg emissions (Cancer), toluene-e/kg emissions (NonCancer), DALYs/tonne emissions (Criteria) |
| Ionizing radiation | Bqeq carbon-14 into air | - | volume | - | - |
| Non-ionizing radiation | - | - | | - | - |
| Accidents | _ | _ | - | _ | _ |
| Photo oxidant formation | kg ethylene equ into air | M: kg ethylene-eq./kg emitted, D: DALYs/kg emitted, NPP/kg emitted, JY/kg emitted | g NM-VOC | kg ethylene-eq./kg emitted, weighting EIP/kg | g - NOx-e / m / kg emission |
| Noise | | | | EIP/km | |
| 1,000 | | M: kg SO2-eq./kg emitted, D: NPP/kg | | | |
| Acidification | kg SO2 equ into air | emitted, JY/kg emitted | H+ moles-e / kg emission | | H+ moles-e / kg emission |
| Eutrophication | kg PO43- equ into water | M: kg PO ₄ ³⁻ -eq./kg emitted; D: JY/kg emitted | g N and g P | kg N (lakes, bays), kg P (lakes, bays), kg COD (lakes, bays), BOD kg (rivers) | N-e / kg emission |
| Ecotoxicity (Fate, exposure and effects) | kg triethylene glycol equ into water / soil | M: kg benzene-eq. emitted to water/kg emitted; D: EINES/kg emitted | g | | 2,4-D-e / kg emission |
| Resource use | | | | | |
| Land use & habitat losses | m2 organic arable crop | M: (occupation) m2.yr, (transformation) m2, D: (transformation) EINES/m2, dry- kg/m2, (occupation) dry-kg/m2/yr | volume and weight of controlled waste deposition (use of scarce space fit for specific waste depositions) | waste generated kg, waste landfilled kg | - |
| Energy extractions | MJ total | M: MJ total, D: JY/kg EINES/kg, dry- kg/kg | - | - | - |
| Mineral extractions | MJ surplus | M&D | - | - | - |
| Water resource use | MJ | | | _ | _ |
| Soil quality | - | <u>-</u> | <u> </u> | _ | - |
| Biotic resource use | - | D | | _ | - |
| DAMAGE ASSESSMENT CATEGORIES | | l B | - | <u>-</u> | <u>-</u> |
| | | | | | |
| Human health | (DATA) | DAIV | | | DATY /: (C ::) |
| Human health Biotic and Abiotic natural environment | (DALYs) | DALYs | - | - | DALYs/tonne emissions (Criteria) |
| Biotic natural environment | PDF-m2-year | EINES (Expected Increase in Number of Extinct Species) | - | - | - |
| Abiotic natural environment | Climate change kept as separate damage on life support system | - | - | - | - |
| Abiotic and biotic natural resources | · | • | | | • |
| Abiotic natural resources | | Loss of economic value (Japanese Yen) | MJ | - | - |
| Biotic natural resources | | NPP (Net Primary Productivity) (dry kg) | - | - | - |
| Abiotic and biotic man-made environment | • | | | 1 | 1 |
| Abiotic man-made environment | - | - | - | - | - |
| Biotic man-made environment | - | Loss of economic value (Japanese Yen) is adopted | - | - | - |
| | | | | | |

APPENDIX B

BEEF PRODUCTION DATA FROM LCA MODEL

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BEEF PRODUCTION DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

Beef Production Data Worksheet

About This Worksheet

This worksheet contains data pertaining to the production of beef in Alberta necessary to calculate the life cycle impacts.

Index

Alberta Beef Statistics

Diet

Manure Generation and Management

Garbage Generation and Management

Mortalities and Disposal

Operation and Maintenance on Beef Farms

Bedding

Water Consumption Transportation

Dairy Cows

| ** | Uncertainty | in | data | - hiah | nliahted | in | blue |
|----|-------------|----|------|--------|----------|----|------|
| | | | | | | | |

Notes:

60,500 number of head

This spreadsheet can be updated based on new data to run different scenarios

All Alberta-specific and beef production data is contained in this tab.

The model will be updated based on any data updated in this tab of the model.

| Description | Value | Units | Source |
|------------------------------------|------------------------|-------|--|
| Alberta Beef Statistics | | | |
| Alberta Cattle | | | |
| 15-May-01 | | | |
| Total Cattle and Calves - Alberta | 6,615,201 number of he | ead | Statistics Canada. Table 19 - Cattle and calves, by province, Census Agricultural Region (CAR) and Census Division (CD), May 15, 2001. Available at: http://www.statcan.gc.ca/pub/95f0301xl/html/4064782-eng.htm |
| Bulls, 1 year and over | 111,379 number of he | ead | Statistics Canada. Table 19 - Cattle and calves, by province, Census Agricultural Region (CAR) and Census Division (CD), May 15, 2001. Available at: http://www.statcan.gc.ca/pub/95f0301x/t/html/4064782-eng.htm |
| Total Cows | 2,183,332 number of he | ead | Statistics Canada. Table 19 - Cattle and calves, by province, Census Agricultural Region (CAR) and Census Division (CD), May 15, 2001. Available at: http://www.statcan.gc.ca/pub/95f0301x/t/html/4064782-eng.htm |
| Dairy Cows | 84,044 number of he | ead | Statistics Canada. Table 19 - Cattle and calves, by province, Census Agricultural Region (CAR) and Census Division (CD), May 15, 2001. Available at: http://www.statcan.gc.ca/pub/95f0301x/t/html/4064782-eng.htm |
| Beef Cows | 2,099,288 number of he | ead | Statistics Canada. Table 19 - Cattle and calves, by province, Census Agricultural Region (CAR) and Census Division (CD), May 15, 2001. Available at: http://www.statcan.gc.ca/pub/95f0301x/t/html/4064782-eng.htm |
| Total Heifers, 1 year and over | 1,159,329 number of he | ead | Statistics Canada. Table 19 - Cattle and calves, by province, Census Agricultural Region (CAR) and Census Division (CD), May 15, 2001. Available at: http://www.statcan.gc.ca/pub/95f0301x/t/html/4064782-eng.htm |
| Heifers for beef herd replacement | 359,291 number of he | ead | Statistics Canada. Table 19 - Cattle and calves, by province, Census Agricultural Region (CAR) and Census Division (CD), May 15, 2001. Available at: http://www.statcan.gc.ca/pub/95f0301x/t/html/4064782-eng.htm |
| Heifers for dairy herd replacement | 38,485 number of he | ead | Statistics Canada. Table 19 - Cattle and calves, by province, Census Agricultural Region (CAR) and Census Division (CD), May 15, 2001. Available at: http://www.statcan.gc.ca/pub/95f0301x/t/html/4064782-eng.htm |
| Heifers for slaughter or feeding | 761,553 number of he | ead | Statistics Canada. Table 19 - Cattle and calves, by province, Census Agricultural Region (CAR) and Census Division (CD), May 15, 2001. Available at: http://www.statcan.gc.ca/pub/95f0301x/t/html/4064782-eng.htm |
| Steers, 1 year and over | 991,554 number of he | ead | Statistics Canada. Table 19 - Cattle and calves, by province, Census Agricultural Region (CAR) and Census Division (CD), May 15, 2001. Available at: http://www.statcan.gc.ca/pub/95f0301x/t/html/4064782-eng.htm |
| Calves, under 1 year | 2,169,607 number of he | ead | National Control of the Available 4: http://www.statcan.gc.ca/pub/95f0301xt/html/4064782-eng.htm |
| Alberta Cattle on Dairy Operations | | | |
| 1-Jan-01 | | | |
| Bulls | 1,800 number of he | ead | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE. |
| Milk Cows | 90,000 number of he | ead | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE. |
| Beef Cows | 0 number of he | ead | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE. |
| Milk Heifers | 35,000 number of he | ead | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE. |
| Beef Heifers - breeding | 0 number of he | ead | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE. |
| Beef Heifers - slaughter | 7,800 number of he | ead | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE. |
| Steers | 7,000 number of he | | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE. |
| Calves | 60 500 number of he | had | Statistics Canada, Cattle Statistics, 2002, vol. 1, no. 1, Catalogue no. 23-012-XIE |

Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE.

Calves

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| <u>1-Jul-01</u> | | |
|-----------------------------------|--|---|
| Bulls | 1,900 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Cows | 91,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Cows | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Heifers | 39,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - breeding | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - slaughter | 6,400 number of head 5,200 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Steers Calves | 45,600 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Caives | 45,000 Humber of flead | Statistics Carlada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 25-012-XII |
| 1-Jan-02 | | |
| Bulls | 1,500 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Cows | 92,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Cows | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Heifers | 36,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - breeding | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - slaughter | 9,200 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Steers | 6,300 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Calves | 46,200 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| | | |
| <u>1-Jul-02</u> | | |
| Bulls | 1,700 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Cows | 90,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Cows | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Heifers | 38,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - breeding | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - slaughter | 7,600 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Steers | 4,500 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Calves | 35,800 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Alberta Cattle on Beef Operations | | |
| Alberta Cattle on Beer Operations | | |
| 1-Jan-01 | | |
| Bulls | 96,200 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Cows | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Cows | 1,995,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Heifers | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - breeding | 275,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - slaughter | 552,200 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Steers | 793,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Calves | 1,915,600 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| | | |
| <u>1-Jul-01</u> | | |
| Bulls | 112,100 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Cows | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Cows | 2,060,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Heifers | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - breeding | 370,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - slaughter | 713,500 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Steers | 954,800 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Calves | 2,100,500 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| 1-Jan-02 | | |
| Bulls | 96,500 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Cows | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Cows | 1,959,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Milk Heifers | 0 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - breeding | 250,000 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - slaughter | 600,900 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Steers | 793,800 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| Calves | 1,883,800 number of head | Statistics Canada. Cattle Statistics. 2002, vol. 1, no. 1. Catalogue no. 23-012-XIE |
| | .,, | |
| <u>1-Jan-03</u> | | |
| Bulls | 94,600 number of head | Statistics Canada. Cattle Statistics. 2004, vol. 3, no. 1. Catalogue no. 23-012-XIE |
| Milk Cows | 0 number of head | Statistics Canada. Cattle Statistics. 2004, vol. 3, no. 1. Catalogue no. 23-012-XIE |
| Beef Cows | 1,915,000 number of head | Statistics Canada. Cattle Statistics. 2004, vol. 3, no. 1. Catalogue no. 23-012-XIE |
| Milk Heifers | 0 number of head | Statistics Canada. Cattle Statistics. 2004, vol. 3, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - breeding | 250,000 number of head | Statistics Canada. Cattle Statistics. 2004, vol. 3, no. 1. Catalogue no. 23-012-XIE |
| Beef Heifers - slaughter | 527,800 number of head | Statistics Canada. Cattle Statistics. 2004, vol. 3, no. 1. Catalogue no. 23-012-XIE |
| Steers | 695,100 number of head | Statistics Canada. Cattle Statistics. 2004, vol. 3, no. 1. Catalogue no. 23-012-XIE |
| Calves | 1,652,300 number of head | Statistics Canada. Cattle Statistics. 2004, vol. 3, no. 1. Catalogue no. 23-012-XIE |
| | | |

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| Percent Breakdown of Animals on Beef Operations | CALCULATION | |
|--|-------------------|---|
| 1-Jan-01 | | |
| Bulls | 98.2 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Milk Cows | 0.0 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Beef Cows | 100.0 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Milk Heifers | 0.0 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Beef Heifers - breeding | 100.0 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Beef Heifers - slaughter | 98.6 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Steers | 99.1 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Calves | 96.9 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| <u>1-Jul-01</u> | | |
| Bulls | 98.3 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Milk Cows | 0.0 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Beef Cows | 100.0 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Milk Heifers | 0.0 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Beef Heifers - breeding | 100.0 % 99.1 % | Calculated based on values above from Statistics Canada. 2002. Table 15 Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Beef Heifers - slaughter Steers | 99.1 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Calves | 97.9 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Carves | 31.3 70 | Calculated blaced of values above from character scanning. 2002. Table 10 |
| Average for 2001 | | |
| Bulls | 98.2 % | Calculated based on values above from Statistics Canada. 2002. Table 15 Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Milk Cows Beef Cows | 0.0 % 100.0 % | Calculated based on values above from Statistics Canada. 2002. Table 15 Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Milk Heifers | 0.0 % | Calculated based on values above from Statistics Canada. 2002. Table 15 Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Beef Heifers - breeding | 100.0 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Beef Heifers - slaughter | 98.9 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Steers | 99.3 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| Calves | 97.4 % | Calculated based on values above from Statistics Canada. 2002. Table 15 |
| | | |
| Alberta Calf-Fed and Yearling-Fed Calf Breakdown | | |
| Percent Calf-Fed Calves in Alberta | 45 % | Comment from ARD during the Life Cycle Analysis of Beef Production in Alberta - Project Kick-Off Meeting. ARD, CRA, and Pembina. |
| 1 order our rou during my mortu | 10 70 | September 28, 2009. |
| Percent Yearling-Fed Calves in Alberta | 55 % | Comment from ARD during the Life Cycle Analysis of Beef Production in Alberta - Project Kick-Off Meeting. ARD, CRA, and Pembina. |
| | | September 28, 2009. |
| Alberta Steer and Heifer Breakdown | CALCULATION | |
| Description in Alberta or May 45, 0004 | 40.07 | October 1 and a second of the |
| Percent steers in Alberta on May 15, 2001 compared to heifers Percent heifers in Alberta on May 15, 2001 compared to steers | 46 % 54 % | Calculated based on above (May 15, 2001 Census data) Calculated based on above (May 15, 2001 Census data) |
| referrit fiellers in Alberta off May 15, 2001 compared to steers | 34 76 | Calculated based off above (way 15, 2001 Cerisus data) |
| Alberta Beef Cow and Bull Breakdown | | |
| Percent cows in Alberta on May 15, 2001 compared to bulls | 95 % | Calculated based on above (May 15, 2001 Census data) |
| Percent bulls in Alberta on May 15, 2001 compared to bulls | 5 % | Calculated based on above (May 15, 2001 Census data) |
| · | 2 /2 | |
| Bull Replacement | | |
| Culling/replacement rate for bulls (US) | 25 % | Agricultural Alternatives. Beef Cow-Calf Operations. Available at: http://agalternatives.aers.psu.edu |
| Percent Cow and Bull Culls Directly to Slaughterhouse from Co | w/Calf Operation | |
| , | 95 % | Assumed value |
| Alberta Auction Information | | |
| | | |
| Sales Through Local Auction Markets (1986/89 data) | 70 % | Alberta Cow-Calf Audit, 1997/1998. Production Indicators and Management Practices Over the Last 10 years. Alberta Agriculture and Rural |
| Through Local Auction Markets (1906/69 data) | 70 % | Alberta Cow-Call Addit, 1997/1996. Production indicators and management Practices Over the Last 10 years. Alberta Agriculture and Rural Development |
| Farmer to Farmer (1986/89 data) | 12.3 % | Alberta Cow-Calf Audit, 1997/1998. Production Indicators and Management Practices Over the Last 10 years. Alberta Agriculture and Rural |
| Direct to Packer (1986/89 data) | 9.6 % | Development Alberta Cow-Calf Audit, 1997/1998. Production Indicators and Management Practices Over the Last 10 years. Alberta Agriculture and Rural |
| Through Dealer (1986/89 data) | 9.3 % | Development Alberta Cow-Calf Audit, 1997/1998. Production Indicators and Management Practices Over the Last 10 years. Alberta Agriculture and Rural |
| Direct to Feedlot (1986/89 data) | 4.4 % | Development Alberta Cow-Calf Audit, 1997/1998. Production Indicators and Management Practices Over the Last 10 years. Alberta Agriculture and Rural |
| Direct to 1 eedibt (1900/09 data) | 4.4 70 | Alberta Cow-Can Addit, 1997/1996. Production indicators and management Practices Over the Last 10 years. Alberta Agriculture and Rural Development |
| | | · |
| Time at Auction Facilities | 24 - 48 hours | Discussion with Calgary Stockyard Ltd. |
| Assume 48 hours to be conservative | | |
| | | |

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BEEF PRODUCTION DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

Alberta Imports of Live Cattle

| Purebred (2001) (for breeding) - international (includes dairy) | 211 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003. Available |
|---|--|--|
| Other Live Cattle (2001) (slaughter and feeder) - international | 129,133 number of head | at:http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd7799/\$file/beef_live_cattle_five_year.pdf?OpenElement Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003. Available |
| (includes dairy) | 90 number of head | at:http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd7799/\$file/beef_live_cattle_five_year.pdf?OpenElement Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003. Available |
| Purebred (2002) (for breeding) - international (includes dairy) | | at:http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd7799/\$file/beef_live_cattle_five_year.pdf?OpenElement |
| Other Live Cattle (2002) (slaughter and feeder) - international (includes dairy) | 8,794 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003. Available at:http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd7799/\$file/beef live cattle five year.pdf?OpenElement |
| ** International imports mainly feeders - assume all feeders | | |
| unless more accurate data is obtained - assume all beef because fraction of beef to dairy is unknown | | |
| International Import Data - breakdown of type of animal not available | | |
| | | |
| Interprovincial Movement of Cattle (Imports) 2007 | | |
| To Alberta from British Columbia - Cattle To Alberta from British Columbia - Calves | 102,372 number of head 87,429 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Alberta from Saskatchewan - Cattle | 314,327 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Alberta from Saskatchewan - Calves | 278,683 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Alberta from Manitoba - Cattle To Alberta from Manitoba - Calves | 160,655 number of head 35,805 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| | | |
| 2008 To Alberta from British Columbia - Cattle | 96,285 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Alberta from British Columbia - Calves | 85,048 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Alberta from Saskatchewan - Cattle To Alberta from Saskatchewan - Calves | 317,216 number of head 259,278 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Alberta from Manitoba - Cattle | 158,425 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Alberta from Manitoba - Calves | 68,261 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| ** 2007-2008 data will be used for the interprovincial movement of cattle (imports) until 2001-2002 data is found. Assume the % of each animal type from Saskatchewan to Alberta in 2008 for all provinces as no further breakdown is available (included below under "Alberta Imports from Saskatchewan - 2008 and 2009) 2001-2002 data not available | | |
| Alberta Exports of Live Cattle | | |
| Alberta 2001 international exports | 513,143 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Purebred (includes dairy animals) | 110 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Other Cattle (includes dairy animals) | 513,033 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Purebred Cattle - female (assume cows) | 8 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Purebred Cattle - male (assume bulls) | 46 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Steers for immediate slaughter Heifers for immediate slaughter | 232,056 number of head 205,868 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Steers for feedlot | 27,628 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Cows for immediate slaughter | 17,443 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Bulls for immediate slaughter Male Calves for backgrounding (weight >200 and <320kc | 13,970 number of head 2,786 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Female Calves for backgrounding (weight >200 and | 298 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| <320kg) Female calves for feedlot (>320kg) | 8,445 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Bulls for breeding | 1,788 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Cows for breeding Male calves >90kg and <200kg | 1,685 number of head 117 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Female calves >90kg and <200kg Female calves >90kg and <200kg | 126 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Male calves <90kg | 18 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Female calves <90kg | 44 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |

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| Alberta 2002 international exports | 511,878 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
|--|--|--|
| Purebred (includes dairy animals) Other Cattle (includes dairy animals) | 263 number of head 511615 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Purebred Cattle - female (assume cows) | 8 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Purebred Cattle - male (assume bulls) | 0 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Steers for immediate slaughter | 184,677 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Heifers for immediate slaughter | 185,164 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Steers for feedlot | 29,386 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Cows for immediate slaughter Bulls for immediate slaughter | 37,795 number of head 16,478 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Male Calves for backgrounding (weight >200 and <320kc | 18,433 number of head | Alberta Trade in Beel and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Female Calves for backgrounding (weight >200 and | 14,018 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| <320kg) | 14,010 humber of flead | Aborta Hade in Decraine Live Gatae. Tools 2002. Aborta Agriculture, Food and Natai Decrophism, Nov. 2000 |
| Female calves for feedlot (>320kg) | 9,661 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Bulls for breeding | 1,831 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Cows for breeding | 2,262 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Male calves >90kg and <200kg Female calves >90kg and <200kg | 5,468 number of head 4,988 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Male calves <90kg | 11 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| Female calves <90kg | 0 number of head | Alberta Trade in Beef and Live Cattle. 1998-2002. Alberta Agriculture, Food and Rural Development, Nov. 2003 |
| | | 9 |
| Interprovincial Movement of Cattle (Exports) 2007 | | |
| To British Columbia from Alberta - Cattle | 15,080 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To British Columbia from Alberta - Calves | 3,866 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Saskatchewan from Alberta - Cattle | 51,805 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Saskatchewan from Alberta - Calves | 23,744 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Manitoba from Alberta - Cattle | 3,923 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Manitoba from Alberta - Calves | 3,809 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Ontario from Alberta - Cattle To Ontario from Alberta - Calves | 27,760 number of head 26,091 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Quebec from Alberta - Cattle | 15,568 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Quebec from Alberta - Calves | 6,950 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To New Brunswick from Alberta - Cattle | 2 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To New Brunswick from Alberta - Calves | 1 number of head | Interprovincial Movement of Cattle and Calves, 2007. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| 2008 | | |
| To British Columbia from Alberta - Cattle | 21,441 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To British Columbia from Alberta - Calves | 1,477 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Saskatchewan from Alberta - Cattle | 48,648 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Saskatchewan from Alberta - Calves | 9,696 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Manitoba from Alberta - Cattle | 5,932 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Manitoba from Alberta - Calves To Ontario from Alberta - Cattle | 1,567 number of head 29,267 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Ontario from Alberta - Calves | 16,383 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marii Donetz, Government of Manitoba, on December 16, 2009. Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marii Donetz, Government of Manitoba, on December 16, 2009. |
| To Quebec from Alberta - Cattle | 8,795 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To Quebec from Alberta - Calves | 2,883 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To New Brunswick from Alberta - Cattle | 1 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| To New Brunswick from Alberta - Calves | 0 number of head | Interprovincial Movement of Cattle and Calves, 2008. Emailed from Marni Donetz, Government of Manitoba, on December 16, 2009. |
| ** 2007-2008 data will be used for the interprovincial movement of cattle (exports) until 2001-2002 data is found. Assume the % of each animal type from Saskatchewan to | | |
| Alberta in 2008 for all provinces as no further breakdown is available (included below under "Alberta Imports from | | |
| Saskatchewan - 2008 and 2009) | | |
| 2001-2002 data not available | | |
| | | |
| Alberta Imports from Saskatchewan - 2001 and 2002 | | |
| <u>2001</u> | | |
| Feeder Steers | 307,580 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 48 % | Calculated |
| Slaughter Steers | 23,980 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 4 % | Calculated |
| Feeder Cows Percent of import | 3,750 number of head 1 % | Cattle Marketings for the Year 2002, Government of Saskatchewan. Calculated |
| . Groots of import | 1 /0 | Calculated |

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| Slaughter Cows | 21,420 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
|--|--|---|
| Percent of import | 3 % | Calculated |
| Feeder Bulls | 1,300 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| | | Calculated |
| Percent of import | 0 % | |
| Slaughter Bulls | 1,110 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 0 % | Calculated |
| Feeder Heifers | 259,080 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 41 % | Calculated |
| Slaughter Heifers | 16,490 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 3 % | Calculated |
| | | |
| Slaughter Calves | 560 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 0 % | Calculated |
| | | |
| <u>2002</u> | | |
| | | |
| Feeder Steers | 211,310 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 42 % | Calculated |
| Slaughter Steers | 35,720 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| | | Calculated |
| Percent of import | 7 % | |
| Feeder Cows | 2,920 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 1 % | Calculated |
| Slaughter Cows | 16,740 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 3 % | Calculated |
| Feeder Bulls | 1,290 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 0 % | Calculated |
| Slaughter Bulls | 940 number of head | |
| | | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 0 % | Calculated |
| Feeder Heifers | 205,590 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 41 % | Calculated |
| Slaughter Heifers | 23,340 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| Percent of import | 5 % | Calculated |
| Slaughter Calves | 450 number of head | Cattle Marketings for the Year 2002, Government of Saskatchewan. |
| | | |
| Percent of import | 0 % | Calculated |
| | | |
| | | |
| Mature Cow Weight in Alberta | 606 kg | Alberta Cow-Calf Audit, 1997/1998. Production Indicators and Management Practices Over the Last 10 years. Alberta Agriculture and Rural |
| | | Development |
| | | |
| | | Development |
| Mature Rull Weight in Alberta | 998 kg | |
| Mature Bull Weight in Alberta | 998 kg | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: |
| Mature Bull Weight in Alberta | 998 kg | |
| • | 998 kg | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: |
| Calf-Fed Weights | 998 kg | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: |
| Calf-Fed Weights Before backgrounding | · · | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/beef4881 |
| Calf-Fed Weights Before backgrounding Heifer | 500 lbs | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding | · · | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer | 500 lbs | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer | 500 lbs 227 kg 500 lbs | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer Steer Steer | 500 lbs 227 kg | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer Steer Steer After backgrounding | 500 lbs 227 kg 500 lbs 227 kg | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer Steer Steer After backgrounding Heifer | 500 lbs 227 kg 500 lbs 227 kg 600 lbs | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer Steer Steer After backgrounding Heifer Heifer | 500 lbs 227 kg 500 lbs 227 kg 600 lbs 272 kg | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer Steer Steer After backgrounding Heifer Heifer Steer | 500 lbs 227 kg 500 lbs 227 kg 600 lbs 272 kg 600 lbs | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer Steer Steer After backgrounding Heifer Heifer Steer Steer Steer Steer | 500 lbs 227 kg 500 lbs 227 kg 600 lbs 272 kg | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer Steer Steer After backgrounding Heifer Heifer Steer | 500 lbs 227 kg 500 lbs 227 kg 600 lbs 272 kg 600 lbs | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer Steer Steer After backgrounding Heifer Heifer Steer Steer Steer Steer | 500 lbs 227 kg 500 lbs 227 kg 600 lbs 272 kg 600 lbs | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer Steer Steer After backgrounding Heifer Heifer Steer Feedlot Heifer | 500 lbs 227 kg 500 lbs 227 kg 600 lbs 272 kg 600 lbs 272 kg 1,350 lbs | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer Steer Steer After backgrounding Heifer Heifer Steer Feedlot Heifer Heifer Heifer | 500 lbs 227 kg 500 lbs 227 kg 600 lbs 272 kg 600 lbs 272 kg 1,350 lbs 612 kg | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Calf-Fed Weights Before backgrounding Heifer Heifer Steer Steer After backgrounding Heifer Heifer Steer Feedlot Heifer Heifer Heifer Steer | 500 lbs 227 kg 500 lbs 227 kg 600 lbs 272 kg 600 lbs 272 kg 1,350 lbs 612 kg 1,450 lbs | Alberta Agriculture and Rural Development. Winter Feeding of Bulls. 2002. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/beef4881 Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
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| Shrunk live weight of animal at time of sale (% reduction at slaughterhouse) | 4 % | Cattlemen's Go To Feedlot Lingo. Dr. Greg Lardy, Beef Specialist, North Dakota State University. January 1999. Available at: http://www.ag.ndsu.edu/pubs/ansci/beef/as1161w.htm |
|---|---|---|
| Alberta Slaughtered Cattle and Calves (2001) | | |
| Total Cattle and Calves | 2,342,002 number of head | Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd12890/\$FILE/table53.pdf |
| Steers | 1,232,796 number of head | Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd12890/\$FILE/table53.pdf |
| Heifers | 887,062 number of head | Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd12890/\$FILE/table53.pdf |
| Cows | 217,408 number of head | Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd12890/\$FILE/table53.pdf |
| Bulls | 4,180 number of head | Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd12890/\$FILE/table53.pdf |
| Calves | 253 number of head | Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd12890/\$FILE/table53.pdf |
| Alberta Slaughtered Cattle and Calves (2002) | | |
| Total Cattle and Calves | 2,367,910 number of head | Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: |
| Steers | 1,223,119 number of head | http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd12890/\$FILE/table53.pdf Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: |
| Heifers | 909,351 number of head | http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd12890/\$FILE/table53.pdf Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: |
| Cows | 231,917 number of head | http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd12890/\$FILE/table53.pdf Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: |
| Bulls | 3,207 number of head | http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd12890/\$FILE/table53.pdf Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: |
| Calves | 330 number of head | http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd12890/\$FILE/table53.pdf Alberta Agriculture Statistics Yearbook, 2008. Table 53. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd12890/\$FILE/table53.pdf |
| Alberta Feedlot Capacity (2008) | | |
| Region 1 - Number of Lots Region 1 - Capacity Region 2 - Number of Lots Region 2 - Capacity Region 3 - Capacity Region 3 - Capacity Region 3 - Capacity Region 4 - Number of Lots Region 4 - Capacity Region 5 - Capacity Region 5 - Number of Lots Region 6 - Number of Lots Region 6 - Capacity Region 6 - Capacity Region 6 - Capacity Region 7 - Capacity Region 8 - Number of Lots Region 8 - Number of Lots Region 7 - Capacity | 4 lots 17,000 number of head capacity 27 lots 243,000 number of head capacity 62 lots 555,300 number of head capacity 13 lots 85,200 number of head capacity 28 lots 367,800 number of head capacity 21 lots 124,600 number of head capacity 16 lots 51,500 number of head capacity 17 lots 120,000 number of head capacity | Canfax. 2008 Annual Report. Available at: www.canfax.ca |
| Alberta Packer (Slaughterhouse) Directory (January 2009) | | |
| Cargill Meat Solutions P.O. Box 3850, High River, AB T0L 1B0 Slaughter Type - Steers, Heifers, Cows Weekly Slaughter Capacity | 20,000 number of head capacity / week | Canfax. 2008 Annual Report. Available at: www.canfax.ca |
| Lacombe Research Centre 6000 C&E Trail, Lacombe, AB T4L 1W1 Slaughter Type - Steers, Heifers, Cows, Bulls Weekly Slaughter Capacity | 25 number of head capacity / week | Canfax. 2008 Annual Report. Available at: www.canfax.ca |
| Canadian Premium Meats Inc. 3401 - 53 Ave., Lacombe, AB T4L 2L6 Slaughter Type - Cattle, Calves, Bison, Elk Weekly Slaughter Capacity | 600 number of head capacity / week | Canfax. 2008 Annual Report. Available at: www.canfax.ca |

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BEEF PRODUCTION DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

Lakeside Packers Ltd. (a div. of Tyson) Box 1868, Brooks, AB TOJ 0J0 Slaughter Type - Steers, Heifers, Cows, Bulls Weekly Slaughter Capacity

Sunterra Meats Ltd.

4312-51 Street, Innisfail, AB T4G 1A3

Slaughter Type - Steers, Heifers, Cows, Bulls, Calves, Bison, Sheep

Weekly Slaughter Capacity 1,500 number of head capacity / week Canfax. 2008 Annual Report. Available at: www.canfax.ca

5101 - 11 Street SE, Calgary, AB T2H 1M7 Slaughter Type - Steers, Heifers, Cows, Bulls

Weekly Slaughter Capacity 5,000 number of head capacity / week Canfax. 2008 Annual Report. Available at: www.canfax.ca

21.59 lb dry matter/head/day

Diet

back to top

Alberta Reef Generic Rations / Diets

See "Diets" tab for data regarding diets

Feed Barley Barley Silage Alfalfa

Pasture

Supplement Ingredients

Lime (calcium)

Potassium Chloride (potassium)

Sodium Chloride (sodium)

Copper Sulphate (Copper) Manganese Oxide (manganese)

Zinc Oxides (zinc)

Selinite (selenium) Cobalt Carbonate (Cobalt)

EDDI (iodine)

Vitamin A Premix (vitamin A)

Vitamin D Premix (vitamin D) Vitamin E Premix (vitamin E)

Rumnesin (monensin)

Dicalphos (calcium and phosphorus)

Potassium Chloride (magnesium)

Millrun Carrier

Dry Matter Intake for Cows/Bulls during Breeding or on Pasture 30 lb dry matter/head/day Dry Matter Intake for Cows during Winter Feeding 25.2 lb dry matter/head/day Dry Matter Intake for Cows during Calving 31.5 lb dry matter/head/day Dry Matter Intake for Steers/Heifers on Pasture 20 lb dry matter/head/day

note that these values can be variable depending on type of grass, level of growth, milk production, etc.

Dry Matter Intake - Backgrounding Calf-Fed 12.81 lb dry matter/head/day Dry Matter Intake - Calf-Fed Heifer Diet 3 9.64 lb dry matter/head/day Dry Matter Intake - Calf-Fed Heifer Diet 4 17.11 lb dry matter/head/day Dry Matter Intake - Calf-Fed Heifer Diet 5 19.72 lb dry matter/head/day Dry Matter Intake - Calf-Fed Heifer Diet 6 20.66 lb dry matter/head/day Dry Matter Intake - Calf-Fed Heifer Diet 7 21.12 lb dry matter/head/day Dry Matter Intake - Calf-Fed Steer Diet 3 10.07 lb dry matter/head/day Dry Matter Intake - Calf-Fed Steer Diet 4 21.77 lb dry matter/head/day Dry Matter Intake - Calf-Fed Steer Diet 5 22.13 lb dry matter/head/day Dry Matter Intake - Calf-Fed Steer Diet 6 22.97 lb dry matter/head/day Dry Matter Intake - Calf-Fed Steer Diet 7 21.86 lb dry matter/head/day Dry Matter Intake - Backgrounding Yearling-Fed 15.28 lb dry matter/head/day Dry Matter Intake - Yearling-Fed Heifer Diet 1 11.27 lb dry matter/head/day Dry Matter Intake - Yearling-Fed Heifer Diet 2 16.68 lb dry matter/head/day Dry Matter Intake - Yearling-Fed Heifer Diet 3 16.18 lb dry matter/head/day Dry Matter Intake - Yearling-Fed Heifer Diet 4 14.95 lb dry matter/head/day Dry Matter Intake - Yearling-Fed Heifer Diet 5 21.75 lb dry matter/head/day Dry Matter Intake - Yearling-Fed Heifer Diet 6 20.31 lb dry matter/head/day Dry Matter Intake - Yearling-Fed Heifer Diet 7 22.33 lb dry matter/head/day Dry Matter Intake - Yearling-Fed Steer Diet 1 12.18 lb dry matter/head/day Dry Matter Intake - Yearling-Fed Steer Diet 2 17.51 lb dry matter/head/day

Feedlot Nutrition Newsletter Dwight Karren Feedlot Nutrition@hotmail.com Fmailed on January 18, 2010

Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on April 1, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on April 1, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010.

Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter, Dwight Karren, Feedlot Nutrition @hotmail.com, Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter, Dwight Karren, Feedlot Nutrition @hotmail.com, Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter, Dwight Karren, Feedlot Nutrition @hotmail.com, Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010.

Dry Matter Intake - Yearling-Fed Steer Diet 3

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| Dry Matter Intake - Yearling-Fed Steer Diet 4 | | |
|---|---|--|
| Dry Matter Intake - Yearling-Fed Steer Diet 5 Dry Matter Intake - Yearling-Fed Steer Diet 6 | 19.91 lb dry matter/head/day 22.49 lb dry matter/head/day 24.76 lb dry matter/head/day | Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Dry Matter Intake - Yearling-Fed Steer Diet 7 | 24.76 lb dry matter/head/day | Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on January 18, 2010. |
| Dry Matter Intake for calves 0-3 months old | 0.00 lb dry matter/head/day | Discussion with John Basarab |
| Dry Matter Intake for calves 0-3 months old | 0.00 lb dry matter/head/day | Discussion with John Basarab |
| Dry Matter Intake for calves 3-4 months old | 8.25 lb dry matter/head/day | Discussion with John Basarab |
| Dry Matter Intake for calves 3-4 months old | 3.74 kg dry matter/head/day | Discussion with John Basarab |
| Feed Cows and Bulls - Winter Feeding and Calving | | |
| Alfalfa - Hay | 2.65 Mcal/kg | Assumed alfalfa hay based on diets. Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 |
| | 11.10 MJ/kg | Calculated |
| Alfalfa - Hay, sun-cured, early bloom | 2.65 Mcal/kg | Assumed alfalfa hay based on diets. Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 |
| AW 19 | 11.10 MJ/kg | Calculated |
| Alfalfa - Hay, sun-cured, mid-bloom | 2.56 Mcal/kg | Assumed alfalfa hay based on diets. Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 |
| Alfalfa I I ann anns a faill blann | 10.72 MJ/kg | Calculated |
| Alfalfa - Hay, sun-cured, full bloom | 2.43 Mcal/kg | Assumed alfalfa hay based on diets. Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 |
| | 10.17 MJ/kg | Calculated |
| Alfalfa - Average | 10.77 MJ/kg | Calculated |
| • | · · | |
| Cows and Bulls - Breeding and Pasture | | |
| Wheat grass - crested fresh early bloom | 2.6 Mcal/kg | Assumed wheat grass-dominated pasture due to lack of more explicit data. Nutrient Requirements of Small Ruminants: Sheep, Goats, |
| | 10.9 MJ/kg | Cervids, and New World Camelids. Available at: http://www.nap.edu/openbook.php?record_id=11654&page=1 Calculated |
| Wheat grass - crested fresh full bloom | 2.4 Mcal/kg | Calculated Assumed wheat grass-dominated pasture due to lack of more explicit data. Nutrient Requirements of Small Ruminants: Sheep, Goats, |
| Wileat grass - crested fresh full bloom | 2.4 Wcarky | Cervids, and New World Camelids. Available at: http://www.nap.edu/openbook.php?record_id=11654&page=1 |
| | 10.0 MJ/kg | Calculated |
| Alfalfa - fresh, full bloom | 0 Mcal/kg | Assumed wheat grass-dominated pasture due to lack of more explicit data. Nutrient Requirements of Small Ruminants: Sheep, Goats, |
| | | Cervids, and New World Camelids. Available at: http://www.nap.edu/openbook.php?record_id=11654&page=1 |
| | 0.00 MJ/kg | Calculated |
| Wheat grass - Average | 10.5 MJ/kg | Calculated |
| Backgrounding, Calf-Fed, Yearling-Fed, Heifers, and Steers | | |
| Barley grain | 3.84 Mcal/kg | Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: |
| | | |
| , | <u>g</u> | http://www.nap.edu/openbook.php?record_id=9791&page=134 |
| , 0 | 16.08 MJ/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated |
| Barley silage | - | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: |
| | 16.08 MJ/kg 2.65 Mcal/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 |
| Barley silage | 16.08 MJ/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: |
| Barley silage Digestible Energy (DE) of Diet | 16.08 MJ/kg 2.65 Mcal/kg 11.10 MJ/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated |
| Barley silage | 16.08 MJ/kg 2.65 Mcal/kg 11.10 MJ/kg 2.7588 Mcal/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 |
| Barley silage Digestible Energy (DE) of Diet | 16.08 MJ/kg 2.65 Mcal/kg 11.10 MJ/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 |
| Barley silage Digestible Energy (DE) of Diet Backgrounding - Yearling-Fed (Diet 1) Backgrounding - Calf-Fed (Diet 2) | 16.08 MJ/kg 2.65 Mcal/kg 11.10 MJ/kg 2.7588 Mcal/kg 11.55 MJ/kg 2.91038 Mcal/kg 12.19 MJ/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated |
| Barley silage Digestible Energy (DE) of Diet Backgrounding - Yearling-Fed (Diet 1) | 16.08 MJ/kg 2.65 Mcal/kg 11.10 MJ/kg 2.7588 Mcal/kg 11.55 MJ/kg 2.91038 Mcal/kg 12.19 MJ/kg 3.06302 Mcal/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 |
| Barley silage Digestible Energy (DE) of Diet Backgrounding - Yearling-Fed (Diet 1) Backgrounding - Calf-Fed (Diet 2) Calf-Fed Diet 3 (Heifers and Steers) | 16.08 MJ/kg 2.65 Mcal/kg 11.10 MJ/kg 2.7588 Mcal/kg 11.55 MJ/kg 2.91038 Mcal/kg 12.19 MJ/kg 3.06302 Mcal/kg 12.82 MJ/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated |
| Barley silage Digestible Energy (DE) of Diet Backgrounding - Yearling-Fed (Diet 1) Backgrounding - Calf-Fed (Diet 2) | 16.08 MJ/kg 2.65 Mcal/kg 11.10 MJ/kg 2.7588 Mcal/kg 11.55 MJ/kg 2.91038 Mcal/kg 12.19 MJ/kg 3.06302 Mcal/kg 12.82 MJ/kg 3.2146 Mcal/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nurrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 |
| Barley silage Digestible Energy (DE) of Diet Backgrounding - Yearling-Fed (Diet 1) Backgrounding - Calf-Fed (Diet 2) Calf-Fed Diet 3 (Heifers and Steers) Calf-Fed Diet 4 (Heifers and Steers) | 16.08 MJ/kg 2.65 Mcal/kg 11.10 MJ/kg 2.7588 Mcal/kg 11.55 MJ/kg 2.91038 Mcal/kg 12.19 MJ/kg 3.06302 Mcal/kg 12.82 MJ/kg 3.2146 Mcal/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated |
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| Barley silage Digestible Energy (DE) of Diet Backgrounding - Yearling-Fed (Diet 1) Backgrounding - Calf-Fed (Diet 2) Calf-Fed Diet 3 (Heifers and Steers) Calf-Fed Diet 5 (Heifers and Steers) Calf-Fed Diet 5 (Heifers and Steers) Calf-Fed Diet 6 (Heifers and Steers) Calf-Fed Diet 7 (Heifers and Steers) Yearling-Fed Diet 1 (Heifers and Steers) Yearling-Fed Diet 2 (Heifers and Steers) Yearling-Fed Diet 3 (Heifers and Steers) Yearling-Fed Diet 4 (Heifers and Steers) Yearling-Fed Diet 5 (Heifers and Steers) Yearling-Fed Diet 5 (Heifers and Steers) Yearling-Fed Diet 6 (Heifers and Steers) | 16.08 MJ/kg 2.65 Mcal/kg 11.10 MJ/kg 2.7588 Mcal/kg 11.55 MJ/kg 2.91038 Mcal/kg 12.19 MJ/kg 3.06302 Mcal/kg 12.82 MJ/kg 3.2146 Mcal/kg 13.46 MJ/kg 3.36618 Mcal/kg 14.09 MJ/kg 3.51882 Mcal/kg 14.73 MJ/kg 2.7588 Mcal/kg 11.55 MJ/kg 2.1155 MJ/kg 2.1038 Mcal/kg 11.55 MJ/kg 2.1038 Mcal/kg 12.19 MJ/kg 3.06302 Mcal/kg 12.82 MJ/kg 3.2146 Mcal/kg 13.36618 Mcal/kg 13.246 MJ/kg 3.36618 Mcal/kg 14.09 MJ/kg 3.36618 Mcal/kg 14.09 MJ/kg 3.51882 Mcal/kg 14.09 MJ/kg 3.51882 Mcal/kg 14.09 MJ/kg 3.51882 Mcal/kg | http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Nurrient Requirements of Beef Cattle: Seventh Revised Edition: Update 2000. Available at: http://www.nap.edu/openbook.php?record_id=9791&page=134 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy content of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010 Calculated Digestible energy cont |
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APPENDIX B Page 10 of 21

| Crude Protein (CP) of Diet | | |
|--|-----------------------|---|
| Backgrounding - Yearling-Fed (Diet 1) | 11.820 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Backgrounding - Calf-Fed (Diet 2) | 11.892 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Calf-Fed Diet 3 (Heifers and Steers) | 11.964 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Calf-Fed Diet 4 (Heifers and Steers) | 12.305 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Calf-Fed Diet 5 (Heifers and Steers) | 12.107 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Calf-Fed Diet 6 (Heifers and Steers) | 12.179 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Calf-Fed Diet 7 (Heifers and Steers) | 12.250 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Yearling-Fed Diet 1 (Heifers and Steers) | 11.820 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Yearling-Fed Diet 2 (Heifers and Steers) | 11.892 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Yearling-Fed Diet 3 (Heifers and Steers) | 11.964 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Yearling-Fed Diet 4 (Heifers and Steers) | 12.305 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Yearling-Fed Diet 5 (Heifers and Steers) | 12.107 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Yearling-Fed Diet 6 (Heifers and Steers) | 12.179 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Yearling-Fed Diet 7 (Heifers and Steers) | 12.250 % | Protein Content (%) of diet from Feedlot Nutrition Newsletter. Dwight Karren. FeedlotNutrition@hotmail.com. Emailed on March 4, 2010. |
| Miles of second of feedbased bloom (feedbase) by the | 44.00.07 | Assumed wheat grass-dominated pasture due to lack of more explicit data. Nutrient Requirements of Small Ruminants: Sheep, Goats, |
| Wheat grass - crested fresh early bloom (for cows, bulls, | 11.00 % | Cervids, and New World Camelids. Available at: http://www.nap.edu/openbook.php?record_id=11654&page=1 |
| yearling-fed on pasture) | 40.00.0/ | Assumed wheat grass-dominated pasture due to lack of more explicit data. Nutrient Requirements of Small Ruminants: Sheep, Goats, |
| Wheat grass - crested fresh full bloom (for cows, bulls, yearling- | 10.00 % | |
| fed on pasture) | 40.50.0/ | Cervids, and New World Camelids. Available at: http://www.nap.edu/openbook.php?record_id=11654&page=1 Calculated |
| Average | 10.50 % | Calculated |
| | | |
| Growth Promoters Dosage per calf (for calf-fed and yearling-fed calves) | 36 mg | RALGRO Implant (Growth Hormone Implants). Available at: http://www.mindfully.org/Farm/2003/RALGRO-Implant-Advertising28dec03.htm |
| bosage per our (for our rea and yearing rea ources) | 30 mg | Websell mpair (Grown Tollione impairs). Walable at http://www.mindairy.org/ ani/2000/Websell impairs/ averaging |
| | | |
| Alberta - Field crops, Yield on harvested area | | |
| Barley (2009) | 4.879 thousand tonnes | Statistics Canada, Field Crop Reporting Series, No. 7, October 2009. 10-year average |
| Barley (2009) | 1,980 thousand ha | Statistics Canada, Field Crop Reporting Series, No. 7, October 2009. 10-year average Statistics Canada, Field Crop Reporting Series, No. 7, October 2009. 10-year average |
| Barley (2009) | 2,464 kg/ha | Statistics Carlada, rield Crip Reporting Genes, No. 7, October 2009. 10-year average 10-year average yield calculated using above |
| Barley (2009) | 113 bushels/ha | ro-year average yield calculated using above Calculated based on above using conversion of 48 lbs/bushel (21.77 kg/bushel) |
| Dailey (2003) | 113 busileis/ila | Calculated based of above using conversion of 40 barbusher (21.77 kg/busher) |
| Alfalfa | 3.35 tons/acre | AgricultureB2B.com. Alfalfa Crop Information Articles References Management Guides. Available at: |
| | | http://www.agricultureb2b.com/biz/e/Crops/Field-Crops/Crop-Information/Alfalfa/ |
| Alfalfa (1998) | 7,510 kg/ha | AgricultureB2B.com. Alfalfa Crop Information Articles References Management Guides. Available at: |
| | , 3 | http://www.agricultureb2b.com/biz/e/Crops/Field-Crops/Crop-Information/Alfalfa/ |
| Alfalfa seed production per acre | 459 lb/acre | http://www.nass.usda.gov/Statistics_by_State/Montana/Publications/crops/alfsdayp.htm |
| | | |
| Barley Silage (2008) | 1 ton/10 bushels | What is my cereal silage crop worth? - Frequently Asked Questions. Government of Alberta. Agriculture and Rural Development. Available |
| | | at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/faq8432?opendocument |
| Barley Silage (2008) | 11 tons/ha | What is my cereal silage crop worth? - Frequently Asked Questions. Government of Alberta. Agriculture and Rural Development. Available |
| | | at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/faq8432?opendocument |
| Barley Silage (2008) | 10,268 kg/ha | What is my cereal silage crop worth? - Frequently Asked Questions. Government of Alberta. Agriculture and Rural Development. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/fag8432?opendocument |
| | | at. http://www.ragno.gov.ab.ca/gueparinent/uepruocs.ns//ali/ragu-452.copenuocument |
| Alberta - Average seeding rates | | |
| | | |
| Barley 2 row | 111.18 kg/ha | Government of Alberta. ARD. Using 1,000 Kernel Weight for Calculating Seeding Rates and Harvest Losses. August 2007. Available at: |
| | | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex81?opendocument#target |
| Barley 6 row | 92.65 kg/ha | Government of Alberta. ARD. Using 1,000 Kernel Weight for Calculating Seeding Rates and Harvest Losses. August 2007. Available at: |
| | | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex81?opendocument#target |
| Alfalfa | 9.33 kg/ha | Government of Alberta. ARD. Using 1,000 Kernel Weight for Calculating Seeding Rates and Harvest Losses. August 2007. Available at: |
| | | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex81?opendocument#target |
| | | |
| Alberta - Tilling Practices (2006) | | |
| No-Till | 48 % of land | Alberta Agriculture Statistics Yearbook, 2008. Figure 37. Available at: |
| NO-TIII | 46 % 01 Ianu | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd12890/\$FILE/table53.pdf |
| Reduced Till | 28 % of land | Alberta Agriculture Statistics Yearbook, 2008. Figure 37. Available at: |
| | | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd12890/\$FILE/table53.pdf |
| Full Till | 24 % of land | Alberta Agriculture Statistics Yearbook, 2008. Figure 37. Available at: |
| | | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd12890/\$FILE/table53.pdf |
| | | |
| Alberta - Tilling Practices (2001) | | |
| | | Alberta Assigniture Centinting Vendragi, 2009. Figure 37 Available et |
| No-Till | 28 % of land | Alberta Agriculture Statistics Yearbook, 2008. Figure 37. Available at: |
| Deducate: | 00.04 - 11 1 | http://www1.agric.gov.ab.ca/\$department/deptdoss.nsf/all/sdd12890/\$FILE/table53.pdf |
| Reduced Till | 36 % of land | Alberta Agriculture Statistics Yearbook, 2008. Figure 37. Available at: |
| Full Till | 37 % of land | http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd12890/\$FILE/table53.pdf Alberta Agriculture Statistics Yearbook, 2008. Figure 37. Available at: |
| I UII I III | 37 70 UI IANU | Anuerra Agriculture Satissus Tearbook, 2006. Pigule 37, Available at. http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd12890/\$FILE/table53.pdf |
| | | mps |
| | | |

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| Alberta Land used for beef production | 21,000,000 acres | A Profile of Alberta's Beef Industry: Lessons for Saskatchewan. Laura Ramsay and Andrew Schmitz Working Paper # 6 |
|--|------------------------|---|
| Alberta - Irrigation Crop Land | | |
| Irrigated crop land in Alberta (2001) | 1,219,329 acres | Government of Alberta. Alberta Irrigation Information 2008. Available |
| Irrigated crop land in Alberta (2001) | 493,444 ha | at:http://www1.agric.gov.ab.ca/\$Department/deptdocs.ns/fall/irr7401/\$FILE/AltaIrrigInfo2008web.pdf Government of Alberta. Alberta Irrigation Information 2008. Available at:http://www1.agric.gov.ab.ca/\$Department/deptdocs.ns/fall/irr7401/\$FILE/AltaIrrigInfo2008web.pdf |
| Total area seeded for crops in Alberta (2001) | 24,247,000 acres | Government of Alberta. 2001 Annual Crop Review. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd4192?opendocument#production |
| Total area seeded for crops in Alberta (2001) | 9,812,397 ha | ntp://www.ragins.gov.ab.ca/sdepartnent/deptdocs.ns/ali/sdd4192/opendocument#production Government of Alberta. 2001 Annual Crop Review. Available at: http://www1.agric.gov.ab.ca/sdepartment/deptdocs.nsf/ali/sdd4192/opendocument#production |
| % of total crop land irrigated (2001) | 5 % | ntp://www.r.agnc.gov.ao.ca/sqepartneni/qeptoocs.nsi/aii/sqq41327qpendocumeni#production Calculated |
| | | |
| Repartition of Soil types for the area of the study in Alberta Black and grey zone area Brown and dark zone area | 25 % 75 % | Alberta Online Encyclopedia. Natural Regions of Alberta. Available at: http://www.abheritage.ca/abnature/map.htm Alberta Online Encyclopedia. Natural Regions of Alberta. Available at: http://www.abheritage.ca/abnature/map.htm |
| Nutrient Composition of Manure | | |
| | Elemental lb/ tonne | Fertilizer equiv Solid Cattle Manure http://www.ssca.ca/agronomics/pdfs/cattlemanure.pdf lb/ tonne Solid Cattle Manure http://www.ssca.ca/agronomics/pdfs/cattlemanure.pdf |
| Nitrogen (N) Phosphorus (P) | 21.5 4 | 21.5 Solid Cattle Manure http://www.ssca.ca/agronomics/pdfs/cattlemanure.pdf 9.2 Solid Cattle Manure http://www.ssca.ca/agronomics/pdfs/cattlemanure.pdf |
| Potassium (K) Sulphur (S) | 12 1.55 | 14.4 Solid Cattle Manure http://www.ssca.ca/agronomics/pdfs/cattlemanure.pdf 1.55 Solid Cattle Manure http://www.ssca.ca/agronomics/pdfs/cattlemanure.pdf |
| Fertilizer Needs | | |
| | | |
| For alfalfa N - Crop Fertilizing Needs | 0 % | SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| Manure Component | 0 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| Synthetic Component | 0 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| K ₂ O - Crop Fertilizing Needs | 0 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| Manure Component | 0 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| Synthetic Component | 0 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| S - Crop Fertilizing Needs | 0 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| Manure Component | 0 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| Synthetic Component | 0 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| Fertilizer Material Ratio | | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |
| N - Urea | 78 % | SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| N - Anhydrous ammonia | 22 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| P - Monoammonium phosphate | 100 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |
| Composition of Monoammonium Phosphate as Fertilizer | | |
| Monoammonium phosphate | 100 % | SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| Monoammonium phosphate as P2O5 | 81 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in |
| Monoammonium phosphate as N | 19 % | Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |
| Ammonia Liquid | | |
| Ammonia liquid | 100 % | SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |

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BEEF PRODUCTION DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

Anhydrous ammonia 36 %

SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2.

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BEEF PRODUCTION DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| <u>Barley</u> | | |
|--|---|---|
| N (SLA - from Pork LCA) | 36.29 kg nutrients/acre | SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |
| N (Alberta Fertilizer Guide) | 31.75 kg nutrients/acre | Alberta Fertilizer Guide. Revised June 2004. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex3894/\$file/541- 1.pdf?OpenElement |
| N (ARD - from Pork LCA) | 31.75 kg nutrients/acre | SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |
| P ₂ O ₅ (SLA - from Pork LCA) | 13.61 kg nutrients/acre | SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |
| P ₂ O ₅ (Alberta Fertilizer Guide) | 13.61 kg nutrients/acre | Alberta Fertilizer Guide. Revised June 2004. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex3894/\$file/541- 1.pdf?OpenElement |
| P ₂ O ₅ (ARD - from Pork LCA) | 13.61 kg nutrients/acre | SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |
| K ₂ O (SLA - from Pork LCA) | 6.80 kg nutrients/acre | SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |
| K ₂ O (Alberta Fertilizer Guide) | 0.00 kg nutrients/acre | Alberta Fertilizer Guide. Revised June 2004. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/agdex3894/\$file/541- 1.pdf?OpenFlement |
| K ₂ O (ARD - from Pork LCA) | 4.54 kg nutrients/acre | SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |
| S (SLA - from Pork LCA) | 5.44 kg nutrients/acre | SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |
| S (Alberta Fertilizer Guide) | 0.00 kg nutrients/acre | Alberta Fertilizer Guide. Revised June 2004. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex3894/\$file/541- |
| S (ARD - from Pork LCA) | 0.00 kg nutrients/acre | 1.pdf?OpenElement SNC-Lavalin Agro. A Life Cycle Analysis of Carbon Dioxide Equivalents (CO2e) of Alberta Barley, Wheat, Peas and Canola Meal Used in Pork Production, Slaughter and further Processing. March 31, 2009, rev. 2. |
| Alfalfa grass | | |
| N (Alberta Fertilizer Guide) | 0 kg nutrients/acre | Alberta Fertilizer Guide. Revised June 2004. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex3894/\$file/541-1.pdf?OpenElement |
| P ₂ O ₅ (Alberta Fertilizer Guide) | 15.20 kg nutrients/acre | 1,poir Openicement Soil and Nutrient Management of Alfalfa. Revised July 2005. Available at: |
| K₂O (Alberta Fertilizer Guide) | 0 kg nutrients/acre | Soil and Nutrient Management of Alfalfa. Revised July 2005. Available at: |
| S (Alberta Fertilizer Guide) | 0 kg nutrients/acre | Alberta Fertilizer Guide. Revised June 2004. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex3894/\$file/541-1.pdf?OpenElement |
| Commercial Fertilizer Application Methods (2001) | | |
| Broadcasting | 27.5 % | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-enq.pdf |
| Injected or knifed in | 18.3 % | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf |
| Post-plant Top/Side Dressing | 41.4 % | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-enq.pdf |
| Applied with Seed | 1.0 % | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf |
| | | |
| Banded | 10.2 % | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. |
| Banded Other | 10.2 % | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf |
| Other | | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. |
| | | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. |
| Other Pesticide Requirements Per Each Cultivated Hectare | 2.2 % | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf |
| Other Pesticide Requirements Per Each Cultivated Hectare Barley Barley Silage | 2.2 % 0.80 kg/ha 0.80 kg/ha | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf |
| Other Pesticide Requirements Per Each Cultivated Hectare Barley Barley Silage Alfalfa Grass | 2.2 % 0.80 kg/ha 0.80 kg/ha | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf |
| Other Pesticide Requirements Per Each Cultivated Hectare Barley Barley Silage Alfalfa Grass Innure Generation and Management K to top | 2.2 % 0.80 kg/ha 0.80 kg/ha | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American |
| Pesticide Requirements Per Each Cultivated Hectare Barley Barley Silage Alfalfa Grass Innure Generation and Management K to top Manure Generation | 2.2 % 0.80 kg/ha 0.80 kg/ha 0.80 kg/ha | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American |
| Pesticide Requirements Per Each Cultivated Hectare Barley Barley Silage Alfalfa Grass Inture Generation and Management K to top Manure Generation Beef Cows | 2.2 % 0.80 kg/ha 0.80 kg/ha 0.80 kg/ha 0.80 kg/ha 36.8 kg/day/635 kg animal | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Pesticide Requirements Per Each Cultivated Hectare Barley Barley Silage Alfalfa Grass anure Generation and Management k to top Manure Generation Beef Cows Bulls | 2.2 % 0.80 kg/ha 0.80 kg/ha 0.80 kg/ha 0.80 kg/ha 36.8 kg/day/635 kg animal 42.1 kg/day/726 kg animal | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Pesticide Requirements Per Each Cultivated Hectare Barley Barley Silage Alfalfa Grass Innure Generation and Management K to top Manure Generation Beef Cows Bulls Calves | 2.2 % 0.80 kg/ha 0.80 kg/ha 0.80 kg/ha 0.80 kg/ha 36.8 kg/day/635 kg animal 42.1 kg/day/726 kg animal 11.8 kg/day/204 kg animal | Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Statistics Canada. Farm Environmental Management in Canada. Fertilizer and Pesticide Management in Canada, 2004, Vol. 1, No. 3. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004002/pdf/4193745-eng.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Alberta Environment. Pesticide Use in Alberta by Sector. (1998). Available at: www.environment.gov.ab.ca/info/library/7469.pdf Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |

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BEEF PRODUCTION DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Nitrogen Generation from Manure | | |
|--|----------------------------|---|
| Beef Cows | 0.216 kg/day/635 kg animal | Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Bulls | 0.247 kg/day/726 kg animal | Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Calves | 0.069 kg/day/204 kg animal | Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Heifers | 0.143 kg/day/421 kg animal | Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Steers | 0.154 kg/day/454 kg animal | Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Phosphorus Generation from Manure | | |
| Beef Cows | 0.058 kg/day/635 kg animal | Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Bulls | 0.067 kg/day/726 kg animal | Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Calves | 0.019 kg/day/204 kg animal | Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Heifers | 0.039 kg/day/421 kg animal | Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Steers | 0.042 kg/day/454 kg animal | Statistics Canada. A Geographical Profile of Manure Production in Canada, 2001. Catalogue No. 21-601-MIE (Data sourced from American Society of Agriculture Engineers) |
| Manure Treatment (Beef Cattle) (Estimated from Graph) (2001) | | |
| Aeration | 3 % farms | Statistics Canada. Farm Environmental Management in Canada. Manure Management in Canada, 2004, Vol. 1, No. 2. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004001/pdf/4193744-eng.pdf |
| Additives | 0.5 % farms | Statistics Canada. Farm Environmental Management in Canada. Manure Management in Canada, 2004, Vol. 1, No. 2. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004001/pdf/4193744-eng.pdf |
| Filtration Marsh | 0.25 % farms | Statistics Canada. Farm Environmental Management in Canada. Manure Management in Canada, 2004, Vol. 1, No. 2. Available at: http://www.statcan.oc.ca/pub/21-021-m/2004001/odf/4193744-eng.pdf |
| Composting | 38 % farms | Statistics Canada. Farm Environmental Management in Canada. Manure Management in Canada, 2004, Vol. 1, No. 2. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004001/pdf/4193744-eng.pdf |
| Drying | 16 % farms | Statistics Canada. Farm Environmental Management in Canada. Manure Management in Canada, 2004, Vol. 1, No. 2. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004001/pdf/4193744-eng.pdf |
| Other Treatments | 5 % farms | Statistics Canada. Farm Environmental Management in Canada. Manure Management in Canada, 2004, Vol. 1, No. 2. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004001/pdf/4193744-eng.pdf |
| None | 37 % farms | Statistics Canada. Farm Environmental Management in Canada. Manure Management in Canada, 2004, Vol. 1, No. 2. Available at: http://www.statcan.gc.ca/pub/21-021-m/2004001/pdf/4193744-eng.pdf |
| Manure Storage | | |
| Unmanaged (left on pasture range and paddock) | 48 % | Methane to markets. Country profile for animal waste management. Canada. Table 2. November 2006. Available at: http://www.methanetomarkets.org/m2m2009/documents/ag_cap_canada.pdf |
| Stored on farms as solid | 47 % | Methane to markets. Country profile for animal waste management. Canada. Table 2. November 2006. Available at: http://www.methanetomarkets.org/m2m2009/documents/ag_cap_canada.pdf |
| Stored on farms as liquid | 1 % | Methane to markets. Country profile for animal waste management. Canada. Table 2. November 2006. Available at: http://www.methanetomarkets.org/m2m2009/documents/ag_cap_canada.pdf |
| N emission reductions from manure using lonophores in the Diet | 4 % N reduction | Tedeschi, Luis Orlindo et. al. Potential Environmental Benefits of Ionophores in Ruminant Diets. Journal of Environmental Quality. 32:1591-1602 (2003). |
| Garbage Generation and Management | | |
| Garbage Generation | | |
| Physical Feed Wastage Feed Storage Loss Goal | 5 % | Alberta Agriculture and Food. Agri-Facts. Feed Waste Management. Agdex 420/54-1. Revised August 2006. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex4734/\$file/420_54-1.pdf?OpenElement |
| Feed Wastage Goal | 5 % | Alberta Agriculture and Food. Agri-Facts. Feed Waste Management. Agdex 420/54-1. Revised August 2006. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/agdex4734/\$file/420_54-1.pdf?OpenElement |

** Other quantities of garbage generated in the Alberta beef industry not available

Physical Garbage (Silage Plastic Covers and Bailer Twine)

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BEEF PRODUCTION DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | | EDMUNION, ALBERIA |
|---|---|---|
| Expected Agricultural Polyethylene to be Marketed in 2008 in Alberta (agricultural sheet materials like silage bags and bale wrap) Agricultural films LLDPE#4 - Linear Low Density Polyethylene Minimum Maximum Average | 9.5 - 11 million lbs 9.5 million lbs 11 million lbs 10.25 million lbs 4,649 tonnes | Alberta Plastics Recycling Association. Volume 4. Spring 2008. Available at: http://www.recycleyourplastic.ca/pdf/apra_news_spr08.pdf http://www.gov.mb.ca/conservation/pollutionprevention/plastic_bags.html Alberta Plastics Recycling Association. Volume 4. Spring 2008. Available at: http://www.recycleyourplastic.ca/pdf/apra_news_spr08.pdf Alberta Plastics Recycling Association. Volume 4. Spring 2008. Available at: http://www.recycleyourplastic.ca/pdf/apra_news_spr08.pdf Calculated Calculated |
| Expected Agricultural Polypropylene to be Marketed in 2008 in Albert (agricultural twine and cord) Minimum Maximum Average | ta 6.5 - 8.7 million lbs 6.5 million lbs 8.7 million lbs 7.6 million lbs 3,447 tonnes | Alberta Plastics Recycling Association. Volume 4. Spring 2008. Available at: http://www.recycleyourplastic.ca/pdf/apra_news_spr08.pdf Alberta Plastics Recycling Association. Volume 4. Spring 2008. Available at: http://www.recycleyourplastic.ca/pdf/apra_news_spr08.pdf Alberta Plastics Recycling Association. Volume 4. Spring 2008. Available at: http://www.recycleyourplastic.ca/pdf/apra_news_spr08.pdf Calculated |
| Alberta Farm Cash Receipts from 2004-2008 used to predict the perd Assumed that all cattle and calves cash receipts from the beef industrials. | | ed in beef production. |
| Total Cattle and Calves - Alberta Farm Cash Receipts | | |
| 2004 | 2,571,540 \$ Thousands | Government of Alberta. Agriculture and Rural Development. Alberta Farm Cash Receipts by Detailed Type (\$ Thousands), 2004-2008. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd4807 |
| 2005 | 3,022,320 \$ Thousands | Government of Alberta. Agriculture and Rural Development. Alberta Farm Cash Receipts by Detailed Type (\$ Thousands), 2004-2008. |
| 2006 | 2,941,140 \$ Thousands | Available at: http://www1.agric.gov.ab.ca/Sdepartment/deptdocs.nsf/all/sdd4807 Government of Alberta. Agriculture and Rural Development. Alberta Farm Cash Receipts by Detailed Type (\$ Thousands), 2004-2008. Available at: http://www1.agric.gov.ab.ca/Sdepartment/deptdocs.nsf/all/sdd4807 |
| 2007 | 3,026,908 \$ Thousands | Government of Alberta. Agriculture and Rural Development. Alberta Farm Cash Receipts by Detailed Type (\$ Thousands), 2004-2008. Available at http://www.d.agric.gov.ab.ca/Sdepartment/dept/dept/dept/dept/dept/dept/dept/dep |

| 2007 | 0,020,000 \$ 111003a1103 | Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd4807 |
|----------------------------------|--------------------------|---|
| 2008 | 2,969,753 \$ Thousands | Government of Alberta. Agriculture and Rural Development. Alberta Farm Cash Receipts by Detailed Type (\$ Thousands), 2004-2008. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd4807 |
| Total Alberta Farm Cash Receipts | | |
| 2004 | 6,570,681 \$ Thousands | Government of Alberta. Agriculture and Rural Development. Alberta Farm Cash Receipts by Detailed Type (\$ Thousands), 2004-2008. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd4807 |
| 2005 | 6,734,259 \$ Thousands | Government of Alberta. Agriculture and Rural Development. Alberta Farm Cash Receipts by Detailed Type (\$ Thousands), 2004-2008. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd4807 |
| 2006 | 6,799,573 \$ Thousands | Government of Alberta. Agriculture and Rural Development. Alberta Farm Cash Receipts by Detailed Type (\$ Thousands), 2004-2008. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd4807 |
| 2007 | 7,757,154 \$ Thousands | Government of Alberta. Agriculture and Rural Development. Alberta Farm Cash Receipts by Detailed Type (\$ Thousands), 2004-2008. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/sdd4807 |
| 2008 | 8,984,221 \$ Thousands | Government of Alberta. Agriculture and Rural Development. Alberta Farm Cash Receipts by Detailed Type (\$ Thousands), 2004-2008. Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/sdd4807 |
| | | |

Percent of Cattle and Calves Farm Receipts of the Total Farm Cash Receipts for Crops and Livestock 2004 Calculated based on above. 2005 44.9 % Calculated based on above. 2006 43.3 % Calculated based on above. 2007 39.0 % Calculated based on above. 2008 33.1 % Calculated based on above. Average 39.9 % Calculated based on above. Assumed amount of polyethylene used in the beef production industry in Alberta Calculated based on above.

1.854 tonnes Assumed amount of polypropylene used in the beef production industry in Alberta

Calculated based on above. 1,374 tonnes

Garbage Management

Most Common Forms of Plastics Management

Garbage Burned in Burning Barrels or on Burn Piles On Farms in Alberta (most common)

Alberta Plastics Recycling Association. Volume 4. Spring 2008. Available at: http://www.recycleyourplastic.ca/pdf/apra_news_spr08.pdf Alberta Plastics Recycling Association. Volume 4. Spring 2008. Available at: http://www.recycleyourplastic.ca/pdf/apra_news_spr08.pdf

** Many landfills will not accept agricultural plastics because of the handling challenges and potential risks the material poses to equipment

Estimated % of plastic in Alberta beef production - burned Estimated % of plastic in Alberta beef production - buried

Estimated based on Alberta Plastics Recycling Association articles. Estimated based on Alberta Plastics Recycling Association articles.

Recycling initiatives in the works

Alberta Plastics Recycling Association. Volume 5. Spring 2009. Available at: http://www.recycleyourplastic.ca/pdf/APRANews_Spr09.pdf

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BEEF PRODUCTION DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

Mortalities and Disposal

| Mortalities | | |
|--|--|--|
| Beef Cattle - Cows and Bulls - average weight 650 kg | 1 % | Government of Alberta. Agriculture and Rural Development. Livestock Mortality Management (Disposal). Available at: |
| Cow/Calf - Calves (newborn) - average weight 40 kg | 3 % | http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/agdex6081 Government of Alberta. Agriculture and Rural Development. Livestock Mortality Management (Disposal). Available at: |
| Cow/Calf - Calves (pre-weaning) - average weight 150 kg | 2 % | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex6081 Government of Alberta. Agriculture and Rural Development. Livestock Mortality Management (Disposal). Available at: |
| Cow/Calf - Calves (replacements) - average weight 350 kg | 1 % | http://www1.agric.gov.ab.ca/\$department/deptdocs.ns/fall/agdex6081 Government of Alberta. Agriculture and Rural Development. Livestock Mortality Management (Disposal). Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.ns/fall/agdex6081 |
| Feedlot - Backgrounders - average weight 300 kg | 2 % | Government of Alberta. Agriculture and Rural Development. Livestock Mortality Management (Disposal). Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.ns/fall/addex6081 |
| Feedlot - Feeders - average weight 425 kg | 1 % | Government of Alberta. Agriculture and Rural Development. Livestock Mortality Management (Disposal). Available at: http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/agdex6081 |
| Mortality Disposal | | |
| Current Estimated Ratios for Disposal Cow-Calf Operations | | |
| On-Farm Disposal Rendering | 90 % 10 % | Discussion with Alberta Agriculture and Rural Development. No other information available for mortality disposal. |
| Feedlot Operations Rendering Other Methods (assume on-farm disposal) | 90 % 10 % | Discussion with Alberta Agriculture and Rural Development. No other information available for mortality disposal. |
| Methods of Mortality Disposal | Incineration Burial Composting On-Farm Rendering | Saskatchewan Ministry of Agriculture. Fact Sheet. Managing Livestock Mortalities. Available at: http://www.agriculture.gov.sk.ca/mortalities |
| Most Prominent Methods of Mortality Disposal in Alberta | On-Farm Rendering | Discussions with people in the cattle industry in Alberta (John Kolk, Bryan Walton, Dave Moss, John Basarab) |
| and an and Malatanana and Back Farms | | |

Operation and Maintenance on Beef Farms

On-Site Usage of Energy (Gasoline, Diesel, Natural Gas, Electricity, Liquid Petroleum Gas)

| Alberta Energy Consumption - Cattle Farms (per year) | | | | |
|---|-------------|--|--|--|
| Gasoline (trucks and auto, farm machine, non-farm) | 5,512.1 TJ | | | |
| Percent of total energy used | 22.9 % | | | |
| Diesel (trucks and auto, farm machine, non-farm) | 13,924.8 TJ | | | |
| Percent of total energy used | 57.9 % | | | |
| Natural Gas (heat and light, non-farm) | 2,108.9 TJ | | | |
| Percent of total energy used | 8.8 % | | | |
| Electricity (heat and light, other uses, non-farm) | 2,371.4 TJ | | | |
| Percent of total energy used | 9.9 % | | | |
| LPG (heat and light, other uses, non-farm) (assume propane) | 124.4 TJ | | | |
| Percent of total energy used | 0.5 % | | | |
| Total energy usage | 24,041.6 TJ | | | |

Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult Calculated

Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult Calculated

Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult Calculated

Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult Calculated

Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult Calculated

Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult

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| Energy used for trucks and auto | 4,729 TJ | Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for |
|--|--|---|
| | | The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult |
| Energy used for heat and light | 1,770 TJ | Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for |
| Casses was different to a second | 270 T.I | The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult |
| Energy used for other uses | 376 TJ | Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for |
| Energy used for farm machinery | 13,217 TJ | The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for |
| Lifetgy used for faith machinery | 15,217 15 | The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult |
| Energy used for non-farm | 3,728 TJ | Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for |
| | -, | The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult |
| Total energy usage | 24,041 TJ | Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for |
| 5, 5 | | The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult |
| | | s in Alberta as farm machinery and personal usage of vehicles has been included in the farm machinery section and the other uses section. |
| ** The trucks and auto portion has been removed from the gas | oline and diesel usage based on the fraction of each | to the total gas and diesel usage, and then the non-farm usage has been removed from all sources of energy proportionate to the total usage. |
| | | |
| Gasoline (trucks and auto, farm machine, non-farm) | 3,333 TJ | Calculated based on source above |
| Diesel (trucks and auto, farm machine, non-farm) | 8,361 TJ | Calculated based on source above |
| Natural Gas (heat and light, non-farm) | 1,782 TJ | Calculated based on source above |
| Electricity (heat and light, other uses, non-farm) | 2,004 TJ | Calculated based on source above |
| LPG (heat and light, other uses, non-farm) (assume propane) | 105 TJ | Calculated based on source above |
| Total energy usage | 15,585 TJ | Calculated based on source above |
| | | |
| | | olk's (ACFA) expert opinion that gasoline usage on beef farms in Alberta is only 10-15% of the total diesel usage. |
| Diesel (trucks and auto, farm machine, non-farm) | 8,361 TJ | |
| | 211,096 tonnes | |
| Gasoline (trucks and auto, farm machine, non-farm) | 31,664 tonnes | Based on assumption above |
| | 1,422 TJ | Based on assumption above |
| | | |
| Gasoline (farm machine) | 1,422 TJ | Based on assumption above |
| | 1,422,364,675 MJ | Calculated |
| | | |
| Diesel (farm machine) | 8,361 TJ | Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for |
| | | The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult |
| | 8,360,951,007 MJ | Calculated |
| | | |
| Natural Gas (heat and light) | 1,782 TJ | Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for |
| | 4 704 000 400 141 | The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult |
| | 1,781,893,132 MJ | Calculated |
| Electricity (heat and light, other uses) | 2,004 TJ | Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for |
| Electricity (fleat and light, other uses) | 2,004 13 | The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult |
| Amount of electricity | 556,580,494 kWh | The Calculated Agricultural Energy End Ose Data and Analysis Centre. Pebruary 2000. Available at: http://www.usask.ca/agricult |
| 7 though of electricity | 330,000,434 KWII | Calculated |
| LPG (heat and light, other uses) (assume propane) | 105 TJ | Khakbazan, Mohammad. Descriptive Analysis of On-Farm Energy Use in Canada. A Report to Natural Resources Canada. Prepared for |
| Er o (near and light, other ases) (assume propane) | 100 10 | The Canadian Agricultural Energy End Use Data and Analysis Centre. February 2000. Available at: http://www.usask.ca/agricult |
| | 105,110,487 MJ | Calculated |
| Energy content of propane | 24,100 MJ/m ³ | Energy Density of Propane. Average value taken. Available at: http://hypertextbook.com/facts/2002/EricLeung.shtml |
| | | |
| Amount of propane | 4,361 m ³ | Calculated |
| Gasoline Factors | | |
| | 0.72722 1// | Country Country Country (United Augusta Angulation of the Country |
| Density of gasoline | 0.73722 kg/L | Simetric. Specific Gravity of Liquids. Available at: http://www.simetric.co.uk/si_liquids.htm |
| Volume of crude oil barrel | 159 L/barrel | The Quiet Road. Carbon dioxide emissions per barrel of crude. Available at: http://numero57.net/?p=255 |
| Gasoline (44.1%) production from 1 barrel crude oil | 70.12 L/barrel | The Quiet Road. Carbon dioxide emissions per barrel of crude. Available at: http://numero57.net/?p=255 |
| Energy content of gasoline | 44.92 MJ/kg | Energy Density of Gasoline. Average value taken. Available at: http://hypertextbook.com/facts/2003/ArthurGolnik.shtml |
| | | |
| Diesel Factors | | |
| Density of diesel | 0.885 kg/L | Simetric. Specific Gravity of Liquids. Available at: http://www.simetric.co.uk/si_liquids.htm |
| Volume of crude oil barrel | 159 L/barrel | The Quiet Road. Carbon dioxide emissions per barrel of crude. Available at: http://numero57.net/?p=255 |
| Diesel fuel (20.8%) production from 1 barrel crude oil | 33.07 L/barrel | The Quiet Road. Carbon dioxide emissions per barrel of crude. Available at: http://numero57.net/?p=255 |
| Energy content of diesel | 35.05 MJ/L | Energy Density of Diesel. Average value taken. Available at: http://hypertextbook.com/facts/2006/TatyanaNektalova.shtml |
| | | |
| Natural Gas Factors | | |
| | | |
| Gas at standard conditions | 38.04 ft ³ /Nm ³ | Answers.com. Available at: http://wiki.answers.com/Q/What_does_this_mean_Nm3 |
| | 38.04 ft³/Nm³ 0.71122 kg/m³ | Answers.com. Available at: http://wiki.answers.com/Q/What_does_this_mean_Nm3 Simetric. Specific Gravity of Liquids. Available at: http://www.simetric.co.uk/si_liquids.htm |
| Gas at standard conditions | 0.71122 kg/m ³ | |
| Gas at standard conditions Density of natural gas | 0.71122 kg/m ³ | Simetric. Specific Gravity of Liquids. Available at: http://www.simetric.co.uk/si_liquids.htm |
| Gas at standard conditions Density of natural gas Estimated transport distance to natural gas processing | 0.71122 kg/m ³ | Simetric. Specific Gravity of Liquids. Available at: http://www.simetric.co.uk/si_liquids.htm Assumed value |

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BEEF PRODUCTION DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

Operation and Maintenance - Farm Components

| Number of barns for beef production in Alberta | units | Unknown Data |
|--|-------|--------------|
| Amount of damage steel removed per year per farm | kg | Unknown Data |
| Amount of damaged wood removed per year per farm | kg | Unknown Data |
| Amount of concrete removed per year per farm | kg | Unknown Data |
| Gravel required per farm per year | kg | Unknown Data |

Bedding

back to top

| Quantity of Bedding (Cow-Calf Operations) | 0.2 tonnes/cow/yr | From conversation with Dale Kaliel with Agriprofit\$; aggregate data, 5 year average for cow-calf operations |
|---|-------------------|--|
| Amount of Straw Bedding Material Used Amount of Wood Chip Bedding Material Used Assumed 100% straw bedding used | 95 % 5 % | From conversation with Dale Kaliel with Agriprofit\$. From conversation with Dale Kaliel with Agriprofit\$. |
| Quantity of Bedding (Feedlot) (assuming 240 days) | 0.42 kg/head/day | From Meeting with ARD and Steering Committee on November 30, 2009. |
| eter Consumption | | |

Water Consumption

back to to

| Feeders - 250 kg (summer days above 25°C x 2) | 15 L/head/day | Alberta Agriculture and Food. Agri-Facts. Farm Water Supply Requirements. Agdex 716 (C01). Revised April 2009. Available at: |
|--|---------------|--|
| Feeders - 400 kg (summer days above 25°C x 2) | 26 L/head/day | http://www1.agric.gov.ab.ca/\$department/deptdocs.nst/all/agdex1349 Alberta Agriculture and Food. Agri-Facts. Farm Water Supply Requirements. Agdex 716 (C01). Revised April 2009. Available at: |
| 1 coucie 100 kg (cummor days above 20 0 x 2) | • | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex1349 |
| Feeders - 550 kg (summer days above 25°C x 2) | 38 L/head/day | Alberta Agriculture and Food. Agri-Facts. Farm Water Supply Requirements. Agdex 716 (C01). Revised April 2009. Available at: |
| | | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex1349 |
| Cows with Calves - 600 kg (summer days above 25°C x 1.5) | 45 L/head/day | Alberta Agriculture and Food. Agri-Facts. Farm Water Supply Requirements. Agdex 716 (C01). Revised April 2009. Available at: |
| , , , | | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex1349 |
| Dry Cows - 600 kg (summer days above 25°C x 1.5) | 38 L/head/day | Alberta Agriculture and Food. Agri-Facts. Farm Water Supply Requirements. Agdex 716 (C01). Revised April 2009. Available at: |
| , | | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex1349 |
| Calves - 120 kg (summer days above 25°C x 1.5) | 8 L/head/day | Alberta Agriculture and Food. Agri-Facts. Farm Water Supply Requirements. Agdex 716 (C01). Revised April 2009. Available at: |
| 3(,,,, | | http://www1.agric.gov.ab.ca/\$department/deptdocs.nsf/all/agdex1349 |

^{**} Note that the water consumption data is not used in the calculations as the total amount of energy used on beef farms in Alberta is known; therefore, the energy required to supply water has been accounted for.

Transportation back to top

| Farm to Primary Elevator - average truck weight | 8 tonnes | The Canadian Encyclopedia. Grain Handling and Marketing. Available at: http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1ARTA0003364 |
|--|---------------|--|
| Primary Elevator to Elsewhere | 91 tonnes | The Canadian Encyclopedia. Grain Handling and Marketing. Available at: http://www.thecanadianencyclopedia.com/index.cfm?PgNm=TCE&Params=A1ARTA0003364 |
| (average train boxcar and hopper car weight) | | III.p.//www.tilecaliaulaiteitoyuopeula.com/iii.ec.com/ii giviii- i oldar atains-A (ACC) 2000-2004 |
| Grain Hauling - Average Load Weight | 43 tonnes | Grain Hauling 2008. Document provided by Alberta Agriculture and Rural Development in an email from Emmanuel Laate to Stephen Ball on November 20, 2009 |
| Average Distance Traveled from Farm (to primary elevators) | 20 km | The Canadian Encyclopedia. Grain Handling and Marketing. Available at: http://www.thecanadianencyclopedia.com/index.cfm?PqNm=TCE&Params=A1ARTA0003364 |
| Average Distance Traveled from Primary Elevators to Port | 1400 km | The Canadian Encyclopedia. Grain Handling and Marketing. Available at: http://www.thecanadianencyclopedia.com/index.cfm?PoNm=TCE&Params=A1ARTA0003364 |
| Feed transportation | 100 km | Assumed value |
| Forage - Hay and Straw - Truck Transportation | | |
| Hay - Estimated Load Weight (max allowable) | 25 tonnes | Microsoft Word document provided by Alberta Agriculture and Rural Development in an email from Emmanuel Laate to Stephen Ball on November 20, 2009 |
| | 30 - 35 bales | Microsoft Word document provided by Alberta Agriculture and Rural Development in an email from Emmanuel Laate to Stephen Ball on November 20, 2009 |

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| Average Weight of Hay Bale | 540 - 725 kg | Microsoft Word document provided by Alberta Agriculture and Rural Development in an email from Emmanuel Laate to Stephen Ball on |
|--|--|--|
| Average Weight of Hay Bale | 1200 - 1600 lbs | November 20, 2009 Microsoft Word document provided by Alberta Agriculture and Rural Development in an email from Emmanuel Laate to Stephen Ball on November 20, 2009 |
| Straw - Estimated Load Weight | 16 tonnes | Microsoft Word document provided by Alberta Agriculture and Rural Development in an email from Emmanuel Laate to Stephen Ball on November 20, 2009 |
| | 30 - 35 bales | Microsoft Word document provided by Alberta Agriculture and Rural Development in an email from Emmanuel Laate to Stephen Ball on |
| Average Weight of Straw Bale | 450 kg | November 20, 2009 Microsoft Word document provided by Alberta Agriculture and Rural Development in an email from Emmanuel Laate to Stephen Ball on November 20, 2009 |
| Forage transportation | 10 km | Alberta Agriculture and Rural Development, Comments from Steering Committee on the Beef LCA Draft Final Report Submitted to CRA, March 30, 2010 |
| Mineral Transportation | 100 km | Assumed value |
| Growth Promotant Transportation | 100 km | Assumed value |
| Vitamin Transportation Vitamin A Vitamin D Vitamin E | Manufactured in Switzerland Manufactured in France Manufactured in NE USA | Conversation with DSM Nutritional Products Canada Inc., High River, Alberta (403-652-7272) |
| Average vitamin transportation distance for Vitamin E Average vitamin transportation distance for vitamin overseas | 2500 km 5500 km | Assumed (from North America) |
| Average vitamin transportation distance for vitamin overseas | 4000 km | Transoceanic freight ship, assumed land, railroad |
| Average vitamin transportation distance for vitamin overseas | 500 km | land, road |
| Nitrogen-Based Fertilizer Transportation | 240 km | Estimated based on Agriculture and Agri-Food Canada Chapter II - The Structure of the Canadian Fertilizer Industry - Fertilizer Pricing in Canada Chapter III - The Structure of the Canadian Fertilizer Industry - Fertilizer Pricing in Canada Chapter III - The Structure of the Canadian Fertilizer Industry - Fertilizer Pricing in Canada Chapter III - The Structure of the Canadian Fertilizer Industry - Fertilizer Pricing in Canada Chapter III - The Structure of the Canadian Fertilizer Industry - Fertilizer Pricing in Canada Chapter III - The Structure of the Canadian Fertilizer Industry - Fertilizer Pricing in Canada Chapter III - The Structure of the Canadian Fertilizer Industry - Fertilizer Pricing in Canada Chapter III - The Structure of the Canadian Fertilizer Industry - Fertilizer Pricing in Canada Chapter III - The Structure of the Canadian Fertilizer Industry - Fer |
| Phosphate-Based Fertilizer Transportation | 550 km | Estimated based on Agriculture and Agri-Food Canada Chapter II - The Structure of the Canadian Fertilizer Industry - Fertilizer Pricing in Canada. Assumed all phosphate fertilizer from Saskatchewan. |
| Pesticide Transportation | 100 km | Assumed |
| Manure Transportation | 7 km | The Economics of Manure vs. Chemical Fertilizer, for ARD Use. Emailed from Emmanuel Laate to Stephen Ball on November 20, 2009. Value chosen by ARD during February 22, 2010 presentation. |
| | | |
| Materials Transportation | 50 km | Assumed |
| Materials Transportation Bedding Transportation | 50 km 10 km | Assumed Assumed |
| • | | |
| Bedding Transportation | 10 km 100 km (one way estimate) | |
| Bedding Transportation Animals - Truck Transportation Average Distance Traveled - From Feedlot to Auction | 10 km 100 km (one way estimate) | Assumed Based on Alberta feedlot locations and capacity and Alberta auction locations (actual distance confidential) |
| Bedding Transportation Animals - Truck Transportation Average Distance Traveled - From Feedlot to Auction Average Distance Traveled - From Auction to Slaughterhouse | 100 km (one way estimate) 200 km (estimate) | Assumed Based on Alberta feedlot locations and capacity and Alberta auction locations (actual distance confidential) Based on Alberta auction locations and the 2 main Alberta slaughterhouse locations Transport Benchmark Study. K. Schwartzkopf-Genswein et. al. Agriculture and Agri-Food Canada. AFAC Transport Conference. January 29, |
| Bedding Transportation Animals - Truck Transportation Average Distance Traveled - From Feedlot to Auction Average Distance Traveled - From Auction to Slaughterhouse Average Distance (Long Haul) Assumed Distance (Short Haul) | 100 km (one way estimate) 200 km (estimate) 1106.5 +/- 329 km | Assumed Based on Alberta feedlot locations and capacity and Alberta auction locations (actual distance confidential) Based on Alberta auction locations and the 2 main Alberta slaughterhouse locations Transport Benchmark Study. K. Schwartzkopf-Genswein et. al. Agriculture and Agri-Food Canada. AFAC Transport Conference. January 29, 2009. Calgary, AB. Available at: http://livestocktransport.ca/conference/presentations/KSG.pdf |
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BEEF PRODUCTION DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

- Internal 309 km - Out of province 686 km Calculated from the 2006 transportation information provided by Pat Mergen from LIS to Matthew Murphy from CRA on January 5, 2010 Calculated from the 2006 transportation information provided by Pat Mergen from LIS to Matthew Murphy from CRA on January 5, 2010

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Government of Canada. Culling Rate and Replacement Rate in Dairy Herds (Canada) (2002 data). Available at: http://www.dairyinfo.gc.ca/pdf/publication_2008.pdf

Conversation with Paulin van Biert based upon impressions from dealing with the dairy industry

BEEF PRODUCTION DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Distance - Yearling-Fed from cow/calf operations to backgrounding feedlot | | |
|---|--|---|
| - Internal - Out of province | 279 km 635 km | Calculated from the 2006 transportation information provided by Pat Mergen from LIS to Matthew Murphy from CRA on January 5, 2010 Calculated from the 2006 transportation information provided by Pat Mergen from LIS to Matthew Murphy from CRA on January 5, 2010 |
| Distance - Yearling-Fed from feedlot to slaughter (heifer) | | |
| - Internal - Out of province | 312 km 659 km | Calculated from the 2006 transportation information provided by Pat Mergen from LIS to Matthew Murphy from CRA on January 5, 2010 Calculated from the 2006 transportation information provided by Pat Mergen from LIS to Matthew Murphy from CRA on January 5, 2010 |
| Distance - Yearling-Fed from feedlot to slaughter (steer) | 039 KIII | Calculated from the 2000 transportation information provided by Fat Weigen from Ero to Matthew Willipmy from Cha on January 3, 2010 |
| - Internal | 309 km | Calculated from the 2006 transportation information provided by Pat Mergen from LIS to Matthew Murphy from CRA on January 5, 2010 |
| - Out of province | 686 km | Calculated from the 2006 transportation information provided by Pat Mergen from LIS to Matthew Murphy from CRA on January 5, 2010 |
| Distance - Heifer Replacements for Breeding | 258 km | Calculated from the 2006 transportation information provided by Pat Mergen from LIS to Matthew Murphy from CRA on January 5, 2010 |
| | | |
| Feedlot Cattle Sold Directly to Packers in Western Canada | 95 % | Statistics Canada. The North American Beef Market: Competition Keeps It Lean. Available at: |
| receipt data dold birectly to rackers in western danada | 30 % | http://www.statcan.gc.ca/kits-trousses/agric/edu04_0104a-eng.htm |
| (no additional auction) | | |
| Max Allowable Travel Time to Slaughter with No Food or Water | 52 hrs | TheBeefSite.com. Transport to Slaughterhouse on Welfare Agenda. November 2, 2009. Available at: |
| ** Assumed value | 48 hrs | http://www.thebeefsite.com/news/28882/transport-to-slaughterhouse-on-welfare-agenda |
| Assumed value | 46 1115 | |
| Livestock Hauling - Most Common Trailer Used | 64000 lb tri-axle possum belly trailer | Livestock Hauling 2008. Document provided by Alberta Agriculture and Rural Development in an email from Emmanuel Laate to Stephen Ball on November 20, 2009 |
| Average Number of Animals Per Truck | 46.7 number of head | Transport Benchmark Study. K. Schwartzkopf-Genswein et. al. Agriculture and Agri-Food Canada. AFAC Transport Conference. January 29, |
| | | 2009. Calgary, AB. Available at: http://livestocktransport.ca/conference/presentations/KSG.pdf |
| Average Calves Per Truck | 104.3 number of head | Transport Benchmark Study. K. Schwartzkopf-Genswein et. al. Agriculture and Agri-Food Canada. AFAC Transport Conference. January 29, 2009. Calgary, AB. Available at: http://livestocktransport.ca/conference/presentations/KSG.pdf |
| Average Feeders Per Truck | 69 number of head | Transport Benchmark Study. K. Schwartzkopf-Genswein et. al. Agriculture and Agri-Food Canada. AFAC Transport Conference. January 29, 2009. Calgary, AB. Available at: http://livestocktransport.ca/conference/presentations/KSG.pdf |
| Average Fed Cattle Per Truck | 42.3 number of head | Transport Benchmark Study. K. Schwartzkopf-Genswein et. al. Agriculture and Agri-Food Canada. AFAC Transport Conference. January 29, |
| Average Weight of Cottle in Trust | 1387.2 lbs | 2009. Calgary, AB. Available at: http://livestocktransport.ca/conference/presentations/KSG.pdf |
| Average Weight of Cattle in Truck | 1367.2 IDS | Transport Benchmark Study. K. Schwartzkopf-Genswein et. al. Agriculture and Agri-Food Canada. AFAC Transport Conference. January 29, 2009. Calgary, AB. Available at: http://livestocktransport.ca/conference/presentations/KSG.pdf |
| Average Weight of Cattle in Truck | 629.2 kg | Transport Benchmark Study. K. Schwartzkopf-Genswein et. al. Agriculture and Agri-Food Canada. AFAC Transport Conference. January 29, |
| | | 2009. Calgary, AB. Available at: http://livestocktransport.ca/conference/presentations/KSG.pdf |
| Transport Mortalities | 100 km | Assumed |
| | | |
| Dairy Cows | | |
| back to top | | |
| Percentage of Dairy Cows Entering the Beef System | 5 % | Conversation with Paulin van Biert based upon impressions from dealing with the dairy industry |
| | 3 /0 | |

23 %

directly to slaughter rather than feedlot

END OF WORKSHEET

National Average Culling Rate of Dairy Cows

Transportation of Dairy Cow Culls

APPENDIX C

EMISSIONS FACTOR DATA FROM LCA MODEL

Emission Factor Data Worksheet

Index

| index | | | | |
|--|---------|--|--|---|
| | AF1 | Construct bunkers | Ecoinvent | building, hall |
| | AF2 | Construct fences and gates | | data gap |
| 5 | AF3 | Construct livestock shelters | Ecoinvent | tied housing system, cattle, construction |
| Construction | AF4 AF5 | Construct manure storage Construct feed storage | Ecoinvent Ecoinvent | slurry tanker, production shed |
| str | AF6 | Construct machinery | Ecoinvent | building, hall |
| ü | AF7 | Construct watering facilities | Ecoinvent | water supply network |
| 0 | AP1 | Construct fences and gates | Ecoinvent | |
| | AP2 | Construct watering facilities | Ecoinvent | water supply network |
| | AP3 | Construct irrigation systems | Ecoinvent | pump station |
| | | Draduas acad (harlay | | |
| | B1 | Produce seed (barley, barley silage, alfalfa) | Ecoinvent | barley, grains IP, at farm, at farm; clover seed IP, at farm |
| | | Transport seed to | | |
| | B6 | processing center | Ecoinvent | |
| | B10 | Process seed | Ecoinvent | |
| ti es | D.O. | Store seed after being | Ecoinvent | seed barley, clover IP, at regional storehouse, CH |
| iž | B12 | processed Transport seed to regional | | |
| -a- | B13 | storehouse | Ecoinvent | |
| and the second s | | Store seed in the regional | | data and |
| <u>89</u> | B14 | storehouse | Ecoinvent | data gap |
| | | Produce fertilizer | Ecoinvent | Urea, as N, urea, as N, at regional storehouse chemicals_organics RER |
| Forage and cereal sub-activities | B2 | | | Ammonia, liquid, at regional storehouse chemicals_inorganics RER; |
| 9 | B7 | Transport fertilizer | Ecoinvent | transport, lorry >16t, fleet average, RER |
| ora (| B3 | Produce pesticide/herbicide | Ecoinvent | pesticide unspecified, at regional storehouse, CH |
| Ř | B8 | <u> </u> | Ecoinvent | transport, lorry >16t, fleet average, RER |
| | B4 | Transport manure | Ecoinvent | transport, lorry >32t, EURO4, RER |
| | B9 | Apply manure | Ecoinvent | Solid manure loading and spreading, by hydraulic loader and spreader_CH |
| | B11 | Incorporate manure | Ecoinvent | Tillage, cultivating, chiseling |
| | B5 | Irrigate crop | Ecoinvent | Irrigating_CH |
| | | | | |
| | E1 | Produce crude | Ecoinvent | proxy of crude oil, at production onshore, RME, see calculations |
| | E4 | <u>Transport crude</u> | Ecoinvent | crude oil, production NO, at long distance transport |
| ties | E7a | Refine crude into diesel | Ecoinvent | proxy of diesel, at refinery, RER, see calculations |
| iž Ž | E9a | Transport diesel | Ecoinvent | diesel, at regional storage oil_fuels(deliver to end user)_RER |
| Energy generation activities | E7b | Refine crude into coloured diesel | Ecoinvent | proxy of diesel, at refinery, RER, see calculations |
| ution | E9b | Transport coloured diesel | Ecoinvent | diesel, at regional storage oil_fuels(deliver to end user)_RER |
| nere see | E2 | Produce natural gas | Ecoinvent (NREL) | proxy of natural gas, unprocessed, at extraction, RNA, see calculations |
| g g | E5 | Transport natural gas | Loomvon (runzz) | transport, natural gas, pipeline, long distance, RER |
| 797 | E8 | Process natural gas | Ecoinvent (NREL) | proxy of natural gas, at production, RNA, see calculations |
| e | E10 | Combust natural gas | Ecoinvent | proxy of natural gas, burned in industrial furnace >100kW, RER, see calculations |
| <u> </u> | E3 | Generate electricity | Ecoinvent (NREL) | proxy of electricity, low voltage, at grid, US, see calculations |
| | E6 | Transmit electricity | LCOINVEIL (IVICLE) | Included in E3 above. |
| | E0 | <u>Transmit electricity</u> | | molded in 20 above. |
| | | Produce materials for | | |
| | R1 | replacement components | | |
| | | Manufacture replacement | | |
| | R4 | components | Ecoinvent | tied hausing austern cattle approxime CH |
| | | Transport replacement | Econvent | tied housing system, cattle, operation, CH |
| | R7 | components | | |
| | D40 | Install replacement | | |
| | R10 | components Remove damaged/worn | | Remove damaged steel: disposal, building, reinforcement steel, to recycling waste |
| | R2 | components | Ecoinvent | management_recycling_CH |
| <i>ω</i> | | Transport steel to recycle | | |
| activities | R5a | center | Ecoinvent | transport, lorry >32t, EURO4, RER |
| acti | Noa | | | |
| 00 M M | Doo | Recycle steel components | Ecoinvent | disposal, building, reinforcement steel, to recycling |
| ľŏ | R8a | | | |
| | | Transport wood to recycle | Ecoinvent | disposal, building, waste wood, untreated, to final disposal |
| | R5b | <u>center</u> | | |
| | Pal . | Recycle wood components | | No recycling. Wood is considered waste. See R2 |
| | R8b | | | |
| | | Transport concrete for | Ecoinvent | transport, lorry >32t, EURO4, RER |
| | R5c | reuse as aggregate | | 17 17 17 17 17 17 17 17 17 17 17 17 17 1 |
| | R3 | Extract gravel materials | Ecoinvent | mining, gravel / sand+ gravel, crushed, at mine (2 processes) |
| | R6 | Transport gravel materials | Ecoinvent | transport, lorry >32t, EURO4, RER |
| 1 | R9 | Grade access roads | data gap | |
| | | | | |

| | CC1 | Plant cover crop or green | Ecoinvent | not applicable for Albert | a agricultural practices |
|-------------------|-----|--|---|---|--|
| | UUI | <u>manure</u> | | not applicable for Alberta | agricultural practices |
| | | <u>Cultivate soil</u> | combination of different processes, adjusted as proxy based on fuel | For adjustment or processes based on fuel of activ | |
| | | no till | Ecoinvent | years | spring tine harrow |
| | CC2 | reduced till | Ecoinvent | year | chiseling |
| | **- | 1000000 | Ecoinvent | | spring tine harrow |
| | | full till | | years | : 5 |
| | | <u>iuii uii</u> | Ecoinvent | year | chiseling |
| | | | Ecoinvent | times per year | chiseling |
| | | | Ecoinvent | two years | cultivator |
| | | | | | |
| activities | | | combination of | | |
| ixi | | Apply fertilizer (includes | different | For adjustment or processes based on fuel of | consumption see appropriate tabs : Cereal |
| <u>8</u> | | manure) | processes, adjusted as proxy | activ | ity |
| Cereal | | | based on fuel | | |
| Ö | | Broadcasting | Ecoinvent | Alberta practice - sprayer | Ecoinvent proxy - tillage, rotary cultivator |
| | CC3 | Injected or knifed in | Ecoinvent | Alberta practice - anhydrous applicator | harrow |
| | | Post-plant Top/Side | Ecoinvent | previous p | |
| | | Banded | Ecoinvent | When seeding. Should not require additional fuel consumption. Assumption. | |
| | | Applied with Seed | Ecoinvent | When seeding. Should not require addit | |
| | | Other | Ecoinvent | when seeding. Should not require addit | ional ruel consumption. Assumption. |
| | CC4 | Plant crop | Ecoinvent | Alberta practice - air drill, once per year | Ecoinvent proxy- planting |
| | CC5 | Irrigate crop CC | Ecoinvent | Irrigatin | |
| | CC6 | | | · | protection products, by field sprayer |
| | CC7 | Apply chemical treatment | Ecoinvent | crop | |
| | 667 | Apply mechanical treatment | Ecoinvent | per year | weeder |
| | CC8 | Harvest crop (grain and straw) | Ecoinvent | Alberta practice -combine (small grain), once per year | Ecoinvent proxy- combine harvesting |
| | 000 | Transport harvested crop | | per year | Econivent proxy-combine harvesting |
| | CC9 | (grain) | Ecoinvent | | |
| | | AND TO I | • | | |
| | | 0.10.1.11.11.11.11.11.11.11.11.11.11.11. | | | |
| | FC1 | Cultivate soil (not annually) | Ecoinvent | see above, culti | vate soil, CC2 |
| | FC2 | Apply fertilizer | Ecoinvent | see above, apply | fertilizer, CC3 |
| _α | FC3 | Plant crop (not annually) | Ecoinvent | see above, pla | anting, CC4 |
| iži iži | FC4 | Irrigate crops | Ecoinvent | Irrigatin | |
| Forage activities | FC5 | Apply chemical treatment | Ecoinvent | see above, apply chem | |
| <u>σ</u> | | Harvest crop (multiple times | | | * |
| rag | FC6 | per year) | Ecoinvent | see above, har | vesting CC8 |
| 3 | 100 | | <u> </u> | see above, na | vesting, coo |
| | FC7 | Transport harvested crop (feed) | Ecoinvent | transp | ort |
| | ror | fieent | | transp | OI L |
| | FC8 | Treat harvested crop (feed) | | no treatment | necessary |
| L | FCO | 1 | 1 | no treatment | песеззаі у |

| | FL1 | Deposit manure | | emissions covered under biological activity of cattle |
|----------|------------|-----------------------------------|-----------|--|
| | FL2 | Collect manure | | Included in total energy used on beef farms |
| | FLZ FL7 | Transfer manure | Ecoinvent | Included in total energy used on beef farms Included in total energy used on beef farms |
| | FL12 | Store manure | Ecoinvent | slurry store and processing CH |
| | FLIZ | Dispose of manure (not on | Econivent | Transport of manure off site+ spreading. Spreading is not accounted for, as the manure |
| | FL24 | crops fed to beef) | Ecoinvent | leaves the beef production system. |
| | FL3 | Collect garbage | | Included in total energy used on beef farms. |
| | FL8 | Store garbage | | No emissions associated with this activity |
| | FL13 | Transport garbage | Ecoinvent | transport, Lorry >32 t |
| | FL25 | Dispose of garbage | | burned , combustion |
| | FL4 | Collect mortalities (on-site) | | Included in total energy used on beef farms |
| | FL9 | Store mortalities | | No emissions involved in this activity |
| | FL14 | Transport mortalities | Ecoinvent | transport, lorry >16t, fleet average, RER |
| | FL26 | Dispose of mortalities | | Rendering. Emissions from rendering are cut-off. |
| | FL5 | Produce bedding material | Ecoinvent | straw, from straw areas_CH |
| S O | FL10 | Transport bedding | Ecoinvent | transport, lorry >16t, fleet average, RER |
| <u>a</u> | FL15 | Store bedding | | No emissions involved in this activity |
| ac | FL27 | Bed livestock | | Included in total energy used on beef farms |
| nre | FL6 | Store feed | Ecoinvent | Included in total energy used on beef farms |
| pasti | FL11 | Store feed | | • |
| d pu | FL16 | Transport feed | | Feedmill consumptions (source Pork LCA) |
| a a | FL28 | Feed livestock | | Included in total energy used on beef farms |
| Sippe | F17 | Produce mineral | Ecoinvent | Sodium phosphate, RER |
| <u>Ф</u> | FL29 | Transport mineral | Ecoinvent | transport, lorry >16t, fleet average, RER |
| | FL18 | Produce trace mineral | | minerals required have not been included in the analysis) |
| | FL30 | Transport trace mineral | Ecoinvent | Not applicable - see FL 18 |
| | FL19 | Produce cobalt (iodized) | | Cobalt lodized Salt Block - considered within the sodium chloride production |
| | FL31 | Transport cobalt (iodized) | Ecoinvent | Cobalt lodized Salt Block - considered within the sodium chloride production |
| | FL20 | Produce millrun carrier | | waste product from the wheat processing industry. |
| | FL32 | Transport millrun carrier | Ecoinvent | transport, lorry >16t, fleet average, RER |
| | FL21 | Produce vitamin | | data gap |
| | FL33 | Transport vitamin | Ecoinvent | transport distance Calgary, AB- New York-Paris (estimated from Google Earth) |
| | FL22 | Produce growth promotant | | data gap |
| | FL34 | Transport growth promotant | Ecoinvent | Transport, van <3.5t |
| | FL23 | Produce vaccination/antibiotic | | data qap |
| | FL 35 | Transport vaccination/antibiotic | | data gap |
| | FL39 | Production of plastic | Ecoinvent | polypropylene, granulate, at plant, RER, polyethylene, LLDPE, granulate, at plant |
| | FL36 | | Econivent | |
| | FL30 | Supply water to livestock | | Included in total energy used on beef farms |

| Parameter | Category | Subcategory | LCIA unit | eq factors | eq units | Mean Value Process | Unit process | Emissions/unit | Source |
|--|-------------------|--|-----------|------------|-----------|--------------------|--------------|----------------|------------------------------|
| AF1 | Construct bunkers | | | | | | | | |
| eack to top | building, hall | Includes a combination of the wooden building hall (30%) and the steel building hall (70%) to represent the estimated current Swiss share. | | | | | | | |
| arbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 8.19E+01 | kg/kg | 8.19E+01 | Ecoinvent V2, building, hall |
| arbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 5.07E+01 | kg/kg | 5.07E+01 | Ecoinvent V2, building, hall |
| arbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 8.20E-06 | kg/kg | 8.20E-06 | Ecoinvent V2, building, hall |
| arbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.42E+02 | kg/kg | 1.42E+02 | Ecoinvent V2, building, hall |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 4.02E-02 | kg/kg | 6.32E-02 | Ecoinvent V2, building, hall |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 9.65E-02 | kg/kg | 1.52E-01 | Ecoinvent V2, building, hall |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 9.63E-09 | kg/kg | 1.51E-08 | Ecoinvent V2, building, hall |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.07E+00 | kg/kg | 1.68E+00 | Ecoinvent V2, building, hall |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 8.62E-08 | kg/kg | 2.59E-06 | Ecoinvent V2, building, hall |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 9.03E-09 | kg/kg | 2.71E-07 | Ecoinvent V2, building, hall |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 6.13E-14 | kg/kg | 1.84E-12 | Ecoinvent V2, building, hall |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 1.93E-03 | kg/kg | 5.75E-01 | Ecoinvent V2, building, hall |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 9.35E-04 | kg/kg | 2.79E-01 | Ecoinvent V2, building, hall |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 7.81E-11 | kg/kg | 2.33E-08 | Ecoinvent V2, building, hall |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 2.25E-03 | kg/kg | 6.71E-01 | Ecoinvent V2, building, hall |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 1.73E-09 | kg/kg | 2.47E-06 | Ecoinvent V2, building, hall |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 4.59E-08 | kg/kg | 6.56E-05 | Ecoinvent V2, building, hall |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 4.41E-05 | kg/kg | 6.31E-02 | Ecoinvent V2, building, hall |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 6.76E-10 | kg/kg | 4.15E-06 | Ecoinvent V2, building, hall |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, building, hall |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 3.20E-08 | kg/kg | 3.97E-06 | Ecoinvent V2, building, hall |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, building, hall |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 8.23E-07 | kg/kg | 8.23E-03 | Ecoinvent V2, building, hall |
| thane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, building, hall |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 4.74E-08 | kg/kg | 5.78E-04 | Ecoinvent V2, building, hall |
| thane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 5.93E-05 | kg/kg | 7.24E-01 | Ecoinvent V2, building, hall |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 8.65E-04 | kg/kg | 2.16E-02 | Ecoinvent V2, building, hall |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.08E-03 | kg/kg | 2.69E-02 | Ecoinvent V2, building, hall |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 4.04E-04 | kg/kg | 1.01E-02 | Ecoinvent V2, building, hall |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 1.66E-13 | kg/kg | 8.31E-13 | Ecoinvent V2, building, hall |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | ka | 1890 | kg CO2-Eq | 8.47E-07 | kg/kg | 1.60E-03 | Ecoinvent V2, building, hall |

| M. d. 1 (20) 111 122 | | | | | 1 00== | 7.057.15 | | 5.74E.55 | F : |
|--|---|--|------------|--------|-----------|------------|---------|----------|--|
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 7.99E-13 | kg/kg | 5.71E-09 | Ecoinvent V2, building, hall |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.14E-06 | kg/kg | 8.16E-03 | Ecoinvent V2, building, hall |
| Methane, chlorodifluoro-, HCFC-22 | air | | ka | 1810 | kg CO2-Eq | 6.38E-06 | | 1.15E-02 | Ecoinvent V2, building, hall |
| | u.i. | high population density | | | | | kg/kg | | |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 3.13E-06 | kg/kg | 5.67E-03 | Ecoinvent V2, building, hall |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | ka | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, building, hall |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.09E-08 | kg/kg | 1.81E-07 | Ecoinvent V2, building, hall |
| | an . | | | | | | | | |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 2.67E-08 | kg/kg | 2.32E-07 | Ecoinvent V2, building, hall |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | ka | 10900 | kg CO2-Eq | 2.70E-09 | kg/kg | 2.94E-05 | Ecoinvent V2, building, hall |
| | air | | l.g | 10900 | | 2.90E-09 | | 3.17E-05 | |
| Methane, dichlorodifluoro-, CFC-12 | an . | low population density | ку | | kg CO2-Eq | | kg/kg | | Ecoinvent V2, building, hall |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 1.10E-13 | kg/kg | 1.20E-09 | Ecoinvent V2, building, hall |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | ka | 210 | kg CO2-Eq | 4.92E-12 | kg/kg | 1.03E-09 | Ecoinvent V2, building, hall |
| | an . | | ing | | | | | | |
| Methane, fossil | air | high population density | кд | 25 | kg CO2-Eq | 1.94E-01 | kg/kg | 4.86E+00 | Ecoinvent V2, building, hall |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 3.94E-01 | kg/kg | 9.86E+00 | Ecoinvent V2, building, hall |
| Methane, fossil | air | lower stratosphere + upper troposphere | ka | 25 | kg CO2-Eq | 1.30E-10 | kg/kg | 3.25E-09 | Ecoinvent V2, building, hall |
| | an . | | kg | | | | | | |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 8.26E-03 | kg/kg | 2.06E-01 | Ecoinvent V2, building, hall |
| Methane, tetrachloro-, R-10 | air | high population density | ka | 1400 | kg CO2-Eq | 2.24E-06 | kg/kg | 3.14E-03 | Ecoinvent V2, building, hall |
| Methane, tetrachloro-, R-10 | air | unspecified | ka | 1400 | kg CO2-Eg | 4.94E-11 | kg/kg | 6.92E-08 | Ecoinvent V2, building, hall |
| | | | , vg | | | | | | |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.65E-09 | kg/kg | 1.22E-05 | Ecoinvent V2, building, hall |
| Methane, tetrafluoro-, R-14 | air | unspecified | ka | 7390 | kg CO2-Eq | 5.34E-04 | kg/kg | 3.94E+00 | Ecoinvent V2, building, hall |
| | air | | 1.9 | 4750 | | | | | |
| Methane, trichlorofluoro-, CFC-11 | all | high population density | ку | | kg CO2-Eq | 7.98E-12 | kg/kg | 3.79E-08 | Ecoinvent V2, building, hall |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 1.56E-09 | kg/kg | 2.32E-05 | Ecoinvent V2, building, hall |
| Sulfur hexafluoride | air | high population density | ka | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, building, hall |
| | oir | | 100 | | | 6.005.00 | | | |
| Sulfur hexafluoride | air | low population density | кд | 22800 | kg CO2-Eq | 6.00E-08 | kg/kg | 1.37E-03 | Ecoinvent V2, building, hall |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 5.47E-06 | kg/kg | 1.25E-01 | Ecoinvent V2, building, hall |
| Methane, monochloro-, R-40 | air | high population density | ka | 13 | kg CO2-Eq | 2.69E-09 | kg/kg | 3.50E-08 | Ecoinvent V2, building, hall |
| | -:- | | Ng . | | | | | | |
| Methane, monochloro-, R-40 | aır | low population density | kg | 13 | kg CO2-Eq | 4.88E-08 | kg/kg | 6.34E-07 | Ecoinvent V2, building, hall |
| Carbon dioxide, land transformation | air | low population density | ka | 1 | kg CO2-Eq | 3.50E-03 | kg/kg | 3.50E-03 | Ecoinvent V2, building, hall |
| | air | high population density | kg | 17200 | | | | 0.00E+00 | Ecoinvent V2, building, hall |
| Nitrogen fluoride | all | night population density | N y | 17200 | kg CO2-Eq | | kg/kg | | Econiverte v2, building, fian |
| | | | | | | | | 2.97E+02 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 3.76E-03 | kg/kg | 7.06E-03 | Ecoinvent V2, building, hall |
| Ammonia | air | low population density | ka | 1.88 | kg SO2-Eq | 9.47E-03 | kg/kg | 1.78E-02 | Ecoinvent V2, building, hall |
| | all . | | kg | | | | | | |
| Ammonia | aır | unspecified | kg | 1.88 | kg SO2-Eq | 6.14E-01 | kg/kg | 1.15E+00 | Ecoinvent V2, building, hall |
| Hydrogen chloride | air | high population density | ka | 0.88 | kg SO2-Eq | 2.21E-03 | kg/kg | 1.95E-03 | Ecoinvent V2, building, hall |
| | oir | | ka | 0.88 | kg SO2-Eq | 2.92E-03 | kg/kg | 2.57E-03 | Ecoinvent V2, building, hall |
| Hydrogen chloride | all . | low population density | , Ny | | | | | | |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 2.82E-01 | kg/kg | 2.48E-01 | Ecoinvent V2, building, hall |
| Hydrogen fluoride | air | high population density | ka | 1.6 | kg SO2-Eq | 8.27E-05 | kg/kg | 1.32E-04 | Ecoinvent V2, building, hall |
| | oir. | | lva ka | 1.6 | kg SO2-Eq | 6.74E-04 | | 1.08E-03 | |
| Hydrogen fluoride | all | low population density | ку | | | | kg/kg | | Ecoinvent V2, building, hall |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 2.37E-03 | kg/kg | 3.79E-03 | Ecoinvent V2, building, hall |
| Hydrogen sulfide | air | high population density | ka | 1.88 | kg SO2-Eq | 1.14E-05 | kg/kg | 2.14E-05 | Ecoinvent V2, building, hall |
| | -:- | | 1.g | | | | | | |
| Hydrogen sulfide | air | low population density | кд | 1.88 | kg SO2-Eq | 9.09E-04 | kg/kg | 1.71E-03 | Ecoinvent V2, building, hall |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.10E-04 | kg/kg | 3.95E-04 | Ecoinvent V2, building, hall |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eq | 1.19E-01 | kg/kg | 8.32E-02 | Ecoinvent V2, building, hall |
| | all . | | 'Ng | | | | | | |
| Nitrogen oxides | air | low population density | кд | 0.7 | kg SO2-Eq | 1.53E-01 | kg/kg | 1.07E-01 | Ecoinvent V2, building, hall |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 7.32E-01 | kg/kg | 5.12E-01 | Ecoinvent V2, building, hall |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eq | 1.27E-01 | kg/kg | 1.27E-01 | Ecoinvent V2, building, hall |
| | | | kg | | | | | | |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 3.55E-01 | kg/kg | 3.55E-01 | Ecoinvent V2, building, hall |
| Sulfur dioxide | air | unspecified | kα | 1 | kg SO2-Eq | 1.14E-01 | kg/kg | 1.14E-01 | Ecoinvent V2, building, hall |
| | water | river | ka | 1.88 | kg SO2-Eq | 2.87E-05 | | 5.40E-05 | Ecoinvent V2, building, hall |
| Hydrogen sulfide | | | kg | | | | kg/kg | | |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 1.85E-11 | kg/kg | 1.20E-11 | Ecoinvent V2, building, hall |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, building, hall |
| | | | , " | | | 3.105.44 | | | Englishment VO Englishment Englishment |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 3.18E-11 | kg/kg | 2.07E-11 | Ecoinvent V2, building, hall |
| | | | | | | | | 2.74E+00 | |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eg | 3.46E-05 | kg/kg | 1.06E-04 | Ecoinvent V2, building, hall |
| | | | Ng L | | ka PO4-Ea | 1.25E-06 | 1 /1 | 3.84E-06 | |
| Phosphorus | air | low population density | кд | 3.06 | | | kg/kg | | Ecoinvent V2, building, hall |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 1.42E-06 | kg/kg | 4.33E-06 | Ecoinvent V2, building, hall |
| Phosphorus | air | unspecified | ka | 3.06 | ka PO4-Ea | 1.68E-07 | kg/kg | 5.14E-07 | Ecoinvent V2, building, hall |
| | | | Ng I | | | | | | |
| Phosphorus | soil | agricultural | кд | 3.06 | kg PO4-Eq | 9.53E-05 | kg/kg | 2.92E-04 | Ecoinvent V2, building, hall |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 3.82E-05 | kg/kg | 1.17E-04 | Ecoinvent V2, building, hall |
| BOD5, Biological Oxygen Demand | water | river | ka | 0.022 | kg PO4-Eg | 2.64E-01 | kg/kg | 5.81E-03 | Ecoinvent V2, building, hall |
| | | | , vg | | | | | | |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 7.32E-03 | kg/kg | 1.61E-04 | Ecoinvent V2, building, hall |
| COD, Chemical Oxygen Demand | water | river | ka | 0.022 | kg PO4-Eg | 2.87E-01 | kg/kg | 6.31E-03 | Ecoinvent V2, building, hall |
| COD, Chemical Oxygen Demand | water | unspecified | 100 | 0.022 | kg PO4-Eq | 7.88E-03 | kg/kg | 1.73E-04 | Ecoinvent V2, building, hall |
| | | | kg | 0.022 | | | | | |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.42E-04 | kg/kg | 1.42E-04 | Ecoinvent V2, building, hall |
| Phosphorus | water | river | ka | 3.06 | kg PO4-Eg | 4.20E-04 | kg/kg | 1.28E-03 | Ecoinvent V2, building, hall |
| | | | ing In- | | | | | | |
| Phosphorus | water | unspecified | кд | 3.06 | kg PO4-Eq | 1.52E-05 | kg/kg | 4.66E-05 | Ecoinvent V2, building, hall |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | |
| | | . , | 3 | | | | 3 3 | 1.45E-02 | |
| Cool brown in ground | *************************************** | in ground | ka | 0.0 | MIFa | 1 425 . 04 | lea/lea | | Facing out V2 building hall |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 1.42E+01 | kg/kg | 1.41E+02 | Ecoinvent V2, building, hall |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 4.09E+01 | kg/kg | 7.82E+02 | Ecoinvent V2, building, hall |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 4.12E-01 | Nm3/kg | 1.64E+01 | Ecoinvent V2, building, hall |
| | | | | | | | | | |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 2.48E+01 | Nm3/kg | 9.48E+02 | Ecoinvent V2, building, hall |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 3.51E+01 | kg/kg | 1.61E+03 | Ecoinvent V2, building, hall |
| | resource | biotic | ka | 9.9 | MJ-Eq | 1.07E-02 | kg/kg | 1.06E-01 | Ecoinvent V2, building, hall |
| | | | | | | | | | |
| Peat, in ground | resource | | 3 | | - 1 | | 3 3 | | • • |
| reat, in ground | resource | | 3 | | | | J J | 3.49E+03 | |

| AF2 | Construct fence |
|-----|-----------------|
| AFZ | and gates |

back to top

| AF3 | Construct livestock shelters | | | | | | | | Ecoinvent V2, tied housing system, cattle, construction, CH |
|-------------------------|--|---|----|--------|-----------|----------|-------|----------|---|
| back to top | tied housing system, cattle, construction | The inventory takes into account the use of construction materials and building machines for construction, repair and replacement including waste disposal and the transportation of the materials to the building site. Not taken into account were direct emission of the construction, disposal of production waste and the use of resources during utilization phase. | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 3.54E+03 | kg/kg | 3.54E+03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 1.72E+03 | kg/kg | 1.72E+03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 3.98E-04 | kg/kg | 3.98E-04 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 8.79E+03 | kg/kg | 8.79E+03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 2.24E+00 | kg/kg | 3.51E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 8.43E+00 | kg/kg | 1.32E+01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 4.67E-07 | kg/kg | 7.34E-07 | Ecoinvent V2, tied housing system, cattle, construction, CH |

| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 4.56E+01 | kg/kg | 7.17E+01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
|--|---------------|---|-----------|---------------|------------------------|----------------------|----------------|----------------------|---|
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 1.90E-06 | kg/kg | 5.71E-05 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 1.12E-07 | kg/kg | 3.35E-06 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 5.96E-13 | kg/kg | 1.79E-11 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Dinitrogen monoxide | air air | high population density | kg | 298 | kg CO2-Eq | 1.48E-01 | kg/kg | 4.42E+01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Dinitrogen monoxide | air | low population density | kg ka | 298 298 | kg CO2-Eq kg CO2-Eq | 3.88E-02 3.79E-09 | kg/kg kg/kg | 1.16E+01 1.13E-06 | Ecoinvent V2, tied housing system, cattle, construction, CH Ecoinvent V2, tied housing system, cattle, construction, CH |
| Dinitrogen monoxide Dinitrogen monoxide | air | lower stratosphere + upper troposphere unspecified | kg kg | 298 | kg CO2-Eq kg CO2-Eq | 1.83E-01 | kg/kg | 5.45E+01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 8.37E-08 | kg/kg | 1.20E-04 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 1.64E-06 | kg/kg | 2.34E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | ka | 1430 | kg CO2-Eq | 2.17E-03 | kg/kg | 3.10E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 3.30E-08 | kg/kg | 2.02E-04 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | ka | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 1.48E-06 | kg/kg | 1.84E-04 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 2.99E-05 | kg/kg | 2.99E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 2.31E-06 | kg/kg | 2.82E-02 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 6.11E-04 | kg/kg | 7.46E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 4.42E-02 | kg/kg | 1.10E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 3.82E-02 | kg/kg | 9.56E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 1.97E-02 | kg/kg | 4.93E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 1.61E-12 | kg/kg | 8.07E-12 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air air | low population density | kg | 1890 | kg CO2-Eq | 3.28E-05 | kg/kg | 6.20E-02 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, bromotrifluoro-, Halon 1301 | an- | high population density | kg | 7140 | kg CO2-Eq | 3.78E-11 | kg/kg | 2.70E-07 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, blorediffuero, HCEC 23 | air | low population density | kg | 7140 | kg CO2-Eq | 5.29E-05 | kg/kg | 3.78E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 3.21E-05 | kg/kg | 5.81E-02 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, chlorotrifluoro-, HCFC-22 | air air | low population density | kg ka | 1810 14400 | kg CO2-Eq | 1.24E-04 | kg/kg | 2.24E-01 | Econyent V2, tied housing system, cattle, construction, CH |
| Methane, chlorotrifluoro-, CFC-13 Methane, dichloro-, HCC-30 | aır air | unspecified | kg ka | 14400 8.7 | kg CO2-Eq kg CO2-Eq | 2.38E-06 | kg/kg | 0.00E+00 2.07E-05 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, dichloro-, HCC-30 | air air | high population density | kg ka | 8.7 8.7 | kg CO2-Eq kg CO2-Eq | 2.38E-06 3.31E-07 | kg/kg kg/kg | 2.88E-06 | Ecoinvent V2, tied housing system, cattle, construction, CH Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, dichlorodifluoro-, CFC-12 | air air | low population density high population density | kg ka | 10900 | kg CO2-Eq | 3.31E-07 1.91E-07 | kg/kg kg/kg | 2.88E-06 2.09E-03 | |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorodifluoro-, CFC-12 | air air | low population density | kg ka | 10900 | kg CO2-Eq kg CO2-Eq | 1.91E-07 1.12E-07 | kg/kg kg/kg | 1.22E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg kg | 10900 | kg CO2-Eq | 1.07E-12 | kg/kg | 1.17E-08 | Econivent V2, tee housing system, cattle, construction, CH Econivent V2, tee housing system, cattle, construction, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg kg | 210 | kg CO2-Eq kg CO2-Eq | 2.38E-10 | kg/kg | 5.00E-08 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, fossil | air | high population density | ka | 25 | kg CO2-Eq | 3.52E+00 | kg/kg | 8.81E+01 | Econivent V2, tied housing system, cattle, construction, CH Econivent V2, tied housing system, cattle, construction, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 1.85E+01 | kg/kg | 4.62E+02 | Ecoinvent V2, tied housing system, cattle, construction, CH Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 6.31E-09 | kg/kg | 1.58E-07 | Ecoinvent V2, tied housing system, cattle, construction, CH Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 2.02E-01 | kg/kg | 5.04E+00 | Ecolinvent V2, tied housing system, cattle, construction, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 3.87E-05 | kg/kg | 5.42E-02 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 4.80E-10 | kg/kg | 6.72E-07 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 7.62E-08 | kg/kg | 5.63E-04 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 5.50E-03 | kg/kg | 4.07E+01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 3.86E-10 | kg/kg | 1.84E-06 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 7.57E-08 | kg/kg | 1.12E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | 7.572 00 | kg/kg | 0.00E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 7.23E-06 | kg/kg | 1.65E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 2.35E-04 | kg/kg | 5.36E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 8.30E-07 | kg/kg | 1.08E-05 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 6.04E-07 | kg/kg | 7.85E-06 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.57E-01 | kg/kg | 1.57E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Nitrogen fluoride | air | high population density | ka | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| | | 3 1 11 2 2 2 7 | 3 | | 3 1 | | 3, 3 | 1.49E+04 | · · · · · · · · · · · · · · · · · · · |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 1.95E-01 | kg/kg | 3.66E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 5.78E-02 | kg/kg | 1.09E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.09E+00 | kg/kg | 3.93E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 1.31E-01 | kg/kg | 1.15E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 1.02E-01 | kg/kg | 8.97E-02 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 8.61E-01 | kg/kg | 7.58E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 5.30E-03 | kg/kg | 8.48E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 2.31E-02 | kg/kg | 3.70E-02 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 8.25E-02 | kg/kg | 1.32E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 2.09E-03 | kg/kg | 3.94E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 3.60E-02 | kg/kg | 6.78E-02 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.12E-02 | kg/kg | 2.11E-02 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 5.04E+00 | kg/kg | 3.53E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 5.94E+00 | kg/kg | 4.16E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 2.83E+01 | kg/kg | 1.98E+01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Sulfur dioxide | air air | high population density | kg ka | 1 | kg SO2-Eq | 4.89E+00 1.63E+01 | kg/kg | 4.89E+00 1.63E+01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Sulfur dioxide | aır air | low population density | kg ka | 1 | kg SO2-Eq | | kg/kg | | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Sulfur dioxide | | unspecified | kg ka | 1 1.88 | kg SO2-Eq | 4.93E+00 1.19E-03 | kg/kg | 4.93E+00 2.24E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Hydrogen sulfide | water soil | river | kg ka | 1.88 0.65 | kg SO2-Eq kg SO2-Eq | 1.19E-03 9.01E-10 | kg/kg kg/kg | 5.86E-10 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Sulfuric acid Phosphoric acid | soii air | agricultural | kg ka | 0.65 | kg SO2-Eq kg SO2-Eq | 9.01E-10 | | 5.86E-10 0.00E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Phosphoric acid Sulfuric acid | aır air | high population density | kg ka | 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 1.47E-09 | kg/kg kg/kg | 9.56E-10 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Ounano dolu | all | low population density | ky | 0.00 | ng GOZ-Eq | 1.7/ =-08 | ng/ng | 5.92E+01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 1.48E-03 | kg/kg | 4.54E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 5.18E-05 | kg/kg | 1.58E-04 | Econivent V2, tied housing system, cattle, construction, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 5.29E-05 | kg/kg | 1.62E-04 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 1.74E-06 | kg/kg | 5.32E-06 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 3.36E-03 | kg/kg | 1.03E-02 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 1.40E-03 | kg/kg | 4.29E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 9.38E+00 | kg/kg | 2.06E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 2.14E-01 | kg/kg | 4.71E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.07E+01 | kg/kg | 2.35E-01 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 2.27E-01 | kg/kg | 5.00E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 4.04E-03 | kg/kg | 4.04E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 8.83E-03 | kg/kg | 2.70E-02 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 4.43E-04 | kg/kg | 1.35E-03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| | | | | | | 0.0:= | | 5.03E-01 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 6.04E+02 | kg/kg | 5.98E+03 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Coal, hard, unspecified, in ground | resource | in ground | kg Nm2 | 19.1 | MJ-Eq | 1.88E+03 | kg/kg | 3.60E+04 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 2.04E+01 | Nm3/kg | 8.13E+02 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Gas, natural, in ground Oil, crude, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 8.71E+02 | Nm3/kg | 3.34E+04 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| | resource | in ground | kg | 45.8 | MJ-Eq | 1.37E+03 | kg/kg | 6.28E+04 | Ecoinvent V2, tied housing system, cattle, construction, CH |
| Oil, crade, in ground | | | | | | | | | |

| eat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 3.51E-01 | kg/kg | 3.48E+00 1.39E+05 | Ecoinvent V2, tied housing system, cattle, construction, CH |
|---|---|---|----------|------------------|------------------------|----------------------|----------------|----------------------|--|
| \F4 | Construct manure | | | | | | | | Ecoinvent V2, slurry tanker, production, CH |
| | storage slurry tanker, production | The inventory takes into account the use of resources and the amount of emissions during the production, the maintenance and repair and the disposal of agricultural slurry tankers. Not taken into account were the impacts caused by fuel consumption during operation-time of the trailing machinery. No data was available about buildings needed for manufacture and maintenance of the machinery. The routes needed for transport from manufacturer place to the farm and from here to disposal | | | | | | | |
| oack to top Carbon dioxide, fossil | air | place of the waste, are balanced in the utilized transport modules. high population density | ka | 1 | kg CO2-Eg | 1.24E+00 | kg/kg | 1.24E+00 | Ecoinvent V2, slurry tanker, production, CH |
| arbon dioxide, fossil | air | low population density | kg | 1 1 | kg CO2-Eq | 6.04E-01 | kg/kg | 6.04E-01 | Ecoinvent V2, slurry tanker, production, CH |
| arbon dioxide, fossil arbon dioxide, fossil | air air | lower stratosphere + upper troposphere unspecified | kg kg | 1 | kg CO2-Eq kg CO2-Eq | 6.80E-08 1.25E+00 | kg/kg kg/kg | 6.80E-08 1.25E+00 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 6.16E-04 | kg/kg | 9.68E-04 | Ecoinvent V2, slurry tanker, production, CH |
| arbon monoxide, fossil arbon monoxide, fossil | air air | low population density lower stratosphere + upper troposphere | kg kg | 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq | 1.25E-03 7.98E-11 | kg/kg kg/kg | 1.96E-03 1.25E-10 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| arbon monoxide, fossil nloroform | air air | unspecified high population density | kg | 1.5714 30 | kg CO2-Eq kg CO2-Eq | 3.31E-02 9.00E-10 | kg/kg kg/kg | 5.20E-02 2.70E-08 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| nloroform | air | low population density | kg | 30 | kg CO2-Eq | 8.07E-11 | kg/kg | 2.42E-09 | Ecoinvent V2, slurry tanker, production, CH |
| nloroform nitrogen monoxide | air air | unspecified high population density | kg ka | 30 298 | kg CO2-Eq kg CO2-Eq | 4.30E-16 2.65E-05 | kg/kg kg/kg | 1.29E-14 7.90E-03 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| nitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 1.43E-05 | kg/kg | 4.26E-03 | Ecoinvent V2, slurry tanker, production, CH |
| nitrogen monoxide nitrogen monoxide | air air | lower stratosphere + upper troposphere unspecified | kg kg | 298 298 | kg CO2-Eq kg CO2-Eq | 6.47E-13 1.53E-05 | kg/kg kg/kg | 1.93E-10 4.57E-03 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| hane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 1.58E-11 | kg/kg | 2.26E-08 | Ecoinvent V2, slurry tanker, production, CH |
| hane, 1,1,1,2-tetrafluoro-, HFC-134a hane, 1,1,1,2-tetrafluoro-, HFC-134a | air air | low population density unspecified | кд kg | 1430 1430 | kg CO2-Eq kg CO2-Eq | 1.12E-09 1.60E-07 | kg/kg kg/kg | 1.61E-06 2.28E-04 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| hane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 5.34E-12 | kg/kg | 3.27E-08 | Ecoinvent V2, slurry tanker, production, CH |
| thane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 thane, 1,1-difluoro-, HFC-152a | air air | unspecified high population density | кд kg | 6130 124 | kg CO2-Eq kg CO2-Eq | 7.27E-10 | kg/kg kg/kg | 0.00E+00 9.02E-08 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| thane, 1,1-difluoro-, HFC-152a thane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air air | low population density | kg | 124 10000 | kg CO2-Eq kg CO2-Eq | 2.18E-08 | kg/kg kg/kg | 0.00E+00 2.18E-04 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| thane, 1,2-dichioro-1,1,2,2-tetrafluoro-, HCFC-124 | air | low population density unspecified | kg kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, slutry tanker, production, CH Ecoinvent V2, slutry tanker, production, CH |
| hane, hexafluoro-, HFC-116 hane, hexafluoro-, HFC-116 | air air | high population density unspecified | kg ka | 12200 12200 | kg CO2-Eq kg CO2-Eq | 3.86E-10 1.62E-08 | kg/kg kg/kg | 4.70E-06 1.98E-04 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| ethane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 1.95E-06 | kg/kg | 4.87E-05 | Ecoinvent V2, slurry tanker, production, CH |
| ethane, biogenic ethane, biogenic | air air | low population density unspecified | kg ka | 25 25 | kg CO2-Eq kg CO2-Eq | 1.09E-05 7.50E-06 | kg/kg kg/kg | 2.74E-04 1.87E-04 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| ethane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 1.16E-15 | kg/kg | 5.82E-15 | Ecoinvent V2, slurry tanker, production, CH |
| ethane, bromochlorodifluoro-, Halon 1211 ethane, bromotrifluoro-, Halon 1301 | air air | low population density high population density | kg ka | 1890 7140 | kg CO2-Eq kg CO2-Eq | 1.17E-08 5.73E-15 | kg/kg kg/kg | 2.21E-05 4.09E-11 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| thane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.22E-08 | kg/kg | 8.74E-05 | Ecoinvent V2, slurry tanker, production, CH |
| ethane, chlorodifluoro-, HCFC-22 ethane, chlorodifluoro-, HCFC-22 | air air | high population density low population density | kg kg | 1810 1810 | kg CO2-Eq kg CO2-Eq | 3.07E-10 4.44E-08 | kg/kg kg/kg | 5.56E-07 8.04E-05 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| ethane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, slurry tanker, production, CH |
| ethane, dichloro-, HCC-30 ethane, dichloro-, HCC-30 | air air | high population density low population density | кд kg | 8.7 8.7 | kg CO2-Eq kg CO2-Eq | 4.18E-11 2.39E-10 | kg/kg kg/kg | 3.64E-10 2.08E-09 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| ethane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 10900 | kg CO2-Eq | 2.04E-11 | kg/kg | 2.22E-07 4.24E-07 | Ecoinvent V2, slurry tanker, production, CH |
| ethane, dichlorodifluoro-, CFC-12 ethane, dichlorodifluoro-, CFC-12 | air air | low population density unspecified | кд kg | 10900 | kg CO2-Eq kg CO2-Eq | 3.89E-11 7.74E-16 | kg/kg kg/kg | 4.24E-07 8.44E-12 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| ethane, dichlorofluoro-, HCFC-21 ethane, fossil | air air | high population density high population density | kg | 210 25 | kg CO2-Eq kg CO2-Eq | 4.49E-14 3.97E-04 | kg/kg | 9.43E-12 9.93E-03 | Ecoinvent V2, slurry tanker, production, CH |
| ethane, fossil | air | low population density | kg kg | 25 25 | kg CO2-Eq | 8.16E-03 | kg/kg kg/kg | 2.04E-01 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| ethane, fossil ethane, fossil | air air | lower stratosphere + upper troposphere unspecified | kg | 25 25 | kg CO2-Eq kg CO2-Eq | 1.08E-12 3.16E-05 | kg/kg kg/kg | 2.70E-11 7.90E-04 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| thane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 4.24E-09 | kg/kg | 5.94E-06 | Ecoinvent V2, slurry tanker, production, CH |
| ethane, tetrachloro-, R-10 ethane, tetrafluoro-, R-14 | air air | unspecified high population density | kg ka | 1400 7390 | kg CO2-Eq kg CO2-Eq | 3.46E-13 3.74E-11 | kg/kg kg/kg | 4.85E-10 2.76E-07 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| ethane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 1.46E-07 | kg/kg | 1.08E-03 | Ecoinvent V2, slurry tanker, production, CH |
| ethane, trichlorofluoro-, CFC-11 ethane, trifluoro-, HFC-23 | air air | high population density high population density | kg ka | 4750 14800 | kg CO2-Eq kg CO2-Eq | 7.29E-14 1.43E-11 | kg/kg kg/kg | 3.46E-10 2.11E-07 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| lfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | 7.445.44 | kg/kg | 0.00E+00 | Ecoinvent V2, slurry tanker, production, CH |
| Ilfur hexafluoride Ilfur hexafluoride | air air | low population density unspecified | кд kg | 22800 22800 | kg CO2-Eq kg CO2-Eq | 7.41E-11 1.07E-07 | kg/kg kg/kg | 1.69E-06 2.44E-03 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| lethane, monochloro-, R-40 lethane, monochloro-, R-40 | air air | high population density low population density | kg kg | 13 13 | kg CO2-Eq kg CO2-Eq | 6.50E-13 4.36E-10 | kg/kg | 8.45E-12 5.67E-09 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| arbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 4.09E-05 | kg/kg kg/kg | 4.09E-05 | Ecoinvent V2, slurry tanker, production, CH |
| litrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 3.39E+00 | Ecoinvent V2, slurry tanker, production, CH |
| mmonia | air | high population density | kg | 1.88 | kg SO2-Eq | 6.67E-06 | kg/kg | 1.25E-05 | Ecoinvent V2, slurry tanker, production, CH |
| nmonia nmonia | air air | low population density unspecified | kg kg | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 1.64E-05 1.57E-04 | kg/kg kg/kg | 3.09E-05 2.95E-04 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| drogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 9.35E-05 | kg/kg | 8.23E-05 | Ecoinvent V2, slurry tanker, production, CH |
| drogen chloride drogen chloride | air air | low population density unspecified | kg kg | 0.88 0.88 | kg SO2-Eq kg SO2-Eq | 2.87E-05 5.17E-05 | kg/kg kg/kg | 2.52E-05 4.55E-05 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| drogen fluoride | air air | high population density | kg | 1.6 1.6 | kg SO2-Eq kg SO2-Eq | 3.00E-06 6.79E-06 | kg/kg | 4.80E-06 1.09E-05 | Ecoinvent V2, slurry tanker, production, CH |
| drogen fluoride drogen fluoride | air | low population density unspecified | kg kg | 1.6 | kg SO2-Eq | 1.05E-05 | kg/kg kg/kg | 1.69E-05 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| drogen sulfide drogen sulfide | air air | high population density low population density | kg ka | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 3.09E-09 2.46E-05 | kg/kg kg/kg | 5.81E-09 4.63E-05 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| drogen sulfide drogen sulfide | air | unspecified | kg kg | 1.88 | kg SO2-Eq | 1.04E-05 | kg/kg | 1.96E-05 | Ecoinvent V2, slurry tanker, production, CH |
| rogen oxides rogen oxides | air air | high population density low population density | kg ka | 0.7 0.7 | kg SO2-Eq kg SO2-Eq | 1.21E-03 2.50E-03 | kg/kg kg/kg | 8.46E-04 1.75E-03 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| rogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 2.79E-03 | kg/kg | 1.95E-03 | Ecoinvent V2, slurry tanker, production, CH |
| ulfur dioxide ulfur dioxide | air air | high population density low population density | kg ka | 1 | kg SO2-Eq kg SO2-Eq | 2.08E-03 3.91E-03 | kg/kg kg/kg | 2.08E-03 3.91E-03 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| Ifur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 1.53E-03 | kg/kg | 1.53E-03 | Ecoinvent V2, slurry tanker, production, CH |
| lydrogen sulfide Sulfuric acid | water soil | river agricultural | kg kg | 1.88 0.65 | kg SO2-Eq kg SO2-Eq | 1.10E-06 1.46E-13 | kg/kg kg/kg | 2.06E-06 9.48E-14 | Ecoinvent V2, slurry tanker, production, CH Ecoinvent V2, slurry tanker, production, CH |
| hosphoric acid | air | high population density | kg | 0.98 0.65 | kg SO2-Eq | 7.23E-13 | kg/kg | 0.00E+00 4.70E-13 | Ecoinvent V2, slurry tanker, production, CH |
| | air | low population density | ka | USE | | | | | |
| Sulfuric acid | all | ion population density | rg | 0.05 | kg SO2-Eq | 7.23E-13 | kg/kg | 1.27E-02 | Ecoinvent V2, slurry tanker, production, CH |

| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 4.71E-08 | kg/kg | 1.44E-07 | Ecoinvent V2, slurry tanker, production, CH |
|---|-------------|-----------------------------------|-----|--------|-----------|----------|--------|----------|---|
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 3.64E-08 | kg/kg | 1.11E-07 | Ecoinvent V2, slurry tanker, production, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 4.71E-11 | kg/kg | 1.44E-10 | Ecoinvent V2, slurry tanker, production, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 1.80E-07 | kg/kg | 5.52E-07 | Ecoinvent V2, slurry tanker, production, CH |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 3.62E-07 | kg/kg | 1.11E-06 | Ecoinvent V2, slurry tanker, production, CH |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eg | 2.20E-03 | kg/kg | 4.83E-05 | Ecoinvent V2, slurry tanker, production, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eg | 1.49E-04 | kg/kg | 3.27E-06 | Ecoinvent V2, slurry tanker, production, CH |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eg | 2.26E-03 | kg/kg | 4.97E-05 | Ecoinvent V2, slurry tanker, production, CH |
| COD, Chemical Oxygen Demand | water | unspecified | ka | 0.022 | kg PO4-Eg | 1.50E-04 | kg/kg | 3.30E-06 | Ecoinvent V2, slurry tanker, production, CH |
| Phosphate | water | river | ka | 1 | kg PO4-Eg | 1.94E-06 | kg/kg | 1.94E-06 | Ecoinvent V2, slurry tanker, production, CH |
| Phosphorus | water | river | ka | 3.06 | kg PO4-Eg | 1.47E-06 | kg/kg | 4.49E-06 | Ecoinvent V2, slurry tanker, production, CH |
| Phosphorus | water | unspecified | ka | 3.06 | kg PO4-Eg | 1.37E-08 | kg/kg | 4.18E-08 | Ecoinvent V2, slurry tanker, production, CH |
| hosphoric acid | air | high population density | ka | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, slurry tanker, production, CH |
| | | g F-F | 9 | | 9 4 | | 55 | 1.14E-04 | |
| oal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 1.82E-01 | kg/kg | 1.80E+00 | Ecoinvent V2, slurry tanker, production, CH |
| oal, hard, unspecified, in ground | resource | in ground | ka | 19.1 | MJ-Eq | 1.15E+00 | kg/kg | 2.19E+01 | Ecoinvent V2, slurry tanker, production, CH |
| as, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 1.11E-02 | Nm3/kg | 4.41E-01 | Ecoinvent V2, slurry tanker, production, CH |
| Sas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 2.59E-01 | Nm3/kg | 9.91E+00 | Ecoinvent V2, slurry tanker, production, CH |
| il, crude, in ground | resource | in ground | ka | 45.8 | MJ-Eq | 3.08E-01 | kg/kg | 1.41E+01 | Ecoinvent V2, slurry tanker, production, CH |
| eat, in ground | resource | biotic | ka | 9.9 | MJ-Eq | 4.58E-05 | kg/kg | 4.53E-04 | Ecoinvent V2, slurry tanker, production, CH |
| , | | . • • • | 9 | | | | | 4.81E+01 | , , , , |

| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 4.58E-05 | kg/kg | 4.53E-04 4.81E+01 | Ecoinvent V2, slurry tanker, production, CH |
|---|-----------------|---|----------|------------------|------------------------|----------------------|----------------|----------------------|---|
| AF5 | Construct feed | | | | | | | | Ecoinvent V2, shed, CH |
| | storage shed | The inventory takes into account the use of construction materials and building machines for construction, repair and replacement including waste disposal and the transportation of the materials to the building site. Not taken into account were direct emission of the construction, disposal of production waste and the use of | | | | | | | |
| back to top | | resources during utilization phase. | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 2.23E+01 | kg/kg | 2.23E+01 | Ecoinvent V2, shed, CH |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 2.08E+01 | kg/kg | 2.08E+01 | Ecoinvent V2, shed, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 5.56E-06 | kg/kg | 5.56E-06 | Ecoinvent V2, shed, CH |
| Carbon dioxide, fossil | air | unspecified | kg | . 1 | kg CO2-Eq | 1.65E+02 | kg/kg | 1.65E+02 | Ecoinvent V2, shed, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 1.57E-02 | kg/kg | 2.46E-02 | Ecoinvent V2, shed, CH |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 2.28E-01 | kg/kg | 3.58E-01 | Ecoinvent V2, shed, CH |
| Carbon monoxide, fossil Carbon monoxide, fossil | air air | lower stratosphere + upper troposphere unspecified | kg ka | 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq | 6.53E-09 4.07E-01 | kg/kg kg/kg | 1.03E-08 6.40E-01 | Ecoinvent V2, shed, CH Ecoinvent V2, shed, CH |
| Chloroform | air | high population density | kg kg | 30 | kg CO2-Eq | 2.88E-08 | kg/kg kg/kg | 8.63E-07 | Ecoinvent V2, shed, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 7.19E-10 | kg/kg | 2.16E-08 | Econivent V2, shed, CH |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 8.71E-16 | kg/kg | 2.61E-14 | Ecoinvent V2, shed, CH |
| Dinitrogen monoxide | air | high population density | kg | 298 | ka CO2-Ea | 3.04E-03 | kg/kg | 9.06E-01 | Ecoinvent V2, shed, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eg | 6.68E-04 | kg/kg | 1.99E-01 | Ecoinvent V2, shed, CH |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 5.29E-11 | kg/kg | 1.58E-08 | Ecoinvent V2, shed, CH |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 1.07E-03 | kg/kg | 3.19E-01 | Ecoinvent V2, shed, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 1.18E-09 | kg/kg | 1.68E-06 | Ecoinvent V2, shed, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 2.90E-08 | kg/kg | 4.15E-05 | Ecoinvent V2, shed, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 4.15E-05 | kg/kg | 5.94E-02 | Ecoinvent V2, shed, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 4.58E-10 | kg/kg | 2.80E-06 | Ecoinvent V2, shed, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, shed, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 2.25E-08 | kg/kg | 2.80E-06 | Ecoinvent V2, shed, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | 5 505 07 | kg/kg | 0.00E+00 | Ecoinvent V2, shed, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 5.52E-07 | kg/kg | 5.52E-03 | Ecoinvent V2, shed, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 12200 | kg CO2-Eq kg CO2-Eq | 3.21E-08 | kg/kg | 0.00E+00 3.91E-04 | Ecoinvent V2, shed, CH Ecoinvent V2, shed, CH |
| Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 | air air | high population density unspecified | kg | 12200 | kg CO2-Eq | 1.78E-06 | kg/kg kg/kg | 2.17E-02 | Ecoinvent V2, shed, CH |
| Methane, biogenic | air | high population density | kg kg | 25 | kg CO2-Eq | 6.71E-04 | kg/kg | 1.68E-02 | Econivent V2, shed, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 9.48E-04 | kg/kg | 2.37E-02 | Ecoinvent V2, shed, CH |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 2.69E-04 | kg/kg | 6.73E-03 | Ecoinvent V2, shed, CH |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 2.36E-15 | kg/kg | 1.18E-14 | Ecoinvent V2, shed, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 2.82E-07 | kg/kg | 5.32E-04 | Ecoinvent V2, shed, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eg | 7.23E-13 | kg/kg | 5.16E-09 | Ecoinvent V2, shed, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 8.67E-07 | kg/kg | 6.19E-03 | Ecoinvent V2, shed, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 4.48E-08 | kg/kg | 8.10E-05 | Ecoinvent V2, shed, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.12E-06 | kg/kg | 2.02E-03 | Ecoinvent V2, shed, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, shed, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 1.90E-09 | kg/kg | 1.66E-08 | Ecoinvent V2, shed, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 2.13E-09 | kg/kg | 1.85E-08 | Ecoinvent V2, shed, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.76E-09 | kg/kg | 1.92E-05 | Ecoinvent V2, shed, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 9.56E-10 | kg/kg | 1.04E-05 | Ecoinvent V2, shed, CH |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorofluoro-, HCFC-21 | air | unspecified | kg | 10900 210 | kg CO2-Eq kg CO2-Eq | 1.57E-15 3.35E-12 | kg/kg | 1.71E-11 7.03E-10 | Ecoinvent V2, shed, CH Ecoinvent V2, shed, CH |
| Methane, fossil | air air | high population density high population density | kg kg | 25 | kg CO2-Eq | 2.13E-02 | kg/kg kg/kg | 5.32E-01 | Ecoinvent V2, shed, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 2.36E-01 | kg/kg | 5.89E+00 | Ecoinvent V2. shed, CH |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 8.82E-11 | kg/kg | 2.20E-09 | Ecoinvent V2, shed, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 5.66E-03 | kg/kg | 1.42E-01 | Ecoinvent V2, shed, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 4.98E-07 | kg/kg | 6.97E-04 | Ecoinvent V2, shed, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 7.02E-13 | kg/kg | 9.82E-10 | Ecoinvent V2, shed, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.16E-09 | kg/kg | 8.57E-06 | Ecoinvent V2, shed, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 1.60E-05 | kg/kg | 1.18E-01 | Ecoinvent V2, shed, CH |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 5.44E-12 | kg/kg | 2.58E-08 | Ecoinvent V2, shed, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 1.07E-09 | kg/kg | 1.58E-05 | Ecoinvent V2, shed, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, shed, CH |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 2.34E-07 | kg/kg | 5.34E-03 | Ecoinvent V2, shed, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 3.67E-06 | kg/kg | 8.38E-02 | Ecoinvent V2, shed, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 7.71E-11 | kg/kg | 1.00E-09 | Ecoinvent V2, shed, CH |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 3.88E-09 | kg/kg | 5.05E-08 | Ecoinvent V2, shed, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 2.47E-03 | kg/kg | 2.47E-03 | Ecoinvent V2, shed, CH |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 2.17E+02 | Ecoinvent V2, shed, CH |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 1.79E-03 | kg/kg | 2.17E+02 3.37E-03 | Ecoinvent V2, shed, CH |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 5.07E-04 | kg/kg | 9.53E-04 | Econivent V2, shed, CH Econivent V2, shed, CH |
| Ammonia | air | unspecified | ka | 1.88 | kg SO2-Eq | 1.02E-02 | kg/kg | 1.92E-02 | Ecoinvent V2, shed, CH |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 4.81E-04 | kg/kg | 4.23E-04 | Ecoinvent V2, shed, CH |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 1.14E-03 | kg/kg | 1.00E-03 | Ecoinvent V2, shed, CH |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 2.58E-03 | kg/kg | 2.27E-03 | Ecoinvent V2, shed, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.96E-05 | kg/kg | 3.14E-05 | Ecoinvent V2, shed, CH |
| | | * · · · · · · · · · · · · · · · · · · · | - | | - | | | | |

| Hydrogen fluoride | air | low population density | ka | 1.6 | kg SO2-Eq | 2.65E-04 | kg/kg | 4.24E-04 | Ecoinvent V2, shed, CH |
|--|-------------|-----------------------------------|-----|--------|-----------|----------|--------|----------|------------------------|
| Hydrogen fluoride | air | unspecified | ka | 1.6 | kg SO2-Eg | 1.50E-04 | kg/kg | 2.40E-04 | Ecoinvent V2, shed, CH |
| Hydrogen sulfide | air | high population density | ka | 1.88 | kg SO2-Eg | 1.49E-04 | kg/kg | 2.80E-04 | Ecoinvent V2, shed, CH |
| Hydrogen sulfide | air | low population density | ka | 1.88 | kg SO2-Eq | 2.69E-04 | kg/kg | 5.06E-04 | Ecoinvent V2, shed, CH |
| Hydrogen sulfide | air | unspecified | ka | 1.88 | kg SO2-Eg | 7.86E-05 | kg/kg | 1.48E-04 | Ecoinvent V2, shed, CH |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eg | 6.11E-02 | kg/kg | 4.27E-02 | Ecoinvent V2, shed, CH |
| Nitrogen oxides | air | low population density | ka | 0.7 | kg SO2-Eg | 7.20E-02 | kg/kg | 5.04E-02 | Ecoinvent V2. shed. CH |
| Nitrogen oxides | air | unspecified | ka | 0.7 | kg SO2-Eg | 5.18E-01 | kg/kg | 3.62E-01 | Ecoinvent V2. shed. CH |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eg | 4.74E-02 | kg/kg | 4.74E-02 | Ecoinvent V2, shed, CH |
| Sulfur dioxide | air | low population density | ka | 1 | kg SO2-Eg | 1.66E-01 | kg/kg | 1.66E-01 | Ecoinvent V2. shed. CH |
| Sulfur dioxide | air | unspecified | ka | 1 | kg SO2-Eg | 7.14E-02 | kg/kg | 7.14E-02 | Ecoinvent V2. shed. CH |
| Hydrogen sulfide | water | river | ka | 1.88 | kg SO2-Eq | 8.15E-06 | kg/kg | 1.53E-05 | Ecoinvent V2, shed, CH |
| Sulfuric acid | soil | agricultural | ka | 0.65 | kg SO2-Eq | 1.25E-11 | kg/kg | 8.13E-12 | Ecoinvent V2, shed, CH |
| Phosphoric acid | air | high population density | ka | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, shed, CH |
| Sulfuric acid | air | low population density | ka | 0.65 | kg SO2-Eq | 2.24E-11 | kg/kg | 1.46E-11 | Ecoinvent V2, shed, CH |
| | | ien popularion, | 9 | | 91 | | | 7.70E-01 | |
| Phosphorus | air | high population density | ka | 3.06 | kg PO4-Eg | 1.42E-05 | kg/kg | 4.36E-05 | Ecoinvent V2, shed, CH |
| Phosphorus | air | low population density | ka | 3.06 | kg PO4-Eg | 3.84E-07 | kg/kg | 1.18E-06 | Ecoinvent V2, shed, CH |
| Phosphorus | air | low population density, long-term | ka | 3.06 | kg PO4-Eg | 9.46E-07 | kg/kg | 2.89E-06 | Ecoinvent V2, shed, CH |
| Phosphorus | air | unspecified | ka | 3.06 | kg PO4-Eg | 5.16E-09 | kg/kg | 1.58E-08 | Ecoinvent V2, shed, CH |
| Phosphorus | soil | agricultural | ka | 3.06 | kg PO4-Eg | 7.66E-06 | kg/kg | 2.34E-05 | Ecoinvent V2, shed, CH |
| Phosphorus | soil | industrial | ka | 3.06 | kg PO4-Eg | 2.20E-05 | kg/kg | 6.73E-05 | Ecoinvent V2, shed, CH |
| BOD5, Biological Oxygen Demand | water | river | ka | 0.022 | ka PO4-Ea | 1.46E-01 | kg/kg | 3.21E-03 | Ecoinvent V2, shed, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | ka | 0.022 | ka PO4-Ea | 1.56E-03 | kg/kg | 3.43E-05 | Ecoinvent V2, shed, CH |
| COD, Chemical Oxygen Demand | water | river | ka | 0.022 | ka PO4-Ea | 1.92E-01 | kg/kg | 4.22E-03 | Ecoinvent V2, shed, CH |
| COD, Chemical Oxygen Demand | water | unspecified | ka | 0.022 | kg PO4-Eg | 1.67E-03 | kg/kg | 3.68E-05 | Ecoinvent V2, shed, CH |
| Phosphate | water | river | ka | 1 | kg PO4-Eg | 6.90E-05 | kg/kg | 6.90E-05 | Ecoinvent V2, shed, CH |
| Phosphorus | water | river | ka | 3.06 | kg PO4-Eg | 7.05E-05 | kg/kg | 2.16E-04 | Ecoinvent V2, shed, CH |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eg | 3.78E-06 | kg/kg | 1.16E-05 | Ecoinvent V2, shed, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, shed, CH |
| • | | 0 1 1 | ŭ | | | | 0 0 | 7.94E-03 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 7.18E+00 | kg/kg | 7.10E+01 | Ecoinvent V2, shed, CH |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 1.99E+01 | kg/kg | 3.80E+02 | Ecoinvent V2, shed, CH |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 2.49E-01 | Nm3/kg | 9.89E+00 | Ecoinvent V2, shed, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 7.89E+00 | Nm3/kg | 3.02E+02 | Ecoinvent V2, shed, CH |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 2.09E+01 | kg/kg | 9.55E+02 | Ecoinvent V2, shed, CH |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 9.36E-03 | kg/kg | 9.26E-02 | Ecoinvent V2, shed, CH |
| | | | | | | | | 1.72E+03 | |

AF6 Construct machinery see building, hall, AF1 storage

hack to ton

| _ | Construct watering | | | | | | | | Ecoinvent V2, water supply network, CH |
|--|--------------------------------|--|------|----------|------------------------|----------------------|----------------|----------------------|---|
| AF7 | facilities | Ecoinvent V2, water supply network, CH | | | | | | | |
| | water supply network Materials | s, transports, disposal for the infrastructure. Estimation for building proc | ess. | | | | | | |
| back to top | | No land use for construction work. | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 8.84E+03 | kg/km | 8.84E+03 | Ecoinvent V2, water supply network, CH |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 9.19E+03 | kg/km | 9.19E+03 | Ecoinvent V2, water supply network, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 6.92E-04 | kg/km | 6.92E-04 | Ecoinvent V2, water supply network, CH |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 2.34E+04 | kg/km | 2.34E+04 | Ecoinvent V2, water supply network, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 5.73E+00 | kg/km | 9.00E+00 | Ecoinvent V2, water supply network, CH |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 2.12E+01 | kg/km | 3.33E+01 | Ecoinvent V2, water supply network, CH |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 8.13E-07 | kg/km | 1.28E-06 | Ecoinvent V2, water supply network, CH |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 5.18E+02 | kg/km | 8.14E+02 | Ecoinvent V2, water supply network, CH |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 1.73E-03 | kg/km | 5.20E-02 | Ecoinvent V2, water supply network, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 4.16E-07 | kg/km | 1.25E-05 | Ecoinvent V2, water supply network, CH |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 2.42E-12 | kg/km | 7.25E-11 | Ecoinvent V2, water supply network, CH |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 3.19E-01 | kg/km | 9.51E+01 | Ecoinvent V2, water supply network, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 1.32E-01 | kg/km | 3.94E+01 | Ecoinvent V2, water supply network, CH |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 6.59E-09 | kg/km | 1.96E-06 | Ecoinvent V2, water supply network, CH |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 3.28E-01 | kg/km | 9.77E+01 | Ecoinvent V2, water supply network, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 4.16E-04 | kg/km | 5.95E-01 | Ecoinvent V2, water supply network, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 5.03E-06 | kg/km | 7.19E-03 | Ecoinvent V2, water supply network, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 1.79E-03 | kg/km | 2.56E+00 | Ecoinvent V2, water supply network, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eg | 5.43E-08 | kg/km | 3.33E-04 | Ecoinvent V2, water supply network, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/km | 0.00E+00 | Ecoinvent V2, water supply network, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 6.17E-06 | kg/km | 7.65E-04 | Ecoinvent V2, water supply network, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eg | | kg/km | 0.00E+00 | Ecoinvent V2, water supply network, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eg | 8.73E-05 | kg/km | 8.73E-01 | Econvent V2, water supply network, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | ka | 609 | kg CO2-Eg | | kg/km | 0.00E+00 | Ecoinvent V2, water supply network, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | ka | 12200 | kg CO2-Eq | 3.89E-06 | kg/km | 4.75E-02 | Ecoinvent V2, water supply network, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | ka | 12200 | kg CO2-Eg | 1.79E-04 | ka/km | 2.18E+00 | Ecoinvent V2, water supply network, CH |
| Methane, biogenic | air | high population density | ka | 25 | kg CO2-Eg | 1.84E-01 | kg/km | 4.60E+00 | Ecoinvent V2, water supply network, CH |
| Methane, biogenic | air | low population density | ka | 25 | kg CO2-Eg | 1.15E-01 | kg/km | 2.87E+00 | Ecoinvent V2, water supply network, CH |
| Methane, biogenic | air | unspecified | ka | 25 | kg CO2-Eg | 9.17E-02 | kg/km | 2.29E+00 | Ecoinvent V2, water supply network, CH |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 6.55E-12 | kg/km | 3.27E-11 | Ecoinvent V2, water supply network, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | ka | 1890 | kg CO2-Eq | 8.69E-05 | kg/km | 1.64E-01 | Ecoinvent V2, water supply network, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | ka | 7140 | kg CO2-Eq | 7.12E-10 | kg/km | 5.08E-06 | Ecoinvent V2, water supply network, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | ka | 7140 | kg CO2-Eq | 1.34E-04 | kg/km | 9.58E-01 | Ecoinvent V2, water supply network, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | ka | 1810 | kg CO2-Eq | 5.90E-03 | kg/km | 1.07E+01 | Ecoinvent V2, water supply network, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | ka | 1810 | kg CO2-Eq | 3.50E-04 | kg/km | 6.33E-01 | Ecoinvent V2, water supply network, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | ka | 14400 | kg CO2-Eq | 0.002 04 | kg/km | 0.00E+00 | Ecoinvent V2, water supply network, CH |
| Methane, dichloro-, HCC-30 | air | high population density | ka | 8.7 | kg CO2-Eq | 9.83E-05 | kg/km | 8.55E-04 | Ecoinvent V2, water supply network, CH |
| Methane, dichloro-, HCC-30 | air | low population density | ka | 8.7 | kg CO2-Eq | 1.23E-06 | kg/km | 1.07E-05 | Ecoinvent V2, water supply network, CH Ecoinvent V2, water supply network, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | ka | 10900 | kg CO2-Eq | 1.37E-04 | kg/km | 1.49E+00 | Ecoinvent V2, water supply network, CH Ecoinvent V2, water supply network, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | ka | 10900 | kg CO2-Eq | 3.03E-07 | kg/km | 3.30E-03 | Ecoinvent V2, water supply retwork, CH Ecoinvent V2, water supply retwork, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | ka | 10900 | kg CO2-Eq | 4.35E-12 | kg/km | 4.75E-08 | Econinvent V2, water supply network, CH Econinvent V2, water supply network, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | ka | 210 | kg CO2-Eq ka CO2-Ea | 4.35E-12 1.18E-06 | kg/km | 4.75E-06 2.48E-04 | Ecoinvent V2, water supply network, CH Ecoinvent V2, water supply network, CH |
| Methane, dichlorofluoro-, HCFC-21 | all | | kg | 25 | kg CO2-Eq | 1.18E-06 1.93E+01 | kg/km ka/km | 4.82E+02 | |
| Methane, fossil | air air | high population density | kg | 25 25 | kg CO2-Eq | 1.93E+01 1.09E+02 | kg/km ka/km | 4.82E+02 2.72E+03 | Ecoinvent V2, water supply network, CH |
| Methane, fossil | air | low population density | kg | 25 25 | | 1.09E+02 1.10E-08 | kg/km ka/km | 2.72E+03 2.75E-07 | Ecoinvent V2, water supply network, CH |
| wiethane, rossii | aır | lower stratosphere + upper troposphere | кд | 25 | kg CO2-Eq | 1.10E-08 | kg/km | 2./5E-U/ | Ecoinvent V2, water supply network, CH |

| Methane, fossil Methane, tetrachloro-, R-10 Methane, tetrachloro-, R-10 Methane, tetrafluoro-, R-14 Methane, tetrafluoro-, R-14 Methane, trichlorofluoro-, CFC-11 Methane, trifluoro-, HFC-23 Sulfur hexafluoride Sulfur hexafluoride Sulfur hexafluoride Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air air air air air air air air | unspecified high population density unspecified high population density unspecified high population density unspecified high population density high population density high population density low population density unspecified high population density | kg kg kg kg kg kg kg | 25 1400 1400 7390 7390 4750 14800 22800 22800 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 4.97E-01 2.26E-04 1.95E-09 3.17E-07 1.61E-03 1.92E-06 3.77E-04 | kg/km kg/km kg/km kg/km kg/km kg/km | 1.24E+01 3.16E-01 2.73E-06 2.35E-03 1.19E+01 9.12E-03 | Ecoinvent V2, water supply network, CH |
|---|--|--|--|---|--|--|--|--|---|
| Methane, tetrachloro-, R-10 Methane, tetrafluoro-, R-14 Methane, tetrafluoro-, R-14 Methane, trichlorofluoro-, CFC-11 Methane, trifluoro-, HFC-23 Sulfur hexafluoride Sulfur hexafluoride Sulfur hexafluoride Sulfur hexafluoride Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air air air air air air air air | unspecified high population density unspecified high population density high population density high population density low population density unspecified | kg kg kg kg kg kg | 1400 7390 7390 4750 14800 22800 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 1.95E-09 3.17E-07 1.61E-03 1.92E-06 | kg/km kg/km kg/km | 2.73E-06 2.35E-03 1.19E+01 | Ecoinvent V2, water supply network, CH Ecoinvent V2, water supply network, CH Ecoinvent V2, water supply network, CH |
| Methane, tetrafluoro-, R-14 Methane, tetrafluoro-, R-14 Methane, trichlorofluoro-, CFC-11 Methane, trichlorofluoro-, CFC-11 Methane, trifluoro-, HFC-23 Sulfur hexafluoride Sulfur hexafluoride Sulfur hexafluoride Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air air air air air air air | high population density unspecified high population density high population density high population density high population density low population density unspecified | kg kg kg kg kg kg | 7390 7390 4750 14800 22800 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 3.17E-07 1.61E-03 1.92E-06 | kg/km kg/km | 2.35E-03 1.19E+01 | Ecoinvent V2, water supply network, CH Ecoinvent V2, water supply network, CH |
| Methane, tetrafluoro-, R-14 Methane, trichlorofluoro-, CFC-11 Methane, trifluoro-, HFC-23 Sulfur hexafluoride Sulfur hexafluoride Sulfur hexafluoride Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air air air air air air | unspecified high population density high population density high population density low population density unspecified | kg kg kg kg kg | 7390 4750 14800 22800 | kg CO2-Eq kg CO2-Eq kg CO2-Eq | 1.61E-03 1.92E-06 | kg/km | 1.19E+01 | Ecoinvent V2, water supply network, CH |
| Methane, trichlorofluoro-, CFC-11 Methane, trifluoro-, HFC-23 Sulfur hexafluoride Sulfur hexafluoride Sulfur hexafluoride Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air air air air air | high population density high population density high population density low population density unspecified | kg kg kg kg | 4750 14800 22800 | kg CO2-Eq kg CO2-Eq | 1.92E-06 | | | |
| Methane, trifluoro-, HFC-23 Sulfur hexafluoride Sulfur hexafluoride Sulfur hexafluoride Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air air air air air | high population density high population density high population density low population density unspecified | kg kg kg | 14800 22800 | kg CO2-Eq kg CO2-Eq | | | 9.12E-03 | |
| Methane, trifluoro-, HFC-23 Sulfur hexafluoride Sulfur hexafluoride Sulfur hexafluoride Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air air air air | high population density high population density low population density unspecified | kg kg kg | 14800 22800 | kg CO2-Eq | | | | |
| Sulfur hexafluoride Sulfur hexafluoride Sulfur hexafluoride Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air air air air | high population density low population density unspecified | kg kg | 22800 | | | kg/km | 5.57E+00 | Ecoinvent V2, water supply network, CH |
| Sulfur hexafluoride Sulfur hexafluoride Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air air air | low population density unspecified | kg | | ka CO2-Ea | 0.772 04 | kg/km | 0.00E+00 | Ecoinvent V2, water supply network, CH |
| Sulfur hexafluoride Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air air | unspecified | · · · · · · · · · · · · · · · · · · · | | kg CO2-Eq | 6.48E-07 | kg/km | 1.48E-02 | |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air | | | | kg CO2-Eq | | | | Ecoinvent V2, water supply network, CH |
| Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air | high population density | 3 | 22800 | kg CO2-Eq | 1.05E-03 | kg/km | 2.39E+01 | Ecoinvent V2, water supply network, CH |
| Carbon dioxide, land transformation | air | 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | kg | 13 | kg CO2-Eq | 6.29E-09 | kg/km | 8.17E-08 | Ecoinvent V2, water supply network, CH |
| | | low population density | kg | 13 | kg CO2-Eq | 2.25E-06 | kg/km | 2.92E-05 | Ecoinvent V2, water supply network, CH |
| | _1_ | low population density | kg | 1 | kg CO2-Eq | 6.19E-01 | kg/km | 6.19E-01 | Ecoinvent V2, water supply network, CH |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/km | 0.00E+00 | Ecoinvent V2, water supply network, CH |
| | | , , , , , , , , , , , , , , , , , , , | 9 | | | | | 4.58E+04 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eg | 1.56E-01 | kg/km | 2.94E-01 | Ecoinvent V2, water supply network, CH |
| Ammonia | air | low population density | ka | 1.88 | kg SO2-Eq | 2.06E-01 | kg/km | 3.87E-01 | Ecoinvent V2, water supply network, CH |
| Ammonia | air | unspecified | ka | 1.88 | kg SO2-Eq | 1.82E+00 | kg/km | 3.41E+00 | Ecoinvent V2, water supply network, CH |
| | air | | 9 | | | | | | |
| Hydrogen chloride | | high population density | kg | 0.88 | kg SO2-Eq | 2.01E-01 | kg/km | 1.77E-01 | Ecoinvent V2, water supply network, CH |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 4.92E-01 | kg/km | 4.33E-01 | Ecoinvent V2, water supply network, CH |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 9.57E-01 | kg/km | 8.43E-01 | Ecoinvent V2, water supply network, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 7.73E-03 | kg/km | 1.24E-02 | Ecoinvent V2, water supply network, CH |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 1.06E-01 | kg/km | 1.69E-01 | Ecoinvent V2, water supply network, CH |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eg | 2.21E-01 | kg/km | 3.54E-01 | Ecoinvent V2, water supply network, CH |
| Hydrogen sulfide | air | high population density | ka | 1.88 | ka SO2-Ea | 3.89E-04 | kg/km | 7.31E-04 | Ecoinvent V2, water supply network, CH |
| Hydrogen sulfide | air | low population density | ka | 1.88 | kg SO2-Eq | 3.48E-01 | kg/km | 6.55E-01 | Ecoinvent V2, water supply network, CH |
| | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.68E-01 | kg/km | 3.16E-01 | Ecoinvent V2, water supply network, CH |
| Hydrogen sulfide | u.i. | | kg I | | | | | | |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 1.20E+01 | kg/km | 8.37E+00 | Ecoinvent V2, water supply network, CH |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 3.60E+01 | kg/km | 2.52E+01 | Ecoinvent V2, water supply network, CH |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 1.15E+02 | kg/km | 8.04E+01 | Ecoinvent V2, water supply network, CH |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 1.50E+01 | kg/km | 1.50E+01 | Ecoinvent V2, water supply network, CH |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 5.20E+01 | kg/km | 5.20E+01 | Ecoinvent V2, water supply network, CH |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eg | 2.75E+01 | kg/km | 2.75E+01 | Ecoinvent V2, water supply network, CH |
| Hydrogen sulfide | water | river | ka | 1.88 | kg SO2-Eg | 1.77E-02 | kg/km | 3.33E-02 | Ecoinvent V2, water supply network, CH |
| Sulfuric acid | soil | agricultural | ka | 0.65 | kg SO2-Eg | 1.48E-09 | kg/km | 9.64E-10 | Ecoinvent V2, water supply network, CH |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | 1.402 00 | kg/km | 0.00E+00 | Ecoinvent V2, water supply network, CH |
| | air | | ka | 0.65 | | 6.13E-09 | kg/km | | |
| Sulfuric acid | aır | low population density | кд | 0.65 | kg SO2-Eq | 6.13E-09 | kg/km | 3.98E-09 | Ecoinvent V2, water supply network, CH |
| | | | | | | | | 2.16E+02 | |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 8.11E-04 | kg/km | 2.48E-03 | Ecoinvent V2, water supply network, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 7.36E-04 | kg/km | 2.25E-03 | Ecoinvent V2, water supply network, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 1.65E-04 | kg/km | 5.04E-04 | Ecoinvent V2, water supply network, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 5.10E-07 | kg/km | 1.56E-06 | Ecoinvent V2, water supply network, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eg | 2.33E-03 | kg/km | 7.14E-03 | Ecoinvent V2, water supply network, CH |
| Phosphorus | soil | industrial | ka | 3.06 | kg PO4-Eg | 5.46E-03 | kg/km | 1.67E-02 | Ecoinvent V2, water supply network, CH |
| BOD5, Biological Oxygen Demand | water | river | ka | 0.022 | kg PO4-Eq | 3.94E+01 | kg/km | 8.66E-01 | Ecoinvent V2, water supply network, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | ka | 0.022 | kg PO4-Eq | 2.28E+00 | kg/km | 5.02E-02 | Ecoinvent V2, water supply network, CH Ecoinvent V2, water supply network, CH |
| | | · | kg | | | | | | |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 4.97E+01 | kg/km | 1.09E+00 | Ecoinvent V2, water supply network, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 2.29E+00 | kg/km | 5.04E-02 | Ecoinvent V2, water supply network, CH |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.04E-02 | kg/km | 1.04E-02 | Ecoinvent V2, water supply network, CH |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 1.08E-01 | kg/km | 3.30E-01 | Ecoinvent V2, water supply network, CH |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 6.23E-05 | kg/km | 1.91E-04 | Ecoinvent V2, water supply network, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/km | 0.00E+00 | Ecoinvent V2, water supply network, CH |
| | | 3 1 11 | | | 3 | | 3 | 2.43E+00 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 2.85E+03 | kg/km | 2.82E+04 | Ecoinvent V2, water supply network, CH |
| Coal, hard, unspecified, in ground | resource | in ground | ka | 19.1 | MJ-Ea | 1.71E+04 | kg/km | 3.27E+05 | Ecoinvent V2, water supply network, CH |
| | | | | | | | | | |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 1.64E+02 | Nm3/km | 6.51E+03 | Ecoinvent V2, water supply network, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 2.55E+03 | Nm3/km | 9.75E+04 | Ecoinvent V2, water supply network, CH |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 4.20E+03 | kg/km | 1.92E+05 | Ecoinvent V2, water supply network, CH |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 3.21E-01 | kg/km | 3.18E+00 | Ecoinvent V2, water supply network, CH |
| | | | - | | | | | 6.51E+05 | |

AP1 Construct fences

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AP2 Construct watering see AF7 facilities

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| AP3 | Construct irrigation systems | Ecoinvent V2, pump station, CH | | | | | | | |
|--|------------------------------|---|----|--------|-----------|----------|---------|----------|--------------------------------|
| ick to top | pump station | Materials, transports, disposal for the infrastructure. Estimation for land use. No data for construction work. | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 1.59E+04 | kg/unit | 1.59E+04 | Ecoinvent V2, pump station, CH |
| arbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 1.49E+04 | kg/unit | 1.49E+04 | Ecoinvent V2, pump station, CH |
| arbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 1.79E-03 | kg/unit | 1.79E-03 | Ecoinvent V2, pump station, CH |
| arbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.23E+05 | kg/unit | 1.23E+05 | Ecoinvent V2, pump station, CH |
| arbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 6.99E+00 | kg/unit | 1.10E+01 | Ecoinvent V2, pump station, CH |
| arbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 2.91E+01 | kg/unit | 4.57E+01 | Ecoinvent V2, pump station, CH |
| arbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 2.10E-06 | kg/unit | 3.30E-06 | Ecoinvent V2, pump station, CH |
| arbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 6.77E+02 | kg/unit | 1.06E+03 | Ecoinvent V2, pump station, CH |
| hloroform | air | high population density | kg | 30 | kg CO2-Eq | 1.30E-05 | kg/unit | 3.89E-04 | Ecoinvent V2, pump station, CH |
| hloroform | air | low population density | kg | 30 | kg CO2-Eq | 3.38E-07 | kg/unit | 1.01E-05 | Ecoinvent V2, pump station, CH |
| hloroform | air | unspecified | kg | 30 | kg CO2-Eq | 1.00E-13 | kg/unit | 3.01E-12 | Ecoinvent V2, pump station, CH |
| initrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 5.25E-01 | kg/unit | 1.56E+02 | Ecoinvent V2, pump station, CH |
| initrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 2.60E-01 | kg/unit | 7.75E+01 | Ecoinvent V2, pump station, CH |
| initrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.70E-08 | kg/unit | 5.08E-06 | Ecoinvent V2, pump station, CH |
| initrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 5.37E-01 | kg/unit | 1.60E+02 | Ecoinvent V2, pump station, CH |
| thane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 4.05E-07 | kg/unit | 5.79E-04 | Ecoinvent V2, pump station, CH |
| thane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 1.58E-05 | kg/unit | 2.26E-02 | Ecoinvent V2, pump station, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | ka | 1430 | kg CO2-Eg | 1.68E-02 | kg/unit | 2.41E+01 | Ecoinvent V2, pump station, CH |

| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a | | bish secondation density. | L | 0400 | I 000 F- | 4 445 07 | 1 6 14 | 0.005.04 | |
|--|--|--|--|--|---|--|---|--|---|
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 6130 | kg CO2-Eq | 1.44E-07 | kg/unit | 8.83E-04 | Ecoinvent V2, pump station, CH |
| | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/unit | 0.00E+00 | Ecoinvent V2, pump station, CH |
| Ethane 1 1-diffuoro- HEC-152a | air | high population density | kg | 124 | kg CO2-Eq | 1.28E-05 | kg/unit | 1.59E-03 | Ecoinvent V2, pump station, CH |
| Littatie, 1,1-dilidolo-, 111 C-132a | air | low population density | kg | 124 | kg CO2-Eq | | kg/unit | 0.00E+00 | Ecoinvent V2, pump station, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 2.99E-04 | kg/unit | 2.99E+00 | Ecoinvent V2, pump station, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/unit | 0.00E+00 | Ecoinvent V2, pump station, CH |
| Ethane, hexafluoro-, HFC-116 | air | | kg | 12200 | kg CO2-Eq | 1.02E-05 | kg/unit | 1.25E-01 | Ecoinvent V2, pump station, CH |
| | | high population density | | | | | | | |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 1.05E-03 | kg/unit | 1.28E+01 | Ecoinvent V2, pump station, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 1.79E-02 | kg/unit | 4.47E-01 | Ecoinvent V2, pump station, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 2.52E-01 | kg/unit | 6.30E+00 | Ecoinvent V2, pump station, CH |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 1.58E-01 | kg/unit | 3.95E+00 | Ecoinvent V2, pump station, CH |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 2.72E-13 | kg/unit | 1.36E-12 | Ecoinvent V2, pump station, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 1.69E-04 | kg/unit | 3.20E-01 | Ecoinvent V2, pump station, CH |
| | | | | 7140 | | | | | |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | | kg CO2-Eq | 3.36E-10 | kg/unit | 2.40E-06 | Ecoinvent V2, pump station, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 4.82E-04 | kg/unit | 3.44E+00 | Ecoinvent V2, pump station, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 1.25E-05 | kg/unit | 2.26E-02 | Ecoinvent V2, pump station, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 6.70E-04 | kg/unit | 1.21E+00 | Ecoinvent V2, pump station, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/unit | 0.00E+00 | Ecoinvent V2, pump station, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 8.01E-05 | kg/unit | 6.97E-04 | Ecoinvent V2, pump station, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 1.00E-06 | kg/unit | 8.71E-06 | Ecoinvent V2, pump station, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | | kg | 10900 | kg CO2-Eq | 5.74E-07 | kg/unit | 6.25E-03 | Ecoinvent V2, pump station, CH |
| | | high population density | | | | | | | |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 5.75E-07 | kg/unit | 6.27E-03 | Ecoinvent V2, pump station, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 1.81E-13 | kg/unit | 1.97E-09 | Ecoinvent V2, pump station, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 1.15E-09 | kg/unit | 2.42E-07 | Ecoinvent V2, pump station, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 8.14E+00 | kg/unit | 2.04E+02 | Ecoinvent V2, pump station, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 2.14E+02 | kg/unit | 5.36E+03 | Ecoinvent V2, pump station, CH |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 2.84E-08 | kg/unit | 7.10E-07 | Ecoinvent V2, pump station, CH |
| Methane, fossil | air | | . • | 25 | kg CO2-Eq | 1.42E+00 | kg/unit | 3.56E+01 | |
| Methane, tetrachloro-, R-10 | | unspecified | kg | 1400 | | | | | Ecoinvent V2, pump station, CH |
| | air | high population density | kg | | kg CO2-Eq | 8.01E-05 | kg/unit | 1.12E-01 | Ecoinvent V2, pump station, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 8.07E-11 | kg/unit | 1.13E-07 | Ecoinvent V2, pump station, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 6.59E-07 | kg/unit | 4.87E-03 | Ecoinvent V2, pump station, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 9.41E-03 | kg/unit | 6.95E+01 | Ecoinvent V2, pump station, CH |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.87E-09 | kg/unit | 8.88E-06 | Ecoinvent V2, pump station, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 3.66E-07 | kg/unit | 5.42E-03 | Ecoinvent V2, pump station, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | 0.00E 07 | kg/unit | 0.00E+00 | Ecoinvent V2, pump station, CH |
| | | | | | | 4.075.00 | | | |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.27E-06 | kg/unit | 2.90E-02 | Ecoinvent V2, pump station, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 2.15E-03 | kg/unit | 4.89E+01 | Ecoinvent V2, pump station, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 2.38E-08 | kg/unit | 3.10E-07 | Ecoinvent V2, pump station, CH |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 1.83E-06 | kg/unit | 2.38E-05 | Ecoinvent V2, pump station, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.13E+00 | kg/unit | 1.13E+00 | Ecoinvent V2, pump station, CH |
| Nitrogen fluoride | air | high population density | ka | 17200 | kg CO2-Eq | 11102100 | kg/unit | 0.00E+00 | Ecoinvent V2, pump station, CH |
| Millogen huonde | all | riigii population density | kg | 17200 | ky CO2-Eq | | kg/unit | 1.61E+05 | Econiverti v.z., punip station, Cri |
| Ammonia | o in | high population density | ka | 4.00 | ka CO2 Fa | 2.67E.04 | ka/unit | | Facinizat V2 numb station CH |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 2.67E-01 | kg/unit | 5.02E-01 | Ecoinvent V2, pump station, CH |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 2.81E-01 | kg/unit | 5.27E-01 | Ecoinvent V2, pump station, CH |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 7.96E+00 | kg/unit | 1.50E+01 | Ecoinvent V2, pump station, CH |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 6.08E-01 | kg/unit | 5.35E-01 | Ecoinvent V2, pump station, CH |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 7.03E-01 | kg/unit | 6.18E-01 | Ecoinvent V2, pump station, CH |
| Hydrogen chloride | air | unspecified | ka | 0.88 | kg SO2-Eg | 1.91E+00 | kg/unit | 1.68E+00 | Ecoinvent V2, pump station, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 2.39E-02 | kg/unit | 3.82E-02 | Ecoinvent V2, pump station, CH |
| | oir. | | leg leg | 1.6 | kg SO2-Eq | 1.57E-01 | kg/unit | 2.52E-01 | |
| Hydrogen fluoride | all | low population density | kg | | | | | | Ecoinvent V2, pump station, CH |
| Hydrogen fluoride | air | unspecified | кg | 1.6 | kg SO2-Eq | 2.43E-01 | kg/unit | 3.89E-01 | Ecoinvent V2, pump station, CH |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 2.34E-04 | kg/unit | 4.40E-04 | Ecoinvent V2, pump station, CH |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 4.13E-01 | kg/unit | 7.77E-01 | Ecoinvent V2, pump station, CH |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.83E-01 | kg/unit | 3.44E-01 | Ecoinvent V2, pump station, CH |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 1.93E+01 | kg/unit | 1.35E+01 | Ecoinvent V2, pump station, CH |
| Nitrogen oxides | air | low population density | ka | 0.7 | | | | | |
| | oir | | | | Ka SO2-Fa | | | | |
| Nitrogen ovides | | unenecified | ka | | kg SO2-Eq | 6.08E+01 | kg/unit | 4.26E+01 | Ecoinvent V2, pump station, CH |
| Nitrogen oxides | all | unspecified | kg | 0.7 | kg SO2-Eq | 6.08E+01 3.10E+02 | kg/unit kg/unit | 4.26E+01 2.17E+02 | Ecoinvent V2, pump station, CH Ecoinvent V2, pump station, CH |
| Sulfur dioxide | air | high population density | kg kg | | kg SO2-Eq kg SO2-Eq | 6.08E+01 3.10E+02 2.54E+01 | kg/unit kg/unit kg/unit | 4.26E+01 2.17E+02 2.54E+01 | Ecoinvent V2, pump station, CH Ecoinvent V2, pump station, CH Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide | air | high population density low population density | kg kg kg | | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 | kg/unit kg/unit kg/unit kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide | air air | high population density low population density unspecified | kg kg kg | 0.7 1 1 1 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 | kg/unit kg/unit kg/unit kg/unit kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide | air | high population density low population density | kg kg kg kg kg | 0.7 1 1 1 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 | kg/unit kg/unit kg/unit kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide | air air | high population density low population density unspecified | kg kg kg | 0.7 1 1 1 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 | kg/unit kg/unit kg/unit kg/unit kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide | air air water | high population density low population density unspecified river agricultural | kg kg kg | 0.7 1 1 1 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 | kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid | air air water soil | high population density low population density unspecified river agricultural high population density | kg kg kg kg kg | 0.7 1 1 1 1.88 0.65 0.98 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 | kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid | air air water soil | high population density low population density unspecified river agricultural | kg kg kg kg kg | 0.7 1 1 1 1.88 0.65 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 | kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid | air air water soil air air | high population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg | 0.7 1 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 | kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air air water soil | high population density low population density unspecified river agricultural high population density low population density high population density | kg kg kg kg kg | 0.7 1 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 | kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus | air air water soil air air air | high population density low population density unspecified river agricultural high population density low population density high population density low population density | kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus | air air water soil air air air air | high population density low population density unspecified river agricultural high population density low population density low population density low population density low population density | kg kg kg kg kg kg kg | 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air air water soil air air air air air | high population density low population density unspecified river agricultural high population density low population density high population density high population density low population density | kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus | air air water soil air air air air | high population density low population density unspecified river agricultural high population density low population density low population density low population density low population density | kg kg kg kg kg kg kg | 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air air water soil air air air air air soil | high population density low population density unspecified river agricultural high population density low population density low population density low population density low population density unspecified agricultural | kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air air water soil air air air air air air soil | high population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg | 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOBS, Biological Oxygen Demand | air air water soil air air air air air soil soil water | high population density low population density unspecified river agricultural high population density low population density high population density low population density | kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand | air air water soil air air air air air air soil soil water | high population density low population density unspecified river agricultural high population density low population density river unspecified | kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-00 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | air air water soil air air air air air soil soil water water | high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified river | kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus ODS, Biological Oxygen Demand ODD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | air air water soil air air air air air air soil soil water water water | high population density low population density unspecified river agricultural high population density low population density high population density low population density river unspecified agricultural industrial river unspecified river unspecified | kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | air air water soil air air air air air soil soil water water | high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified river | kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 3.74E-02 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus ODS, Biological Oxygen Demand DODS, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | air air water soil air air air air air air soil soil water water water | high population density low population density unspecified river agricultural high population density low population density high population density low population density river unspecified agricultural industrial river unspecified river unspecified | kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | air air water soil air air air air air soil soil water | high population density low population density unspecified river agricultural high population density low population density high population density low population density low population density low population density low population density in density low population density low population density river population density unspecified agricultural industrial river unspecified river unspecified river river | kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 3.09E-02 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 3.74E-02 9.45E-02 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus ODS, Biological Oxygen Demand OD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphorus | air air water soil air air air air air air soil soil water | high population density low population density unspecified river agricultural high population density low population density high population density low population density river unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified | kg kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 3.74E-02 9.45E-02 2.93E-04 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus OD5, Biological Oxygen Demand DD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | air air water soil air air air air air soil soil water | high population density low population density unspecified river agricultural high population density low population density high population density low population density low population density low population density low population density in density low population density low population density river population density unspecified agricultural industrial river unspecified river unspecified river river | kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 3.09E-02 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 9.45E-02 2.93E-04 0.00E+00 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphorical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air air water soil air air air air air air soil soil water | high population density low population density unspecified river agricultural high population density low population density high population density low population density in unspecified agricultural industrial river unspecified | kg kg kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.092 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 9.58E-05 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 9.45E-02 9.45E-02 9.45E-02 0.93E-04 0.00E+00 3.56E+00 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground | air air water soil air air air air air air soil soil water | high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified high population density | kg kg kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 3.09E-02 9.58E-05 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 9.45E-02 2.93E-04 0.00E+00 3.56E+00 4.36E+00 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground | air air water soil air air air air air air air soil soil water air resource resource | high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified river iver unspecified river river unspecified high population density | kg kg kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 3.09E-02 9.58E-05 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 9.45E-02 2.93E-04 0.00E+00 3.56E+00 4.36E+04 4.86E+04 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD | air air water soil air air air air air air soil soil water | high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified river iver unspecified river in river unspecified river in river unspecified river river unspecified high population density in ground in ground | kg k | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 9.58E-05 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E+02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 3.74E-02 9.45E-02 2.93E-04 0.00E+00 3.56E+00 4.36E+04 4.86E+05 1.13E+04 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground | air air water soil air air air air air air air soil soil water air resource resource | high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified river iver unspecified river river unspecified high population density | kg kg kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 3.09E-02 9.58E-05 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 9.45E-02 2.93E-04 0.00E+00 3.56E+00 4.36E+04 4.86E+05 1.13E+04 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, ard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | air air water soil air air air air air air air soil soil water resource resource resource | high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river iver unspecified river iver unspecified river river unspecified river river unspecified high population density in ground in ground in ground in ground | kg k | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 9.58E-05 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E+02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 3.74E-02 9.45E-02 2.93E-04 0.00E+00 3.56E+00 4.36E+04 4.86E+05 1.13E+04 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Phosphorus Phosphoric acid COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | air air water soil air air air air air air air air soil soil water water water water water water water water water exer water soil soil soil water | high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified river iver unspecified river iver unspecified river iver unspecified river river unspecified high population density | kg k | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 9.58E-05 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 9.45E-02 2.93E-04 0.00E+00 3.56E+00 4.36E+04 4.86E+05 1.13E+04 1.84E+05 5.20E+05 | Ecoinvent V2, pump station, CH |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, ard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | air air water soil air air air air air air air soil soil water soil resource resource resource resource | high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river iver unspecified river iver unspecified river river unspecified river river unspecified high population density in ground in ground in ground in ground | kg k | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.08 3 | kg SO2-Eq kg PO4-Eq | 6.08E+01 3.10E+02 2.54E+01 1.56E+02 6.90E+01 1.93E-02 3.94E-09 1.27E-08 1.86E-03 8.19E-04 5.15E-04 3.00E-06 4.07E-03 1.16E-02 6.97E+01 3.34E+00 7.68E+01 3.34E+00 3.74E-02 3.09E-02 9.58E-05 | kg/unit | 4.26E+01 2.17E+02 2.54E+01 1.56E+02 6.90E+01 3.62E-02 2.56E-09 0.00E+00 8.28E-09 5.44E+02 5.68E-03 2.51E-03 1.58E-03 9.17E-06 1.25E-02 3.56E-02 1.53E+00 7.35E-02 1.69E+00 7.34E-02 9.45E-02 2.93E-04 0.00E+00 3.56E+00 4.36E+04 4.86E+05 1.13E+04 | Ecoinvent V2, pump station, CH |

31 Produce Seed

Barley

The inventory includes the processes of soil cultivation, sowing, weed control, fertilization, pest and pathogen control, harvest and grain drying. Machine infrastructure and a shed for machine sheltering is included. Inputs of fertilizers, pesticides and seed as well as grain transports to the regional processing center (10km) are considered. The direct emissions on the field are also included.

Ecoinvent V2, barley grains IP, at farm, CH

| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 5.72E-02 | kg/kg | 5.72E-02 | Ecoinvent V2, barley grains IP, at farm, CH |
|---|---|--|----------------|--------------------|-------------------------------------|----------------------------------|-------------------------|----------------------------------|---|
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 7.52E-02 | kg/kg | 7.52E-02 | Ecoinvent V2, barley grains IP, at farm, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 3.70E-08 | kg/kg | 3.70E-08 | Ecoinvent V2, barley grains IP, at farm, CH |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.31E-02 | kg/kg | 1.31E-02 | Ecoinvent V2, barley grains IP, at farm, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 2.04E-05 | kg/kg | 3.21E-05 | Ecoinvent V2, barley grains IP, at farm, CH |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 1.46E-04 | kg/kg | 2.29E-04 | Ecoinvent V2, barley grains IP, at farm, CH |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 4.35E-11 | kg/kg | 6.83E-11 | Ecoinvent V2, barley grains IP, at farm, CH |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.84E-04 | kg/kg | 2.89E-04 | Ecoinvent V2, barley grains IP, at farm, CH |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 7.04E-11 | kg/kg | 2.11E-09 | Ecoinvent V2, barley grains IP, at farm, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 6.02E-13 | kg/kg | 1.81E-11 | Ecoinvent V2, barley grains IP, at farm, CH |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 1.05E-18 | kg/kg | 3.16E-17 | Ecoinvent V2, barley grains IP, at farm, CH |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 1.85E-04 | kg/kg | 5.51E-02 | Ecoinvent V2, barley grains IP, at farm, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 5.76E-04 | kg/kg | 1.72E-01 | Econivent V2, barley grains Ir, at faint, CH |
| Dinitrogen monoxide | air | | kg | 298 | | 3.53E-13 | kg/kg | 1.05E-10 | |
| | | lower stratosphere + upper troposphere | | 298 | kg CO2-Eq | 4.22E-07 | | | Ecoinvent V2, barley grains IP, at farm, CH |
| Dinitrogen monoxide | air air | unspecified | kg | | kg CO2-Eq | | kg/kg | 1.26E-04 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 7.43E-12 | kg/kg | 1.06E-08 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | | low population density | kg | 1430 | kg CO2-Eq | 2.06E-11 | kg/kg | 2.94E-08 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 1.11E-08 | kg/kg | 1.59E-05 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 3.21E-12 | kg/kg | 1.97E-08 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 1.66E-11 | kg/kg | 2.06E-09 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 3.87E-10 | kg/kg | 3.87E-06 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 2.21E-10 | kg/kg | 2.70E-06 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eg | 4.63E-09 | kg/kg | 5.65E-05 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 3.37E-08 | kg/kg | 8.43E-07 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 6.42E-07 | kg/kg | 1.60E-05 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 2.05E-07 | kg/kg | 5.12E-06 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 2.86E-18 | kg/kg | 1.43E-17 | Econivent V2, barley grains Ir, at farm, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 8.55E-10 | kg/kg | 1.62E-06 | Econvent V2, barley grains IF, at farm, CH |
| | | | | 7140 | | 3.85E-15 | | | |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | | kg CO2-Eq | | kg/kg | 2.75E-11 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.25E-09 | kg/kg | 8.89E-06 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 1.12E-10 | kg/kg | 2.02E-07 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 3.04E-09 | kg/kg | 5.51E-06 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.92E-12 | kg/kg | 2.54E-11 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 1.78E-12 | kg/kg | 1.55E-11 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.54E-11 | kg/kg | 1.68E-07 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 2.96E-12 | kg/kg | 3.23E-08 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 1.90E-18 | kg/kg | 2.07E-14 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 2.11E-14 | kg/kg | 4.44E-12 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 1.10E-05 | kg/kg | 2.75E-04 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 2.20E-04 | kg/kg | 5.50E-03 | Ecoinvent V2, barley grains Ir, at farm, CH |
| Methane, fossil | air | | | 25 | | 5.88E-13 | | 1.47E-11 | |
| | | lower stratosphere + upper troposphere | kg | | kg CO2-Eq | | kg/kg | | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 4.13E-07 | kg/kg | 1.03E-05 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 1.01E-10 | kg/kg | 1.42E-07 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 8.49E-16 | kg/kg | 1.19E-12 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 8.53E-13 | kg/kg | 6.31E-09 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 4.17E-08 | kg/kg | 3.08E-04 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 3.43E-14 | kg/kg | 1.63E-10 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 6.72E-12 | kg/kg | 9.95E-08 | Ecoinvent V2, barley grains IP, at farm, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, barley grains IP, at farm, CH |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 6.73E-12 | kg/kg | 1.53E-07 | Ecoinvent V2, barley grains IP, at farm, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 2.73E-09 | kg/kg | 6.23E-05 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 6.27E-14 | kg/kg | 8.15E-13 | Ecoinvent V2, barley grains IP, at farm, CH |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 3.25E-12 | kg/kg | 4.23E-11 | Ecoinvent V2, barley grains IP, at farm, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 2.03E-05 | kg/kg | 2.03E-05 | Ecoinvent V2, barley grains IP, at farm, CH |
| Nitrogen fluoride | air | high population density | ka | 17200 | kg CO2-Eq | 2.002 00 | kg/kg | 0.00E+00 | Ecoinvent V2, barley grains IP, at farm, CH |
| - This ogot inconce | an en | mgm population donoity | 9 | 11200 | g 002 24 | | ng, ng | 3.79E-01 | |
| Ammonia | air | high population density | ka | 1.88 | kg SO2-Eq | 7.81E-05 | kg/kg | 1.47E-04 | Ecoinvent V2, barley grains IP, at farm, CH |
| Ammonia | air | low population density | ka | 1.88 | kg SO2-Eq | 1.29E-03 | kg/kg | 2.42E-03 | Ecoinvent V2, barley grains IP, at farm, CH |
| | all | | kg | 1.88 | | | | | |
| Ammonia | dii | unspecified | kg | 1.88 0.88 | kg SO2-Eq | 1.92E-06 | kg/kg | 3.61E-06 | Ecoinvent V2, barley grains IP, at farm, CH |
| Hydrogen chloride | alr | high population density | kg | | kg SO2-Eq | 1.08E-06 | kg/kg | 9.47E-07 | Ecoinvent VC, barley grains IP, at farm, CH |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 9.46E-07 | kg/kg | 8.33E-07 | Ecoinvent V2, barley grains IP, at farm, CH |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 5.12E-07 | kg/kg | 4.50E-07 | Ecoinvent V2, barley grains IP, at farm, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 4.16E-07 | kg/kg | 6.66E-07 | Ecoinvent V2, barley grains IP, at farm, CH |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 6.16E-07 | kg/kg | 9.86E-07 | Ecoinvent V2, barley grains IP, at farm, CH |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 1.61E-07 | kg/kg | 2.58E-07 | Ecoinvent V2, barley grains IP, at farm, CH |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 2.77E-09 | kg/kg | 5.20E-09 | Ecoinvent V2, barley grains IP, at farm, CH |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 4.92E-07 | kg/kg | 9.24E-07 | Ecoinvent V2, barley grains IP, at farm, CH |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 4.91E-08 | kg/kg | 9.24E-08 | Ecoinvent V2, barley grains IP, at farm, CH |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 1.64E-04 | kg/kg | 1.15E-04 | Ecoinvent V2, barley grains IP, at farm, CH |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 9.33E-04 | kg/kg | 6.53E-04 | Ecoinvent V2, barley grains IP, at farm, CH |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 7.54E-05 | kg/kg | 5.28E-05 | Ecoinvent V2, barley grains IP, at farm, CH |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 2.20E-04 | kg/kg | 2.20E-04 | Ecoinvent V2, barley grains IP, at farm, CH |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 1.70E-04 | kg/kg | 1.70E-04 | Ecoinvent V2, barley grains IP, at farm, CH |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 9.99E-06 | kg/kg | 9.99E-06 | Ecoinvent V2, barley grains IP, at farm, CH |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 5.07E-09 | kg/kg | 9.52E-09 | Econivent V2, barley grains Ir, at falm, CH |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 8.76E-14 | kg/kg | 5.69E-14 | Econivent V2, barley grains IP, at farm, CH |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | 0.7 JL-14 | kg/kg | 0.00E+00 | Econvent V2, barley grains IP, at farm, CH Econvent V2, barley grains IP, at farm, CH |
| Sulfuric acid | air | low population density | kg kg | 0.65 | kg SO2-Eq | 1.65E-14 | kg/kg kg/kg | 1.07E-14 | Econivent V2, barley grains ir-, at farm, CH Econivent V2, barley grains ir-, at farm, CH |
| Canano acia | all | iow population density | ky | 0.05 | ng GOZ-Eq | 1.03E-14 | ky/ky | 3.80E-03 | Louinveil, v.z., baney glattis ir., at tatili, ori |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 2.93E-09 | kg/kg | 8.95E-09 | Ecoinvent V2, barley grains IP, at farm, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 2.43E-10 | kg/kg | 7.43E-10 | Ecoinvent V2, barley grains IP, at farm, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 6.69E-10 | kg/kg | 2.05E-09 | Ecoinvent V2, barley grains IP, at farm, CH |
| Phosphorus | air | unspecified | kq | 3.06 | kg PO4-Eq | 1.32E-11 | kg/kg | 4.03E-11 | Ecoinvent V2, barley grains II , at farm, CH |
| | soil | agricultural | kg | 3.06 | kg PO4-Eq | 6.02E-09 | kg/kg | 1.84E-08 | Econivent V2, barley grains ir, at farm, CH |
| | soil | industrial | kg kg | 3.06 | kg PO4-Eq | 4.04E-08 | kg/kg kg/kg | 1.24E-07 | Econivert V2, barley grains IP, at farm, CH |
| Phosphorus Phosphorus | | | kg kg | 0.022 | kg PO4-Eq | 2.62E-04 | kg/kg kg/kg | 5.77E-06 | |
| Phosphorus | | river | | | | 2.62E-04 7.54E-07 | | | Ecoinvent V2, barley grains IP, at farm, CH Ecoinvent V2, barley grains IP, at farm, CH |
| Phosphorus BOD5, Biological Oxygen Demand | water | | kg | 0.022 | kg PO4-Eq | | kg/kg | 1.66E-08 | Econyent VZ pariev drains IP at farm CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand | water | unspecified | | 0.000 | | | | | |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | water water | river | kg | 0.022 | kg PO4-Eq | 2.65E-04 | kg/kg | 5.83E-06 | Ecoinvent V2, barley grains IP, at farm, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | water water water | river unspecified | kg kg | 0.022 0.022 | kg PO4-Eq | 7.61E-07 | kg/kg | 1.67E-08 | Ecoinvent V2, barley grains IP, at farm, CH Ecoinvent V2, barley grains IP, at farm, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | water water water water | river unspecified river | kg kg kg | 0.022 1 | kg PO4-Eq kg PO4-Eq | 7.61E-07 1.23E-04 | kg/kg kg/kg | 1.67E-08 1.23E-04 | Ecoinvent V2, barley grains IP, at farm, CH Ecoinvent V2, barley grains IP, at farm, CH Ecoinvent V2, barley grains IP, at farm, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | water water water water water | river unspecified river river | kg kg | 0.022 1 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.61E-07 1.23E-04 1.66E-05 | kg/kg kg/kg kg/kg | 1.67E-08 1.23E-04 5.07E-05 | Ecoinvent V2, barley grains IP, at farm, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | water water water water | river unspecified river | kg kg kg | 0.022 1 | kg PO4-Eq kg PO4-Eq | 7.61E-07 1.23E-04 | kg/kg kg/kg | 1.67E-08 1.23E-04 | Ecoinvent V2, barley grains IP, at farm, CH Ecoinvent V2, barley grains IP, at farm, CH Ecoinvent V2, barley grains IP, at farm, CH |

| Coal, brown, in ground resource Coal, hard, unspecified, in ground resource | igh population density kg in ground kg | g 0.9 | 7 kg PO4-l | Eq | kg/kg 0.00E+00 1.86E-04 | Ecoinvent V2, barley grains IP, at farm, CH |
|---|--|---------|------------|----------|----------------------------|---|
| Coal, hard, unspecified, in ground resource | in ground ko | | | | 1.86F-04 | |
| Coal, hard, unspecified, in ground resource | in ground ko | 0.0 | | | 1.002 04 | |
| | | g 9.9 | MJ-Eq | 5.73E-03 | kg/kg 5.67E-02 | Ecoinvent V2, barley grains IP, at farm, CH |
| One wise off and assessment and assistant | in ground kg | g 19. | 1 MJ-Eq | 8.59E-03 | kg/kg 1.64E-01 | Ecoinvent V2, barley grains IP, at farm, CH |
| Gas, mine, off-gas, process, coal mining resource | in ground Nm | n3 39.8 | 8 MJ-Eq | 8.40E-05 | Nm3/kg 3.34E-03 | Ecoinvent V2, barley grains IP, at farm, CH |
| Gas, natural, in ground resource | in ground Nm | n3 38.2 | 93 MJ-Eq | 1.86E-02 | Nm3/kg 7.14E-01 | Ecoinvent V2, barley grains IP, at farm, CH |
| Oil, crude, in ground resource | in ground kg | g 45.8 | 8 MJ-Eq | 3.08E-02 | kg/kg 1.41E+00 | Ecoinvent V2, barley grains IP, at farm, CH |
| Peat, in ground resource | biotic kg | g 9.9 | MJ-Eq | 1.10E-06 | kg/kg 1.09E-05 | Ecoinvent V2, barley grains IP, at farm, CH |
| | | | | | 2.35E+00 | |

| Barley District D | The seed produced at the farm is transported to the processing centre, treated (precleaning, cleaning, eventually drying, chemical dressing (for integrated production) and bag filling), stored and afterwards transported to the regional storage centre. No data on wastewater production were available. high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density lower stratosphere + upper troposphere | kg kg kg kg | 1 1 1 1 1 | kg CO2-Eq kg CO2-Eq | 6.16E-02 | | | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
|--|--|----------------------|----------------|------------------------|----------------------|----------------|----------------------|---|
| back to top Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon monoxide, fossil air Chloroform air Chloroform air Chloroform air Dinitrogen monoxide air Dinitrogen monoxide air Dinitrogen monoxide air | cleaning, cleaning, eventually drying, chemical dressing (for integrated production) and bag filling), stored and afterwards transported to the regional storage centre. No data on wastewater production were available. high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density low population density lower stratosphere + upper troposphere | kg kg kg | 1 1 1 1 1 | | 6.16E-02 | | | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| back to top Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon monoxide, fossil air Chloroform air Chloroform air Chloroform air Dinitrogen monoxide air Dinitrogen monoxide air Dinitrogen monoxide air | cleaning, cleaning, eventually drying, chemical dressing (for integrated production) and bag filling), stored and afterwards transported to the regional storage centre. No data on wastewater production were available. high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density low population density lower stratosphere + upper troposphere | kg kg kg | 1 1 1 1 | | 6.16E-02 | | | Econivent vz., baney seed ii , at regional storenouse, ori |
| Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon monoxide, fossil air Chloroform air Chloroform air Chloroform air Dinitrogen monoxide air Dinitrogen monoxide air Dinitrogen monoxide air Dinitrogen monoxide air | and bag filling), stored and afterwards transported to the regional storage centre. No data on wastewater production were available. high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density lower stratosphere + upper troposphere | kg kg kg | 1 1 1 | | 6.16E-02 | | | |
| Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon monoxide, fossil air Chloroform air Chloroform air Dinitrogen monoxide air | No data on wastewater production were available. high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density lower stratosphere + upper troposphere | kg kg kg | 1 1 1 | | 6.16E-02 | | | |
| Carbon dioxide, fossil air carbon monoxide, fossil air chloroform air c | low population density lower stratosphere + upper troposphere unspecified high population density low population density lower stratosphere + upper troposphere | kg kg kg | 1 1 1 | | 6.16E-02 | | | |
| Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon dioxide, fossil air Carbon monoxide, fossil air Chloroform air | low population density lower stratosphere + upper troposphere unspecified high population density low population density lower stratosphere + upper troposphere | kg kg kg | 1 1 1 | | 6.16E-02 | | | |
| carbon dioxide, fossil air larbon dioxide, fossil air larbon monoxide, fossil air larbon forom air larboroform air | lower stratosphere + upper troposphere unspecified high population density low population density lower stratosphere + upper troposphere | kg kg | 1 | kg CO2-⊑q | 8.05E-02 | kg/kg | 6.16E-02 8.05E-02 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| arbon dioxide, fossil air arbon monoxide, fossil air arbon monoxide, fossil air arbon monoxide, fossil air arbon monoxide, fossil air alron monoxide, fossil air hloroform air hloroform air hloroform air initrogen monoxide air | unspecified high population density low population density lower stratosphere + upper troposphere | kg | | kg CO2-Eq | 4.05E-08 | kg/kg kg/kg | 4.05E-08 | Econvent V2, barley seed IP, at regional storehouse, CH Econvent V2, barley seed IP, at regional storehouse, CH |
| arbon monoxide, fossil air hloroform air hloroform air hloroform air initrogen monoxide air | high population density low population density lower stratosphere + upper troposphere | • | | kg CO2-Eq | 3.46E-02 | kg/kg | 3.46E-02 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| arbon monoxide, fossil air arbon monoxide, fossil air hloroform air hloroform air hloroform air hloroform air initrogen monoxide air | lower stratosphere + upper troposphere | | 1.5714 | kg CO2-Eq | 2.26E-05 | kg/kg | 3.55E-05 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| arbon monoxide, fossil air hloroform air hloroform air hloroform air initrogen monoxide air | | kg | 1.5714 | kg CO2-Eq | 1.52E-04 | kg/kg | 2.38E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| hloroform air hloroform air hloroform air initrogen monoxide air | | kg | 1.5714 | kg CO2-Eq | 4.75E-11 | kg/kg | 7.47E-11 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| hloroform air hloroform air initrogen monoxide air | unspecified | kg | 1.5714 | kg CO2-Eq | 2.63E-04 | kg/kg | 4.14E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| nloroform air nitrogen monoxide air nitrogen monoxide air nitrogen monoxide air nitrogen monoxide air | high population density low population density | kg ka | 30 30 | kg CO2-Eq | 8.76E-11 9.63E-13 | kg/kg | 2.63E-09 2.89E-11 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| nitrogen monoxide air nitrogen monoxide air nitrogen monoxide air nitrogen monoxide air | unspecified | kg | 30 | kg CO2-Eq kg CO2-Eq | 1.16E-18 | kg/kg kg/kg | 3.47E-17 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| nitrogen monoxide air nitrogen monoxide air nitrogen monoxide air | high population density | kg | 298 | kg CO2-Eq | 1.85E-04 | kg/kg | 5.51E-02 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| nitrogen monoxide air | low population density | kg | 298 | kg CO2-Eq | 5.76E-04 | kg/kg | 1.72E-01 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 3.86E-13 | kg/kg | 1.15E-10 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| hane, 1,1,1,2-tetrafluoro-, HFC-134a air | unspecified | kg | 298 | kg CO2-Eq | 8.55E-07 | kg/kg | 2.55E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| | high population density | kg | 1430 | kg CO2-Eq | 8.14E-12 | kg/kg | 1.16E-08 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| hane, 1,1,1,2-tetrafluoro-, HFC-134a air | low population density | kg | 1430 | kg CO2-Eq | 3.67E-11 | kg/kg | 5.25E-08 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| hane, 1,1,1,2-tetrafluoro-, HFC-134a air hane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 air | unspecified high population density | kg ka | 1430 6130 | kg CO2-Eq kg CO2-Eq | 6.37E-08 3.50E-12 | kg/kg kg/kg | 9.11E-05 2.14E-08 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| hane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 air | unspecified | kg | 6130 | kg CO2-Eq | 0.00L-12 | kg/kg | 0.00E+00 | Econvent V2, barley seed IP, at regional storehouse, CH |
| hane, 1,1-difluoro-, HFC-152a air | high population density | kg | 124 | kg CO2-Eq | 2.55E-11 | kg/kg | 3.16E-09 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| hane, 1,1-difluoro-, HFC-152a air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| thane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 air | low population density | kg | 10000 | kg CO2-Eq | 7.05E-10 | kg/kg | 7.05E-06 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| thane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 air | unspecified | kg | 609 | kg CO2-Eq | 0.40= | kg/kg | 0.00E+00 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| hane, hexafluoro-, HFC-116 air hane, hexafluoro-, HFC-116 air | high population density | kg | 12200 | kg CO2-Eq | 2.42E-10 | kg/kg | 2.95E-06 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| | unspecified | kg | 12200 | kg CO2-Eq kg CO2-Eq | 8.24E-09 4.88E-08 | kg/kg | 1.01E-04 1.22E-06 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, biogenic air ethane, biogenic air | high population density low population density | kg ka | 25 25 | kg CO2-Eq | 7.86E-07 | kg/kg kg/kg | 1.96E-05 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, biogenic air | unspecified | kg | 25 | kg CO2-Eq | 2.83E-07 | kg/kg | 7.08E-06 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, bromo-, Halon 1001 air | unspecified | kg | 5 | kg CO2-Eq | 3.13E-18 | kg/kg | 1.57E-17 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, bromochlorodifluoro-, Halon 1211 air | low population density | kg | 1890 | kg CO2-Eq | 9.02E-10 | kg/kg | 1.70E-06 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, bromotrifluoro-, Halon 1301 air | high population density | kg | 7140 | kg CO2-Eq | 4.72E-15 | kg/kg | 3.37E-11 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, bromotrifluoro-, Halon 1301 air | low population density | kg | 7140 | kg CO2-Eq | 1.60E-09 | kg/kg | 1.14E-05 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, chlorodifluoro-, HCFC-22 air | high population density | kg | 1810 | kg CO2-Eq | 1.24E-10 | kg/kg | 2.25E-07 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, chlorodifluoro-, HCFC-22 air ethane, chlorotrifluoro-, CFC-13 air | low population density | kg ka | 1810 14400 | kg CO2-Eq kg CO2-Eq | 3.25E-09 | kg/kg | 5.88E-06 0.00E+00 | Econvent V2, barley seed IP, at regional storehouse, CH |
| ethane, dichloro-, HCC-30 air | unspecified high population density | kg | 8.7 | kg CO2-Eq | 5.09E-12 | kg/kg kg/kg | 4.43E-11 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, dichloro-, HCC-30 air | low population density | kg | 8.7 | kg CO2-Eq | 2.85E-12 | kg/kg | 2.48E-11 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, dichlorodifluoro-, CFC-12 air | high population density | kg | 10900 | kg CO2-Eq | 1.62E-11 | kg/kg | 1.76E-07 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, dichlorodifluoro-, CFC-12 air | low population density | kg | 10900 | kg CO2-Eq | 3.11E-12 | kg/kg | 3.39E-08 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, dichlorodifluoro-, CFC-12 air | unspecified | kg | 10900 | kg CO2-Eq | 2.08E-18 | kg/kg | 2.27E-14 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, dichlorofluoro-, HCFC-21 air | high population density | kg | 210 | kg CO2-Eq | 2.32E-14 | kg/kg | 4.86E-12 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, fossil air ethane, fossil air | high population density | kg | 25 25 | kg CO2-Eq kg CO2-Eq | 1.32E-05 2.63E-04 | kg/kg | 3.31E-04 6.57E-03 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, fossil air ethane, fossil air | low population density lower stratosphere + upper troposphere | kg ka | 25 | kg CO2-Eq | 6.43E-13 | kg/kg kg/kg | 1.61E-11 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, fossil air | unspecified | kg | 25 | kg CO2-Eq | 7.45E-07 | kg/kg | 1.86E-05 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, tetrachloro-, R-10 | high population density | kg | 1400 | kg CO2-Eq | 1.19E-10 | kg/kg | 1.67E-07 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, tetrachloro-, R-10 air | unspecified | kg | 1400 | kg CO2-Eq | 9.32E-16 | kg/kg | 1.30E-12 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, tetrafluoro-, R-14 air | high population density | kg | 7390 | kg CO2-Eq | 1.31E-12 | kg/kg | 9.69E-09 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, tetrafluoro-, R-14 air | unspecified | kg | 7390 | kg CO2-Eq | 7.42E-08 | kg/kg | 5.48E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, trichlorofluoro-, CFC-11 air lethane, trifluoro-, HFC-23 air | high population density | kg | 4750 14800 | kg CO2-Eq | 3.76E-14 | kg/kg | 1.79E-10 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, trifluoro-, HFC-23 air ulfur hexafluoride air | high population density high population density | kg ka | 14800 22800 | kg CO2-Eq kg CO2-Eq | 7.37E-12 | kg/kg kg/kg | 1.09E-07 0.00E+00 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Ilfur hexafluoride air | low population density | kg ka | 22800 | kg CO2-Eq | 8.95E-12 | kg/kg kg/kg | 2.04E-07 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Ilfur hexafluoride air | unspecified | kg | 22800 | kg CO2-Eq | 4.20E-09 | kg/kg | 9.58E-05 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, monochloro-, R-40 air | high population density | kg | 13 | kg CO2-Eq | 7.86E-14 | kg/kg | 1.02E-12 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ethane, monochloro-, R-40 air | low population density | kg | 13 | kg CO2-Eq | 5.20E-12 | kg/kg | 6.76E-11 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| arbon dioxide, land transformation air | low population density | kg | 1 | kg CO2-Eq | 2.08E-05 | kg/kg | 2.08E-05 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| trogen fluoride air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| nmonia | high population density | kc | 1.88 | kg SO2-Eq | 7.82E-05 | ka/ka | 4.12E-01 1.47E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| nmonia air nmonia air | low population density | ka | 1.88 | kg SO2-Eq | 1.29E-03 | kg/kg kg/kg | 2.42E-03 | Econvent V2, barley seed IP, at regional storehouse, CH Econvent V2, barley seed IP, at regional storehouse, CH |
| nmonia air | unspecified | ka | 1.88 | kg SO2-Eq | 2.89E-06 | kg/kg | 5.43E-06 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| drogen chloride air | high population density | kg | 0.88 | kg SO2-Eq | 1.14E-06 | kg/kg | 1.01E-06 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| drogen chloride air | low population density | kg | 0.88 | kg SO2-Eq | 1.18E-06 | kg/kg | 1.03E-06 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| drogen chloride air | unspecified | kg | 0.88 | kg SO2-Eq | 6.57E-07 | kg/kg | 5.78E-07 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| drogen fluoride air | high population density | kg | 1.6 | kg SO2-Eq | 4.20E-07 | kg/kg | 6.72E-07 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| rdrogen fluoride air | low population density | Kg kc | 1.6 1.6 | kg SO2-Eq kg SO2-Eq | 6.79E-07 2.85E-07 | kg/kg | 1.09E-06 4.56E-07 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| rdrogen fluoride air rdrogen sulfide air | unspecified high population density | ka | 1.88 | kg SO2-Eq kg SO2-Eq | 2.85E-07 2.90E-09 | kg/kg kg/kg | 4.56E-07 5.46E-09 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| rdrogen sulfide air | low population density | ka | 1.88 | kg SO2-Eq | 5.29E-07 | kg/kg | 9.95E-07 | Econvent V2, barley seed IP, at regional storehouse, CH Econvent V2, barley seed IP, at regional storehouse, CH |
| rdrogen sulfide air | unspecified | kg | 1.88 | kg SO2-Eq | 5.78E-08 | kg/kg | 1.09E-07 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| trogen oxides air | high population density | kg | 0.7 | kg SO2-Eq | 1.70E-04 | kg/kg | 1.19E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| trogen oxides air | low population density | kg | 0.7 | kg SO2-Eq | 9.51E-04 | kg/kg | 6.66E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| itrogen oxides air | unspecified | kg | 0.7 | kg SO2-Eq | 2.82E-04 | kg/kg | 1.98E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ulfur dioxide air | high population density | kg | 1 | kg SO2-Eq | 2.31E-04 | kg/kg | 2.31E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| ulfur dioxide air | low population density | kg | 1 | kg SO2-Eq | 2.14E-04 | kg/kg | 2.14E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Sulfur dioxide air | unspecified | кд | 1 | kg SO2-Eq | 1.42E-05 | kg/kg | 1.42E-05 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |

| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 5.95E-09 | kg/kg | 1.12E-08 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
|---|----------------------|---|-----------|------------------|------------------------|---------------------------|-----------------|----------------------|---|
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 9.56E-14 | kg/kg | 6.21E-14 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Phosphoric acid Sulfuric acid | air air | high population density low population density | kg kg | 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 2.54E-14 | kg/kg kg/kg | 0.00E+00 1.65E-14 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Culturio dold | an | ion population density | Ng Ng | 0.00 | Ng OOZ Lq | 2.042 14 | ng/ng | 4.02E-03 | Example 10 v2, builty seed in , at regional substitution, or |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 3.95E-09 | kg/kg | 1.21E-08 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Phosphorus Phosphorus | air air | low population density low population density, long-term | kg kg | 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 3.07E-10 1.19E-09 | kg/kg kg/kg | 9.40E-10 3.64E-09 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 2.34E-11 | kg/kg | 7.17E-11 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 9.38E-09 | kg/kg | 2.87E-08 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Phosphorus BOD5, Biological Oxygen Demand | soil water | industrial river | kg kg | 3.06 0.022 | kg PO4-Eq kg PO4-Eq | 4.94E-08 3.20E-04 | kg/kg kg/kg | 1.51E-07 7.05E-06 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 9.21E-07 | kg/kg | 2.03E-08 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 3.24E-04 | kg/kg | 7.13E-06 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| COD, Chemical Oxygen Demand Phosphate | water water | unspecified river | kg kg | 0.022 1 | kg PO4-Eq kg PO4-Eq | 9.30E-07 1.23E-04 | kg/kg kg/kg | 2.05E-08 1.23E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 1.66E-05 | kg/kg | 5.07E-05 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Phosphorus | water air | unspecified | kg | 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 2.42E-10 | kg/kg kg/kg | 7.40E-10 0.00E+00 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Phosphoric acid | all | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 1.88E-04 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 7.39E-03 | kg/kg | 7.32E-02 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | resource resource | in ground in ground | kg Nm3 | 19.1 39.8 | MJ-Eq MJ-Eq | 1.07E-02 1.05E-04 | kg/kg Nm3/kg | 2.04E-01 4.17E-03 | Ecoinvent V2, barley seed IP, at regional storehouse, CH Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 2.01E-02 | Nm3/kg | 7.71E-01 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 3.89E-02 | kg/kg | 1.78E+00 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 1.38E-06 | kg/kg | 1.37E-05 2.83E+00 | Ecoinvent V2, barley seed IP, at regional storehouse, CH |
| | Alfalfa grass | The seed produced at the farm is transported to the processing centre, treated (pre- | | | | | | 2.002100 | |
| | - | cleaning, cleaning, eventually drying, chemical dressing (for integrated production) | | | | | | | |
| | | and bag filling), stored and afterwards transported to the regional storage centre. No data on wastewater production were available. | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 0.43066 | kg/kg | 4.31E-01 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Carbon dioxide, fossil Carbon dioxide, fossil | air air | lower strategybers + upper troposphere | kg kg | 1 1 | kg CO2-Eq | 0.56138 3.0304E-07 | kg/kg | 5.61E-01 3.03E-07 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Carbon dioxide, fossil | air air | lower stratosphere + upper troposphere unspecified | кд kg | 1 | kg CO2-Eq kg CO2-Eq | 0.20354 | kg/kg kg/kg | 2.04E-01 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 0.00019687 | kg/kg | 3.09E-04 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Carbon monoxide, fossil Carbon monoxide, fossil | air air | low population density lower stratosphere + upper troposphere | kg kg | 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq | 0.0011769 3.5596E-10 | kg/kg kg/kg | 1.85E-03 5.59E-10 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 0.0016561 | kg/kg | 2.60E-03 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 6.9185E-10 | kg/kg | 2.08E-08 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Chloroform Chloroform | air air | low population density unspecified | kg kg | 30 30 | kg CO2-Eq kg CO2-Eq | 8.284E-12 9.1337E-18 | kg/kg kg/kg | 2.49E-10 2.74E-16 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 0.000014514 | kg/kg | 4.33E-03 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 0.0073099 | kg/kg | 2.18E+00 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Dinitrogen monoxide Dinitrogen monoxide | air air | lower stratosphere + upper troposphere unspecified | kg kg | 298 298 | kg CO2-Eq kg CO2-Eq | 2.8861E-12 8.7416E-06 | kg/kg kg/kg | 8.60E-10 2.60E-03 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 6.1239E-11 | kg/kg | 8.76E-08 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 3.2237E-10 | kg/kg | 4.61E-07 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air air | unspecified high population density | kg kg | 1430 6130 | kg CO2-Eq kg CO2-Eq | 3.4794E-07 2.6256E-11 | kg/kg kg/kg | 4.98E-04 1.61E-07 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a | air air | high population density low population density | kg kg | 124 124 | kg CO2-Eq kg CO2-Eq | 2.2571E-10 | kg/kg kg/kg | 2.80E-08 0.00E+00 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 6.2085E-09 | kg/kg | 6.21E-05 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 | air air | high population density unspecified | kg kg | 12200 12200 | kg CO2-Eq kg CO2-Eq | 1.8151E-09 4.004E-08 | kg/kg kg/kg | 2.21E-05 4.88E-04 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 3.3303E-07 | kg/kg | 8.33E-06 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 7.7832E-06 | kg/kg | 1.95E-04 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, bromo-, Halon 1001 | air air | unspecified unspecified | kg kg | 25 5 | kg CO2-Eq kg CO2-Eq | 2.4992E-06 2.4758E-17 | kg/kg kg/kg | 6.25E-05 1.24E-16 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 3.9657E-09 | kg/kg | 7.50E-06 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 | air air | high population density low population density | kg ka | 7140 7140 | kg CO2-Eq kg CO2-Eq | 2.3537E-14 1.1276E-08 | kg/kg kg/kg | 1.68E-10 8.05E-05 | Econvent V2, clover seed IP, at regional storehouse, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq kg CO2-Eq | 9.4024E-10 | kg/kg | 1.70E-06 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.4998E-08 | kg/kg | 2.71E-05 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, chlorotrifluoro-, CFC-13 Methane, dichloro-, HCC-30 | air air | unspecified high population density | kg kg | 14400 8.7 | kg CO2-Eq kg CO2-Eq | 3.1399E-11 | kg/kg kg/kg | 0.00E+00 2.73E-10 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 2.4517E-11 | kg/kg | 2.13E-10 | Econvent V2, clover seed IP, at regional storehouse, CH Econvent V2, clover seed IP, at regional storehouse, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 6.8991E-11 | kg/kg | 7.52E-07 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorodifluoro-, CFC-12 | air air | low population density unspecified | kg kg | 10900 10900 | kg CO2-Eq kg CO2-Eq | 1.3595E-11 1.6461E-17 | kg/kg kg/kg | 1.48E-07 1.79E-13 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 1.7423E-13 | kg/kg | 3.66E-11 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 0.00014872 | kg/kg | 3.72E-03 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, fossil Methane, fossil | air air | low population density lower stratosphere + upper troposphere | kg kg | 25 25 | kg CO2-Eq kg CO2-Eq | 0.0017803 4.8103E-12 | kg/kg kg/kg | 4.45E-02 1.20E-10 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 0.000012175 | kg/kg | 3.04E-04 | Econivert V2, clover seed IP, at regional storehouse, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 1400 | kg CO2-Eq | 1.4415E-09 | kg/kg | 2.02E-06 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, tetrachloro-, R-10 Methane, tetrafluoro-, R-14 | air air | unspecified high population density | kg kg | 1400 7390 | kg CO2-Eq kg CO2-Eq | 7.3605E-15 1.1606E-11 | kg/kg kg/kg | 1.03E-11 8.58E-08 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 3.6036E-07 | kg/kg | 2.66E-03 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, trifluoro-, CFC-11 | air air | high population density high population density | kg | 4750 14800 | kg CO2-Eq kg CO2-Eq | 2.8285E-13 5.5437E-11 | kg/kg | 1.34E-09 8.20E-07 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, trifluoro-, HFC-23 Sulfur hexafluoride | air air | high population density | kg kg | 22800 | kg CO2-Eq kg CO2-Eq | 0.0437 E-11 | kg/kg kg/kg | 0.00E+00 | Econvent V2, clover seed IP, at regional storehouse, CH Econvent V2, clover seed IP, at regional storehouse, CH |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 5.55E-11 | kg/kg | 1.27E-06 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Sulfur hexafluoride Methane, monochloro-, R-40 | air air | unspecified high population density | kg kg | 22800 13 | kg CO2-Eq kg CO2-Eq | 3.7183E-08 5.8306E-13 | kg/kg kg/kg | 8.48E-04 7.58E-12 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Methane, monochloro-, R-40 | air air | high population density low population density | кд kg | 13 | kg CO2-Eq kg CO2-Eq | 4.4767E-11 | kg/kg kg/kg | 5.82E-10 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 0.00026835 | kg/kg | 2.68E-04 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 3.44E+00 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 3.3977E-06 | kg/kg | 6.39E-06 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 6.3152E-06 | kg/kg | 1.19E-05 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Ammonia Hydrogen chloride | aır air | unspecified high population density | kg kg | 1.88 0.88 | kg SO2-Eq kg SO2-Eq | 0.000019013 9.2519E-06 | kg/kg kg/kg | 3.57E-05 8.14E-06 | Ecoinvent V2, clover seed IP, at regional storehouse, CH Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 0.00001006 | kg/kg | 8.85E-06 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| | | | | | | | | | |

| Hydrogen chloride | air | unspecified | ka | 0.88 | kg SO2-Eq | 4.9746E-06 | kg/kg | 4.38E-06 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
|--|----------|-----------------------------------|-----|--------|-----------|-------------|--------|----------|--|
| Hydrogen fluoride | air | high population density | ka | 1.6 | kg SO2-Eq | 0.000010979 | kg/kg | 1.76E-05 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Hydrogen fluoride | air | low population density | ka | 1.6 | kg SO2-Eq | 8.4191E-06 | kg/kg | 1.35E-05 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Hydrogen fluoride | air | unspecified | ka | 1.6 | kg SO2-Eg | 1.4057E-06 | kg/kg | 2.25E-06 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Hydrogen sulfide | air | high population density | ka | 1.88 | kg SO2-Eg | 2.6869E-09 | kg/kg | 5.05E-09 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Hydrogen sulfide | air | low population density | ka | 1.88 | kg SO2-Eq | 0.000054683 | kg/kg | 1.03E-04 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Hydrogen sulfide | air | unspecified | ka | 1.88 | kg SO2-Eg | 1.1719E-06 | kg/kg | 2.20E-06 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eg | 0.00055579 | kg/kg | 3.89E-04 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Nitrogen oxides | air | low population density | ka | 0.7 | kg SO2-Eg | 0.0078766 | kg/kg | 5.51E-03 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Nitrogen oxides | air | unspecified | ka | 0.7 | kg SO2-Eg | 0.0017051 | kg/kg | 1.19E-03 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eg | 0.0027763 | kg/kg | 2.78E-03 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Sulfur dioxide | air | low population density | ka | 1 | kg SO2-Eq | 0.0014512 | kg/kg | 1.45E-03 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Sulfur dioxide | air | unspecified | ka | 1 | kg SO2-Eg | 0.000087455 | kg/kg | 8.75E-05 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Hydrogen sulfide | water | river | ka | 1.88 | kg SO2-Eq | 4.0284E-08 | kg/kg | 7.57E-08 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Sulfuric acid | air | high population density | ka | 0.65 | kg SO2-Eg | 1.1615E-09 | kg/kg | 7.55E-10 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Phosphoric acid | air | high population density | ka | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 2.2446E-13 | kg/kg | 1.46E-13 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| | | | - | | | | 0 0 | 1.16E-02 | |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 2.7699E-08 | kg/kg | 8.48E-08 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 2.208E-09 | kg/kg | 6.76E-09 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 1.0477E-08 | kg/kg | 3.21E-08 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 1.1378E-10 | kg/kg | 3.48E-10 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 7.0817E-08 | kg/kg | 2.17E-07 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 3.2257E-07 | kg/kg | 9.87E-07 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 0.0021282 | kg/kg | 4.68E-05 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 6.1276E-06 | kg/kg | 1.35E-07 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 0.0021544 | kg/kg | 4.74E-05 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 6.1894E-06 | kg/kg | 1.36E-07 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 0.00074534 | kg/kg | 7.45E-04 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 0.00025472 | kg/kg | 7.79E-04 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 1.5699E-09 | kg/kg | 4.80E-09 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| | | | | | | | | 1.62E-03 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 0.063903 | kg/kg | 6.33E-01 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 0.08034 | kg/kg | 1.53E+00 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 0.00078635 | Nm3/kg | 3.13E-02 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 0.095384 | Nm3/kg | 3.65E+00 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 0.26983 | kg/kg | 1.24E+01 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 9.5208E-06 | kg/kg | 9.43E-05 | Ecoinvent V2, clover seed IP, at regional storehouse, CH |
| | | | | | | | | 1.82E+01 | |

Store seed in the

| back to top | regional storenous | | | | | | | | |
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| | | | | | | | | | |
| 32 | Produce Fertilizer | | | | | | | | |
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| | Urea, as N | The unit process inventory takes into account the production of urea from ammonia | | | | | | | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| | | and carbon dioxide. Transports of the intermediate products were included as well | | | | | | | |
| | | as the transport of the fertilizer product from the factory to the regional storehouse. | | | | | | | |
| | | Production and waste treatment of catalysts, coating and packaging of the final | | | | | | | |
| | | fertilizer products were not included. CO2-consumption (733 kg CO2/ton of urea) | | | | | | | |
| | | during production of urea was not included, since CO2 arises as a by-product | | | | | | | |
| back to top | | during the production of ammonia. Infrastructure was included by means of a proxy | | | | | | | |
| Carbon dioxide, fossil | air | high population density | ka | 1 | kg CO2-Eq | 2.64E+00 | kg/kg | 2.64E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 3.60E-01 | kg/kg | 3.60E-01 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 1.11E-06 | kg/kg | 1.11E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 9.17E-02 | kg/kg | 9.17E-02 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 3.18E-03 | kg/kg | 4.99E-03 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 3.70E-04 | kg/kg | 5.81E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 1.30E-09 | kg/kg | 2.04E-09 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 9.42E-04 | kg/kg | 1.48E-03 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 1.83E-09 | kg/kg | 5.48E-08 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 6.77E-12 | kg/kg | 2.03E-10 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 9.24E-18 | kg/kg | 2.77E-16 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 2.89E-05 | kg/kg | 8.62E-03 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 5.83E-06 | kg/kg | 1.74E-03 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.05E-11 | kg/kg | 3.14E-09 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 5.51E-06 | kg/kg | 1.64E-03 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air air | high population density | kg | 1430 | kg CO2-Eq | 2.23E-10 | kg/kg | 3.19E-07 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air air | low population density unspecified | kg ka | 1430 1430 | kg CO2-Eq kg CO2-Eq | 2.27E-10 7.11E-08 | kg/kg kg/kg | 3.25E-07 1.02E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | ka | 6130 | kg CO2-Eq | 9.66E-11 | kg/kg | 5.92E-07 | Econivent V2, urea, as N, at regional storehouse, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | ka | 6130 | kg CO2-Eq | 9.00E-11 | kg/kg | 0.00E+00 | Econivent V2, urea, as N, at regional storehouse, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | ka | 124 | kg CO2-Eq | 2.84E-10 | kg/kg | 3.52E-08 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | ka | 124 | kg CO2-Eq | 2.042 10 | kg/kg | 0.00E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 3.92E-09 | kg/kg | 3.92E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | ka | 609 | kg CO2-Eq | 0.022 00 | kg/kg | 0.00E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Ethane, hexafluoro-, HFC-116 | air | high population density | ka | 12200 | kg CO2-Eq | 6.67E-09 | kg/kg | 8.13E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | ka | 12200 | kg CO2-Eg | 4.06E-08 | kg/kg | 4.96E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 2.12E-07 | kg/kg | 5.29E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.12E-05 | kg/kg | 2.81E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 4.28E-06 | kg/kg | 1.07E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 2.51E-17 | kg/kg | 1.25E-16 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 6.05E-08 | kg/kg | 1.14E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 1.73E-15 | kg/kg | 1.24E-11 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.04E-08 | kg/kg | 7.43E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 3.28E-09 | kg/kg | 5.95E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 2.10E-07 | kg/kg | 3.80E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | 0.075.44 | kg/kg | 0.00E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 6.87E-11 | kg/kg | 5.98E-10 | Ecoinvent V2, urea, as N, at regional storehouse, RER |

| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 2.00E-11 | kg/kg | 1.74E-10 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
|--|--|--|---|---|--|--|---|---|--|
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 7.83E-10 | kg/kg | 8.53E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eg | 2.07E-10 | kg/kg | 2.25E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | ka | 10900 | kg CO2-Eq | 1.67E-17 | kg/kg | 1.82E-13 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 6.34E-13 | kg/kg | 1.33E-10 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, fossil | air | | kg | 25 | | 8.80E-04 | | 2.20E-02 | |
| | | high population density | • | | kg CO2-Eq | | kg/kg | | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 7.02E-03 | kg/kg | 1.75E-01 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 1.76E-11 | kg/kg | 4.39E-10 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 3.98E-06 | kg/kg | 9.94E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 1.07E-09 | kg/kg | 1.50E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 7.45E-15 | kg/kg | 1.04E-11 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.46E-11 | kg/kg | 1.08E-07 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 3.66E-07 | kg/kg | 2.70E-03 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.03E-12 | kg/kg | 4.89E-09 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, trifluoro-, HFC-23 | air | high population density | ka | 14800 | kg CO2-Eq | 2.02E-10 | kg/kg | 2.98E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | 2.022 10 | kg/kg | 0.00E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Sulfur hexafluoride | air | | kg | 22800 | kg CO2-Eq | 1.27E-10 | kg/kg | 2.91E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| | | low population density | • | | | | | | |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 4.80E-08 | kg/kg | 1.09E-03 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 1.70E-12 | kg/kg | 2.21E-11 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 3.66E-11 | kg/kg | 4.76E-10 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 3.80E-05 | kg/kg | 3.80E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| | | | | | | | | 3.31E+00 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 3.48E-03 | kg/kg | 6.55E-03 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 2.76E-06 | kg/kg | 5.20E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Ammonia | air | unspecified | ka | 1.88 | kg SO2-Eq | 2.90E-05 | kg/kg | 5.46E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Hydrogen chloride | air | high population density | ka | 0.88 | kg SO2-Eq | 1.92E-05 | kg/kg | 1.69E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| | air | low population density | ka | 0.88 | kg SO2-Eq | 2.22E-05 | | 1.95E-05 | Econivent V2, urea, as N, at regional storehouse, RER |
| Hydrogen chloride | all | | kg | 0.88 | | | kg/kg | 1.95E-05 5.58E-06 | |
| Hydrogen chloride | air | unspecified | kg | | kg SO2-Eq | 6.34E-06 | kg/kg | | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.67E-06 | kg/kg | 2.67E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 4.86E-06 | kg/kg | 7.78E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 1.53E-06 | kg/kg | 2.45E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 9.86E-10 | kg/kg | 1.85E-09 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 2.91E-05 | kg/kg | 5.47E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.42E-07 | kg/kg | 4.55E-07 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eq | 2.20E-03 | kg/kg | 1.54E-03 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Nitrogen oxides | air | low population density | ka | 0.7 | kg SO2-Eq | 1.01E-03 | kg/kg | 7.07E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| | all | | kg ka | 0.7 | | 7.19E-04 | | 5.04E-04 | |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | | kg/kg | | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 4.80E-04 | kg/kg | 4.80E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 3.46E-03 | kg/kg | 3.46E-03 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 6.17E-05 | kg/kg | 6.17E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 2.27E-08 | kg/kg | 4.26E-08 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 2.64E-12 | kg/kg | 1.72E-12 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Sulfuric acid | air | low population density | ka | 0.65 | kg SO2-Eq | 2.82E-13 | kg/kg | 1.83E-13 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| | | The property servery | 9 | | 9 1 | | | 1.35E-02 | |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 3.88E-08 | kg/kg | 1.19E-07 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus | air | low population density | ka | 3.06 | kg PO4-Eq | 1.29E-09 | kg/kg | 3.96E-09 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| | - | | kg ka | 3.06 | kg PO4-Eq | 7.48E-09 | | | |
| Phosphorus | air | low population density, long-term | KQ | 3.00 | | | kg/kg | 2.29E-08 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Di i | | 100 | , " | | | | | 0.505.40 | F : 170 N : 1 - 1 DED |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 1.15E-10 | kg/kg | 3.53E-10 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus | soil | agricultural | kg kg | 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 | kg/kg kg/kg | 3.92E-07 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| | | | kg kg kg | 3.06 3.06 3.06 | kg PO4-Eq | 1.15E-10 | kg/kg | 3.92E-07 2.16E-06 | |
| Phosphorus | soil | agricultural | 3 | 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 | kg/kg kg/kg | 3.92E-07 | Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand | soil soil | agr ⁱ cultural industrial | 3 | 3.06 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 | kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand | soil soil water | agricultural industrial river | 3 | 3.06 3.06 3.06 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 | kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | soil soil water water | agricultural industrial river unspecified river | 3 | 3.06 3.06 3.06 0.022 0.022 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | soil soil water water water water | agricultural industrial river unspecified river unspecified | kg kg kg kg | 3.06 3.06 3.06 0.022 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | soil soil water water water water water | agricultural industrial river unspecified river unspecified river | kg kg kg kg kg | 3.06 3.06 3.06 0.022 0.022 0.022 0.022 1 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | soil soil water water water water water | agricultural industrial river unspecified river unspecified river unspecified river river | kg kg kg kg | 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus | soil water water water water water water water | agricultural industrial river unspecified river unspecified river unspecified river river unspecified | kg kg kg kg kg | 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | soil soil water water water water water | agricultural industrial river unspecified river unspecified river unspecified river river | kg kg kg kg kg | 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid | soil soil water water water water water water air | agricultural industrial river unspecified river unspecified river unspecified river river unspecified river river unspecified | kg kg kg kg kg | 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground | soil soil water water water water water water water water water ivater water resource | agricultural industrial river unspecified river unspecified river unspecified river river unspecified river industrial unspecified river industrial river unspecified high population density in ground | kg kg kg kg kg | 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoria caid Coal, brown, in ground Coal, hard, unspecified, in ground | soil soil water water water water water water water water air resource resource | agricultural industrial river unspecified river unspecified river unspecified river river river unspecified high population density in ground in ground | kg kg kg kg kg kg kg kg | 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground | soil soil water water water water water water water water water ivater water resource | agricultural industrial river unspecified river unspecified river unspecified river river unspecified river industrial unspecified river industrial river unspecified high population density in ground | kg kg kg kg kg kg kg kg kg | 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 | kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoria caid Coal, brown, in ground Coal, hard, unspecified, in ground | soil soil water water water water water water water water air resource resource | agricultural industrial river unspecified river unspecified river unspecified river river river unspecified high population density in ground in ground | kg kg kg kg kg kg kg kg | 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse, RER |
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| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide | soil soil water air resource resource resource resource resource air | agricultural industrial river unspecified river unspecified river river unspecified river river river river river unspecified high population density in ground in gr | kg (15%) kg | 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4 | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.38E-04 3.86E-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-05 2.72E-06 3.13E-12 | kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 6.07E-10 6.47E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, ammonia, liquid, at regional storehouse, RER Ecoinvent V2, ammonia, liqu |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Dil, crude, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform Chloroform Chirtogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide | soil soil water esource resource resour | agricultural industrial river unspecified river unspecified river unspecified river unspecified river river unspecified high population density in ground i | kg (15%) kg | 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.38EE-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-05 2.72E-06 3.13E-12 2.05E-06 | kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 6.07E-10 6.47E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 6.11E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urean, as N, at regional storehouse, RER Ecoinvent V2, urean, as N, at regional storehouse, RER Ecoinvent V2, urean, as N, at regional storehouse, RER Ecoinvent V2, urean, as N, at regional storehouse, RER Ecoinvent V2, urean, as N, at regional storehouse, RER Ecoinvent V2, ureannonia, liquid, at regional storehouse, RER Ecoinvent |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide | soil soil water air resource resource resource resource resource air | agricultural industrial river unspecified river unspecified river river unspecified river river river river river unspecified high population density in ground in gr | kg (15%) kg | 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4 | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.99E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.38E-04 3.86E-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-06 3.13E-12 2.05E-06 6.58E-11 | kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 6.11E-04 9.40E-08 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, ammonia, liquid, at regional storehouse, RER Ecoinvent V2, ammonia, liqu |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Dil, crude, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform Chloroform Chirtogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide | soil soil water esource resource resour | agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground | kg (15%) kg | 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.38EE-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-05 2.72E-06 3.13E-12 2.05E-06 | kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 6.07E-10 6.47E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 6.11E-04 9.34E-10 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urean, as N, at regional storehouse, RER Ecoinvent V2, urean, as N, at regional storehouse, RER Ecoinvent V2, urean, as N, at regional storehouse, RER Ecoinvent V2, urean, as N, at regional storehouse, RER Ecoinvent V2, urean, as N, at regional storehouse, RER Ecoinvent V2, ureannonia, liquid, at regional storehouse, RER Ecoinvent |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Peat, in ground Peat, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | soil soil water cresource resource resourc | agricultural industrial river unspecified river unspecified river river unspecified river unspecified river river unspecified high population density in ground in gr | kg m3 Nm3 Nm3 kg | 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.99E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.38E-04 3.86E-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-06 3.13E-12 2.05E-06 6.58E-11 | kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 6.11E-04 9.40E-08 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, ammonia, liquid, at regional storehouse, RER Ecoinvent V2, ammonia, |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Diardout Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform Chirogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | soil soil water air resource resource resource resource resource resource air | agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground | kg (15%) kg | 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.386E-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-05 2.72E-06 3.13E-12 2.05E-06 6.58E-11 7.39E-11 3.31E-08 | kg/kg Mm3/kg Mg/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 6.11E-04 9.40E-08 1.06E-07 4.74E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, ammonia, liquid, at reg |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Linane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, LFC-134a Ethane, 1,1,1,2-tetrafluoro-, LFC-134a Ethane, 1,1,1,2-tetrafluoro-, LFC-134a Ethane, 1,1,1,2-tetrafluoro-, LFC-134a | soil soil water constant resource | agricultural industrial river unspecified river unspecified river river unspecified river unspecified river river unspecified high population density in ground in gr | kg (15%) kg | 3.06 3.06 0.022 0.022 0.022 1 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.38E-04 3.86E-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-05 2.72E-06 3.13E-11 7.39E-11 | kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 6.11E-04 9.40E-08 1.06E-07 4.74E-05 1.75E-07 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, ammonia, liquid, at regional |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-tetrafluoro-, L2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | soil soil water air resource resource resource resource resource resource air | agricultural industrial river unspecified river unspecified river unspecified river unspecified river river river unspecified high population density in ground in gr | kg (15%) Kg | 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1,5714 | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.38E-04 3.86E-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-05 2.72E-06 3.13E-12 2.05E-06 6.58E-11 7.39E-11 3.31E-08 2.85E-11 | kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 6.07E-10 6.47E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 6.11E-04 9.34E-05 1.75E-07 0.00E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, ammonia, liquid, at reg |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,2-tetrafluoro, HFC-134a Ethane, 1,1,2-tetrafluoro, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro, CFC-113 Ethane, 1,1-difluoro, HFC-152a | soil soil water esource resource res | agricultural industrial river unspecified river unspecified river unspecified river unspecified river river unspecified high population density in ground i | kg Mm3 Nm3 kg | 3.06 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1,5714 1,5715 1,5716 1 | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.386E-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-05 2.72E-06 3.13E-12 2.05E-06 6.58E-11 7.39E-11 3.31E-08 | kg/kg Mm3/kg Mm3/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 6.11E-04 9.40E-08 1.06E-07 4.74E-05 1.75E-07 0.00E+00 1.14E-08 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, ammonia, liquid, at reg |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide Dinitrogen monoxide | soil soil water construct resource resourc | agricultural industrial river unspecified river unspecified river river river unspecified river river unspecified river river unspecified high population density in ground in | kg Rm3 Nm3 kg | 3.06 3.06 3.06 0.022 0.022 0.022 1 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1,5714 1,5716 1,571 | kg PO4-Eq kg PO4 | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.38E-04 3.86E-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-05 2.72E-06 3.13E-12 2.05E-06 6.58E-11 7.39E-11 3.31E-08 2.85E-11 | kg/kg Mm3/kg Mm3/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-08 6.41E-11 8.37E-17 7.63E-08 1.06E-07 4.74E-04 9.34E-10 6.11E-04 9.40E-08 1.06E-07 4.75E-07 0.00E+00 1.14E-08 0.00E+00 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, area, as N, at regional storehouse, RER Ecoinvent V2, ammonia, liquid, at regional storehouse, RER Ecoinvent V2, ammonia, liqu |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Oil, crude, in ground Oil, crude, in ground Oil, crude, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,2-tetrafluoro, HFC-134a Ethane, 1,1,2-tetrafluoro, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro, HFC-152a Ethane, 1,1-difluoro, HFC-152a | soil soil water air resource resource resource resource resource resource air | agricultural industrial river unspecified high population density in ground i | kg | 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1,5714 1,5716 | kg PO4-Eq kg PO4 | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.38E-04 3.86E-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-05 2.72E-06 3.13E-12 2.05E-06 6.58E-11 7.39E-11 3.31E-08 2.85E-11 | kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 6.07E-10 6.47E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 6.11E-04 9.40E-08 1.06E-07 4.74E-05 1.75E-07 0.00E+00 1.14E-08 0.00E+00 1.28E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, ammonia, liquid, at regional storehouse, RER Ecoinvent V2, ammonia, |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, | soil soil water esource resource resour | agricultural industrial river unspecified river river unspecified high population density in ground in grou | kg (15%) kg | 3.06 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1,5714 | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.38E-04 3.86E-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-05 2.72E-06 3.13E-12 2.05E-06 6.58E-11 7.39E-11 3.31E-08 2.85E-11 | kg/kg Nm3/kg Nm3/kg kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 6.11E-04 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, urea, as N, at regional storehouse |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Oil, crude, in ground Oil, crude, in ground Oil, crude, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,2-tetrafluoro, HFC-134a Ethane, 1,1,2-tetrafluoro, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro, HFC-152a Ethane, 1,1-difluoro, HFC-152a | soil soil water air resource resource resource resource resource resource air | agricultural industrial river unspecified high population density in ground i | kg | 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1,5714 1,5716 | kg PO4-Eq kg PO4 | 1.15E-10 1.28E-07 7.07E-07 3.42E-03 4.27E-06 3.46E-03 4.33E-06 1.94E-06 1.09E-07 1.42E-09 1.32E-01 9.74E-02 9.51E-04 1.19E+00 3.00E-01 2.24E-05 1.78E+00 1.64E-01 3.29E-07 4.05E-02 2.02E-04 2.38E-04 3.86E-10 4.12E-04 5.42E-10 2.14E-12 2.79E-18 2.56E-05 2.72E-06 3.13E-12 2.05E-06 6.58E-11 7.39E-11 3.31E-08 2.85E-11 | kg/kg | 3.92E-07 2.16E-06 7.53E-05 9.40E-08 7.60E-05 9.52E-08 1.94E-06 3.35E-07 4.34E-09 0.00E+00 1.57E-04 1.31E+00 1.86E+00 3.79E-02 4.55E+01 1.37E+01 2.22E-04 6.24E+01 1.78E+00 1.64E-01 3.29E-07 4.05E-02 3.18E-04 3.74E-04 6.07E-10 6.47E-04 1.63E-08 6.41E-11 8.37E-17 7.63E-03 8.12E-04 9.34E-10 6.11E-04 9.40E-08 1.06E-07 4.74E-05 1.75E-07 0.00E+00 1.14E-08 0.00E+00 1.28E-05 | Ecoinvent V2, urea, as N, at regional storehouse, RER Ecoinvent V2, ammonia, liquid, at regional storehouse, RER Ecoinvent V2, ammonia, |

| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 1.25E-08 | kg/kg | 1.52E-04 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
|---|--------------------|--|----------|--------|------------|-----------|--------|------------|---|
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 7.52E-08 | kg/kg | 1.88E-06 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 6.38E-06 | kg/kg | 1.59E-04 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 1.39E-06 | kg/kg | 3.46E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 7.57E-18 | kg/kg | 3.78E-17 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | | | | - | | | | | |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 3.20E-08 | kg/kg | 6.04E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 7.16E-16 | kg/kg | 5.11E-12 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.16E-08 | kg/kg | 8.25E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 9.73E-10 | kg/kg | 1.76E-06 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.10E-07 | kg/kg | 2.00E-04 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | | | • | | | 1.102-07 | | | |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.07E-11 | kg/kg | 1.80E-10 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 6.33E-12 | kg/kg | 5.51E-11 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 5.08E-10 | kg/kg | 5.54E-06 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eg | 1.10E-10 | kg/kg | 1.20E-06 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 5.03E-18 | kg/kg | 5.48E-14 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | | 210 | | 1.87E-13 | | 3.93E-11 | |
| | | | kg | | kg CO2-Eq | | kg/kg | | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 5.30E-05 | kg/kg | 1.32E-03 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 3.86E-03 | kg/kg | 9.64E-02 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 5.22E-12 | kg/kg | 1.31E-10 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 1.83E-06 | kg/kg | 4.58E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 4.72E-10 | kg/kg | 6.61E-07 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | | | | | | | | | |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 2.25E-15 | kg/kg | 3.15E-12 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 4.73E-12 | kg/kg | 3.49E-08 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 1.12E-07 | kg/kg | 8.30E-04 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 3.04E-13 | kg/kg | 1.44E-09 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 5.95E-11 | kg/kg | 8.81E-07 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Sulfur hexafluoride | air | | | 22800 | kg CO2-Eq | 0.00L 11 | | 0.00E+00 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | | high population density | kg | | | 2 025 44 | kg/kg | | |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 3.82E-11 | kg/kg | 8.71E-07 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.54E-08 | kg/kg | 3.51E-04 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 5.09E-13 | kg/kg | 6.61E-12 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 1.16E-11 | kg/kg | 1.50E-10 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.54E-05 | kg/kg | 1.54E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | air | high population density | ka | 17200 | | 1.0.2.00 | | 0.00E+00 | |
| Nitrogen fluoride | all | riigii population density | kg | 17200 | kg CO2-Eq | | kg/kg | | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | | | | | | | | 2.10E+00 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 8.79E-07 | kg/kg | 1.65E-06 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 1.68E-06 | kg/kg | 3.15E-06 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.06E-05 | kg/kg | 1.99E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 1.94E-05 | kg/kg | 1.71E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Hydrogen chloride | oir | low population density | ka | 0.88 | kg SO2-Eq | 7.23E-06 | kg/kg | 6.37E-06 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | ali | | kg L | | | | | | |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 2.19E-06 | kg/kg | 1.92E-06 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.86E-06 | kg/kg | 2.98E-06 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 1.58E-06 | kg/kg | 2.52E-06 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 5.00E-07 | kg/kg | 7.99E-07 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 2.10E-07 | kg/kg | 3.95E-07 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Hydrogen sulfide | air | low population density | ka | 1.88 | kg SO2-Eq | 1.53E-05 | kg/kg | 2.88E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | -:- | | kg L | 1.88 | | | | | |
| Hydrogen sulfide | all | unspecified | kg | | kg SO2-Eq | 1.05E-07 | kg/kg | 1.97E-07 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 1.45E-03 | kg/kg | 1.02E-03 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 6.37E-04 | kg/kg | 4.46E-04 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 3.34E-04 | kg/kg | 2.34E-04 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eq | 2.21E-03 | kg/kg | 2.21E-03 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Sulfur dioxide | air | low population density | ka | i | kg SO2-Eq | 2.14E-03 | kg/kg | 2.14E-03 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | | | kg L | | | | | | |
| Sulfur dioxide | air | unspecified | kg | . 1 | kg SO2-Eq | 2.49E-05 | kg/kg | 2.49E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 1.01E-08 | kg/kg | 1.90E-08 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 7.79E-13 | kg/kg | 5.06E-13 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Sulfuric acid | air | low population density | ka | 0.65 | kg SO2-Eq | 9.12E-14 | kg/kg | 5.93E-14 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | | 1.1 | | | 3 7 | | | 6.16E-03 | |
| Phosphorus | air | high population density | kg | 2.06 | kg PO4-Eq | 1.27E-08 | ka/ka | 3.90E-08 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | | | ky k- | 3.06 | | | kg/kg | | |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 5.34E-10 | kg/kg | 1.63E-09 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 2.43E-09 | kg/kg | 7.43E-09 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 3.56E-11 | kg/kg | 1.09E-10 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 4.17E-08 | kg/kg | 1.28E-07 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Phosphorus | soil | industrial | ka | 3.06 | kg PO4-Eq | 6.35E-07 | kg/kg | 1.94E-06 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| BOD5, Biological Oxygen Demand | water | river | ka | 0.022 | kg PO4-Eq | 3.88E-03 | kg/kg | 8.53E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| | | | ke | | | 1.98E-06 | ka/ka | 4.35E-08 | |
| BOD5, Biological Oxygen Demand | water | unspecified | кg | 0.022 | kg PO4-Eq | | | | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 3.90E-03 | kg/kg | 8.58E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 2.00E-06 | kg/kg | 4.40E-08 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 6.07E-07 | kg/kg | 6.07E-07 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 7.35E-08 | kg/kg | 2.25E-07 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 7.04E-10 | kg/kg | 2.15E-09 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| - neophono dold | all | riigii population density | ng . | 0.31 | Ng i O4-Lq | | kg/kg | 1.74E-04 | Louiston, 12, animonia, ngura, at regional atorenouse, NEIX |
| Cool brown in ground | , | in order of | le= | 0.0 | MICH | 4.045.00 | 1 | | Facility and V/O commonic liquid at a river latest transport |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 4.24E-02 | kg/kg | 4.20E-01 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 3.39E-02 | kg/kg | 6.47E-01 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 3.31E-04 | Nm3/kg | 1.32E-02 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 6.34E-01 | Nm3/kg | 2.43E+01 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 3.35E-01 | kg/kg | 1.53E+01 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| Peat, in ground | resource | biotic | ka | 9.9 | MJ-Eq | 8.87E-06 | kg/kg | 8.78E-05 | Ecoinvent V2, ammonia, liquid, at regional storehouse, RER |
| . oat, in ground | 76304166 | Diotib | ng . | 3.3 | IVIO-LY | 0.07 L-00 | ng/ng | 4.07E+01 | LOGITTORY 72, GIRITORIU, INGIA, AL TOSIONIAI SIOTORIOUSO, INCIN |
| | Monoammonium | The unit process inventory takes into account the production of management | | | | | | 4.07 = +01 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| | | The unit process inventory takes into account the production of monoammonium | | | | | | | Econivent vz, monoammonium priospirate, as F2O5, at regional storetiouse, KEK |
| | phosphate, as P205 | phosphate from ammonia and phosphoric acid. Transports of raw materials and | | | | | | | |

Monoammonium
phosphate, as P205

The unit process inventory takes into account the production of monoammonium
phosphate from ammonia and phosphoric acid. Transports of raw materials and
intermediate products to the fertilizer plant as well as the transport of the fertilizer
product from the factory to the regional department store were included. Production
and waste treatment of catalysts, coating and packaging of the final fertilizer
product were not included. Infrastructure was replicated by the product were not included by the product were not included by the product were not included by the product was the product were not included by the product was the pro

| | pro | oducts were not included. Infrastructure was included by means of a prox | V | | | | | | |
|-------------------------|-----|--|----|--------|-----------|----------|-------|----------|--|
| back to top | | | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 7.54E-01 | kg/kg | 7.54E-01 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 6.17E-01 | kg/kg | 6.17E-01 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 8.94E-07 | kg/kg | 8.94E-07 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.53E-01 | kg/kg | 1.53E-01 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 1.86E-04 | kg/kg | 2.93E-04 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 8.80E-04 | kg/kg | 1.38E-03 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 1.05E-09 | kg/kg | 1.65E-09 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.02E-03 | kg/kg | 1.60E-03 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 1.50E-09 | kg/kg | 4.51E-08 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |

| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 6.66E-12 | kg/kg | 2.00E-10 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
|---|---|--|--|--|--|--|---|--|--|
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 7.99E-18 | kg/kg | 2.40E-16 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 9.22E-06 | kg/kg | 2.75E-03 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 8.24E-06 | kg/kg | 2.45E-03 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Dinitrogen monoxide | air air | lower stratosphere + upper troposphere | kg | 298 298 | kg CO2-Eq | 8.51E-12 | kg/kg | 2.54E-09 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified high population density | kg kg | 298 1430 | kg CO2-Eq kg CO2-Eq | 8.13E-06 1.80E-10 | kg/kg kg/kg | 2.42E-03 2.57E-07 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 2.42E-10 | kg/kg | 3.45E-07 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 2.33E-07 | kg/kg | 3.33E-04 | Ecoinvent V2, monoammonium phosphate, as P20,5 at regional storehouse, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 7.80E-11 | kg/kg | 4.78E-07 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 2.98E-10 | kg/kg | 3.70E-08 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 4.20E-09 | kg/kg | 4.20E-05 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 5.38E-09 | kg/kg | 6.56E-05 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Ethane, hexafluoro-, HFC-116 Methane, biogenic | air air | unspecified | kg kg | 12200 25 | kg CO2-Eq kg CO2-Eq | 3.51E-08 2.69E-07 | kg/kg | 4.28E-04 6.73E-06 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, biogenic | air | high population density low population density | kg | 25 | kg CO2-Eq | 5.66E-05 | kg/kg kg/kg | 1.41E-03 | Econivent V2, monoammonium phosphate, as P2O3, at regional storehouse, RER |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 4.45E-06 | kg/kg | 1.11E-04 | Econvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 2.16E-17 | kg/kg | 1.08E-16 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 1.04E-08 | kg/kg | 1.97E-05 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 4.25E-15 | kg/kg | 3.03E-11 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 6.18E-09 | kg/kg | 4.41E-05 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 2.69E-09 | kg/kg | 4.86E-06 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 3.83E-08 | kg/kg | 6.94E-05 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 5.66E-11 | kg/kg | 4.92E-10 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, dichlorodifluoro, CEC-12 | air | low population density | kg ka | 8.7 10900 | kg CO2-Eq | 1.97E-11 | kg/kg | 1.71E-10 2.20E-06 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorodifluoro-, CFC-12 | air air | high population density low population density | kg kg | 10900 | kg CO2-Eq kg CO2-Eq | 2.02E-10 3.58E-11 | kg/kg kg/kg | 2.20E-06 3.90E-07 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg ka | 10900 | kg CO2-Eq | 1.44E-17 | кд/кд kg/kg | 3.90E-07 1.57E-13 | Econvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 5.12E-13 | kg/kg | 1.08E-10 | Econivent V2, monoammonium phosphate, as P2O3, at regional storehouse, RER |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 7.67E-05 | kg/kg | 1.92E-03 | Ecoinvent V2, monoammonium phosphate, as P20,5 at regional storehouse, RER |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 2.15E-03 | kg/kg | 5.37E-02 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 1.42E-11 | kg/kg | 3.55E-10 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 9.73E-06 | kg/kg | 2.43E-04 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 3.83E-09 | kg/kg | 5.36E-06 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 6.44E-15 | kg/kg | 9.01E-12 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.53E-11 | kg/kg | 1.13E-07 | Econvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 3.16E-07 | kg/kg | 2.33E-03 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Methane, trichlorofluoro-, CFC-11 Methane, trifluoro-, HFC-23 | air air | high population density high population density | kg kg | 4750 14800 | kg CO2-Eq kg CO2-Eq | 8.32E-13 1.63E-10 | kg/kg kg/kg | 3.95E-09 2.41E-06 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | 1.03E-10 | kg/kg | 0.00E+00 | Econivent V2, monoammonium phosphate, as P2O3, at regional storehouse, RER |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.07E-10 | kg/kg | 2.44E-06 | Econvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 4.92E-08 | kg/kg | 1.12E-03 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 1.43E-12 | kg/kg | 1.86E-11 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 3.60E-11 | kg/kg | 4.68E-10 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 2.50E-03 | kg/kg | 2.50E-03 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| | | | | | | | | 1.60E+00 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 4.63E-06 | kg/kg | 8.71E-06 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Ammonia | air | low population density | kg | 1.88 1.88 | kg SO2-Eq | 1.27E-05 2.75E-05 | kg/kg | 2.39E-05 5.18E-05 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Ammonia Hydrogen chloride | air | unspecified high population density | кд ka | 0.88 | kg SO2-Eq kg SO2-Eq | 2.75E-05 3.41E-05 | kg/kg kg/kg | 3.00E-05 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 2.35E-05 | kg/kg | 2.07E-05 | Econivent V2, monoammonium phosphate, as P2O3, at regional storehouse, RER |
| Hydrogen chloride | air | unspecified | ka | 0.88 | kg SO2-Eq | 6.61E-06 | kg/kg | 5.82E-06 | Ecoinvent V2, monoammonium phosphate, as P295, at regional storehouse, RER |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.27E-06 | kg/kg | 2.03E-06 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 8.47E-05 | kg/kg | 1.36E-04 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 1.30E-06 | kg/kg | 2.08E-06 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 1.38E-09 | kg/kg | 2.59E-09 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 5.20E-06 | kg/kg | 9.77E-06 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.26E-07 | kg/kg | 4.25E-07 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 2.03E-03 | kg/kg | 1.42E-03 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Nitrogen oxides | air | low population density | kg | 0.7 0.7 | kg SO2-Eq | 1.28E-03 | kg/kg | 8.98E-04 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Nitrogen oxides Sulfur dioxide | air air | unspecified high population density | kg ka | 0.7 | kg SO2-Eq kg SO2-Eq | 1.47E-03 3.24E-02 | kg/kg kg/kg | 1.03E-03 3.24E-02 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 2.29E-03 | kg/kg | 2.29E-03 | Econivent V2, monoammonium phosphate, as P2O3, at regional storehouse, RER |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 6.01E-05 | kg/kg | 6.01E-05 | Econvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 2.08E-08 | kg/kg | 3.91E-08 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 2.13E-12 | kg/kg | 1.38E-12 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Sulfuric acid | | low population density | kg | 0.65 | kg SO2-Eq | 2.96E-13 | kg/kg | 1.92E-13 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| | air | | | | | | | 3.84E-02 | |
| | - | | | 0.00 | kg PO4-Eq | 9.09E-08 | kg/kg | 2.78E-07 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus | air | high population density | kg | 3.06 | L- DC 1 F | | | | |
| Phosphorus | air air | low population density | kg | 3.06 | kg PO4-Eq | 1.24E-09 | kg/kg | 3.81E-09 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus Phosphorus | air air air | low population density low population density, long-term | kg kg | 3.06 3.06 | kg PO4-Eq | 7.99E-09 | kg/kg | 3.81E-09 2.44E-08 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus | air air air air air | low population density low population density, long-term unspecified | kg kg kg | 3.06 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-11 | kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus Phosphorus | air air air | low population density low population density, long-term | kg kg | 3.06 3.06 | kg PO4-Eq | 7.99E-09 | kg/kg | 3.81E-09 2.44E-08 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus Phosphorus | air air air air air soil | low population density low population density, long-term unspecified agricultural | kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-11 1.72E-07 2.51E-07 1.78E-03 | kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand | air air air air soil soil | low population density low population density, long-term unspecified agricultural industrial | kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-11 1.72E-07 2.51E-07 1.78E-03 3.71E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | air air air air soil soil water water | low population density low population density, long-term unspecified agricultural industrial river unspecified river | kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-11 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | air air air air soil soil water water water water | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified | kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-11 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | air air air soil soil water water water water water water | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river | kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-11 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 5.48E-05 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 5.48E-05 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | air air air air soil soil water water water water water water | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river river | kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-111 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 5.48E-05 3.48E-05 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 5.48E-05 1.06E-04 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus | air air air air air soil soil water | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified river unspecified | kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-11 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 5.48E-05 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 5.48E-05 1.06E-04 3.93E-09 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | air air air air soil soil water water water water water water | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river river | kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-111 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 5.48E-05 3.48E-05 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 5.48E-05 1.06E-04 3.93E-09 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid | air air air air air soil soil water air | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified high population density | kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-111 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 5.48E-05 3.48E-05 1.28E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 5.48E-05 1.06E-04 3.93E-09 0.00E+00 2.42E-04 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus | air air air air air soil soil water | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified river unspecified | kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-111 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 5.48E-05 3.48E-05 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 5.48E-05 1.06E-04 3.93E-09 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground | air air air air air air soil soil water water water water water water water water water air resource | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified fiver higer unspecified fiver iver unspecified fiver iver unspecified fiver iver unspecified fiver iver unspecified high population density in ground | kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 7.99E-09 9.93E-11 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 5.48E-05 1.28E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 5.48E-05 1.06E-04 3.93E-09 0.00E+00 2.42E-04 1.35E+00 2.48E+00 5.03E-02 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus | air air air air air soil soil water water water water water water water water water ir resource resource | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified fiver iver unspecified fiver iver iver unspecified fiver iver unspecified fiver iver unspecified fiver iver unspecified high population density in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 7.99E-09 9.93E-11 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 5.48E-05 3.48E-05 1.28E-09 1.37E-01 1.30E-01 1.26E-03 2.13E-01 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 5.48E-05 1.06E-04 3.93E-09 0.00E+00 2.42E-04 1.35E+00 5.03E-02 8.16E+00 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus | air air air air air soil soil soil water water water water water water water water escurce resource resource resource resource resource | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river iver unspecified river iver iver unspecified high population density in ground in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1.022 0.022 0.022 1.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 7.99E-09 9.93E-11 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 5.48E-05 3.48E-05 1.28E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 5.48E-05 1.06E-04 3.93E-09 0.00E+00 2.42E-04 1.35E+00 2.48E+00 5.03E-02 8.16E+00 7.34E+00 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |
| Phosphorus | air air air air air air soil soil water water water water water water water air resource resource resource resource resource | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified fiver iver unspecified fiver iver iver unspecified fiver iver unspecified fiver iver unspecified fiver iver unspecified high population density in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 7.99E-09 9.93E-11 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 5.48E-05 3.48E-05 1.28E-09 1.37E-01 1.30E-01 1.26E-03 2.13E-01 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 5.48E-05 1.06E-04 3.93E-09 0.00E+00 2.42E-04 1.35E+00 2.48E+00 5.03E-02 8.16E+00 7.34E+00 1.31E-04 | Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P2O5, at regional storehouse, RER |
| Phosphorus | air air air air air soil soil soil water water water water water water water water escurce resource resource resource resource resource | low population density low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river iver unspecified river iver iver unspecified high population density in ground in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1.022 0.022 0.022 1.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 7.99E-09 9.93E-11 1.72E-07 2.51E-07 1.78E-03 3.71E-06 1.80E-03 3.76E-06 5.48E-05 3.48E-05 1.28E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 3.81E-09 2.44E-08 3.04E-10 5.27E-07 7.69E-07 3.91E-05 8.17E-08 3.95E-05 8.27E-08 5.48E-05 1.06E-04 3.93E-09 0.00E+00 2.42E-04 1.35E+00 2.48E+00 5.03E-02 8.16E+00 7.34E+00 | Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as P205, at regional storehouse, RER |

Monoammonium phosphate, as N

The unit process inventory takes into account the production of monoammonium phosphate from ammonia and phosphoric acid. Transports of raw materials and intermediate products to the fertilizer plant as well as the transport of the fertilizer product from the factory to the regional department store were included. Production and waste treatment of catalysts, coating and packaging of the final fertilizer products were not included. Infrastructure was included by means of a proxy

Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER

| | products were not included. Infrastructure was included by means of a pro | | | | | | | |
|--|---|----------|------------------|------------------------|----------------------|----------------|----------------------|--|
| Carbon dioxide, fossil | air high population density | ka | 1 | kg CO2-Eq | 2.14E+00 | kg/kg | 2.14E+00 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Carbon dioxide, fossil | air low population density | kg | i | kg CO2-Eq | 3.52E-01 | kg/kg | 3.52E-01 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Carbon dioxide, fossil | air lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 1.71E-06 | kg/kg | 1.71E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Carbon dioxide, fossil | air unspecified | kg | 1 | kg CO2-Eq | 1.59E-01 | kg/kg | 1.59E-01 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Carbon monoxide, fossil | air high population density | kg | 1.5714 | kg CO2-Eq | 2.70E-04 | kg/kg | 4.24E-04 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Carbon monoxide, fossil | air low population density | kg | 1.5714 | kg CO2-Eq | 4.21E-04 | kg/kg | 6.62E-04 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Carbon monoxide, fossil Carbon monoxide, fossil | air lower stratosphere + upper troposphere air unspecified | kg ka | 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq | 2.01E-09 1.31E-03 | kg/kg kg/kg | 3.16E-09 2.05E-03 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Chloroform | air high population density | kg kg | 30 | kg CO2-Eq | 2.76E-09 | kg/kg kg/kg | 8.27E-08 | Ecoinvent V2, monoammonium prospinate, as N, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Chloroform | air low population density | kg | 30 | kg CO2-Eq | 7.69E-12 | kg/kg | 2.31E-10 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Chloroform | air unspecified | kg | 30 | kg CO2-Eq | 1.43E-17 | kg/kg | 4.30E-16 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Dinitrogen monoxide | air high population density | kg | 298 | kg CO2-Eq | 2.78E-05 | kg/kg | 8.30E-03 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Dinitrogen monoxide | air low population density | kg | 298 | kg CO2-Eq | 6.13E-06 | kg/kg | 1.83E-03 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Dinitrogen monoxide | air lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.63E-11 | kg/kg | 4.85E-09 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Dinitrogen monoxide | air unspecified | kg | 298 1430 | kg CO2-Eq | 7.04E-06 | kg/kg | 2.10E-03 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air high population density air low population density | kg kg | 1430 | kg CO2-Eq kg CO2-Eq | 3.44E-10 2.02E-10 | kg/kg kg/kg | 4.91E-07 2.88E-07 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air unspecified | kg | 1430 | kg CO2-Eq | 2.14E-07 | kg/kg | 3.05E-04 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air high population density | kg | 6130 | kg CO2-Eq | 1.50E-10 | kg/kg | 9.17E-07 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air high population density | kg | 124 | kg CO2-Eq | 2.45E-10 | kg/kg | 3.04E-08 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air low population density | kg | 10000 | kg CO2-Eq | 3.48E-09 | kg/kg | 3.48E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air unspecified air high population density | kg | 609 | kg CO2-Eq | 4.025.00 | kg/kg | 0.00E+00 1.26E-04 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 | air high population density air unspecified | kg kg | 12200 12200 | kg CO2-Eq kg CO2-Eq | 1.03E-08 6.15E-08 | kg/kg kg/kg | 7.50E-04 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, biogenic | air high population density | kg | 25 | kg CO2-Eq | 3.01E-07 | kg/kg | 7.52E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, biogenic | air low population density | kg | 25 | kg CO2-Eq | 1.05E-05 | kg/kg | 2.64E-04 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, biogenic | air unspecified | kg | 25 | kg CO2-Eq | 3.68E-06 | kg/kg | 9.20E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, bromo-, Halon 1001 | air unspecified | kg | 5 | kg CO2-Eq | 3.88E-17 | kg/kg | 1.94E-16 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, bromochlorodifluoro-, Halon 1211 | air low population density | kg | 1890 | kg CO2-Eq | 4.76E-08 | kg/kg | 9.00E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, bromotrifluoro-, Halon 1301 | air high population density | kg | 7140 | kg CO2-Eq | 3.90E-15 | kg/kg | 2.79E-11 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, bromotrifluoro-, Halon 1301 Methane, chlorodifluoro-, HCFC-22 | air low population density air high population density | kg kg | 7140 1810 | kg CO2-Eq kg CO2-Eq | 1.14E-08 5.07E-09 | kg/kg kg/kg | 8.15E-05 9.17E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, chlorodifluoro-, HCFC-22 | air low population density | kg | 1810 | kg CO2-Eq | 1.65E-07 | kg/kg | 2.99E-04 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, chlorotrifluoro-, CFC-13 | air unspecified | kg | 14400 | kg CO2-Eq | 1.002 07 | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, dichloro-, HCC-30 | air high population density | kg | 8.7 | kg CO2-Eq | 1.03E-10 | kg/kg | 8.99E-10 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, dichloro-, HCC-30 | air low population density | kg | 8.7 | kg CO2-Eq | 2.28E-11 | kg/kg | 1.98E-10 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air high population density | kg | 10900 | kg CO2-Eq | 8.96E-10 | kg/kg | 9.76E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air low population density | kg | 10900 | kg CO2-Eq | 1.63E-10 | kg/kg | 1.78E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air unspecified air high population density | kg | 10900 | kg CO2-Eq | 2.58E-17 | kg/kg | 2.81E-13 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, dichlorofluoro-, HCFC-21 Methane, fossil | air high population density air high population density | kg kg | 210 25 | kg CO2-Eq kg CO2-Eq | 9.78E-13 9.16E-05 | kg/kg kg/kg | 2.05E-10 2.29E-03 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, fossil | air low population density | kg | 25 | kg CO2-Eq | 5.81E-03 | kg/kg | 1.45E-01 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, fossil | air lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 2.71E-11 | kg/kg | 6.78E-10 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, fossil | air unspecified | kg | 25 | kg CO2-Eq | 9.15E-06 | kg/kg | 2.29E-04 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, tetrachloro-, R-10 | air high population density | kg | 1400 | kg CO2-Eq | 1.45E-09 | kg/kg | 2.03E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, tetrachloro-, R-10 | air unspecified | kg | 1400 | kg CO2-Eq | 1.15E-14 | kg/kg | 1.62E-11 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, tetrafluoro-, R-14 | air high population density | kg | 7390 | kg CO2-Eq | 1.26E-11 | kg/kg | 9.32E-08 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, tetrafluoro-, R-14 Methane, trichlorofluoro-, CFC-11 | air unspecified air high population density | kg kg | 7390 4750 | kg CO2-Eq kg CO2-Eq | 5.53E-07 1.59E-12 | kg/kg kg/kg | 4.09E-03 7.54E-09 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, trifluoro-, HFC-23 | air high population density | kg | 14800 | kg CO2-Eq | 3.11E-10 | kg/kg | 4.60E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Sulfur hexafluoride | air high population density | kg | 22800 | kg CO2-Eq | 02 .0 | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Sulfur hexafluoride | air low population density | kg | 22800 | kg CO2-Eq | 1.85E-10 | kg/kg | 4.23E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Sulfur hexafluoride | air unspecified | kg | 22800 | kg CO2-Eq | 4.13E-08 | kg/kg | 9.41E-04 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, monochloro-, R-40 | air high population density | kg | 13 | kg CO2-Eq | 2.50E-12 | kg/kg | 3.25E-11 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Methane, monochloro-, R-40 | air low population density | kg | 13 | kg CO2-Eq | 4.15E-11 | kg/kg | 5.40E-10 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Carbon dioxide, land transformation | air low population density air high population density | kg | 1 | kg CO2-Eq | 3.59E-05 | kg/kg | 3.59E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Nitrogen fluoride | air high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 2.82E+00 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ammonia | air high population density | ka | 1.88 | kg SO2-Eq | 1.20E-03 | kg/kg | 2.26E-03 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ammonia | air low population density | kq | 1.88 | kg SO2-Eq | 7.12E-06 | kg/kg | 1.34E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Ammonia | air unspecified | kg | 1.88 | kg SO2-Eq | 4.01E-05 | kg/kg | 7.55E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Hydrogen chloride | air high population density | kg | 0.88 | kg SO2-Eq | 2.07E-05 | kg/kg | 1.82E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Hydrogen chloride | air low population density | kg | 0.88 | kg SO2-Eq | 2.00E-05 | kg/kg | 1.76E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Hydrogen chloride | air unspecified air high population density | kg kg | 0.88 1.6 | kg SO2-Eq kg SO2-Eq | 9.39E-06 1.70E-06 | kg/kg | 8.26E-06 2.72E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Hydrogen fluoride Hydrogen fluoride | air high population density air low population density | кд kg | 1.6 | kg SO2-Eq | 4.34E-06 | kg/kg kg/kg | 6.94E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Hydrogen fluoride | air unspecified | kg | 1.6 | kg SO2-Eq | 2.27E-06 | kg/kg | 3.64E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Hydrogen sulfide | air high population density | kg | 1.88 | kg SO2-Eq | 1.60E-09 | kg/kg | 3.02E-09 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Hydrogen sulfide | air low population density | kg | 1.88 | kg SO2-Eq | 2.31E-05 | kg/kg | 4.34E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Hydrogen sulfide | air unspecified | kg | 1.88 | kg SO2-Eq | 2.88E-07 | kg/kg | 5.41E-07 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Nitrogen oxides | air high population density | kg | 0.7 | kg SO2-Eq | 1.91E-03 | kg/kg | 1.34E-03 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Nitrogen oxides | air low population density air unspecified | kg | 0.7 | kg SO2-Eq | 1.51E-03 | kg/kg | 1.06E-03 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Nitrogen oxides Sulfur dioxide | air unspecified air high population density | kg kg | 0.7 1 | kg SO2-Eq kg SO2-Eq | 1.30E-03 5.10E-04 | kg/kg kg/kg | 9.07E-04 5.10E-04 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Sulfur dioxide | air low population density | kg | 1 | kg SO2-Eq | 3.84E-03 | kg/kg | 3.84E-03 | Ecoinvent V2, monoammonium prospriate, as N, at regional storehouse, RER |
| Sulfur dioxide | air unspecified | kg | 1 | kg SO2-Eq | 8.56E-05 | kg/kg | 8.56E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Hydrogen sulfide | water river | kg | 1.88 | kg SO2-Eq | 2.82E-08 | kg/kg | 5.30E-08 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Sulfuric acid | soil agricultural | kg | 0.65 | kg SO2-Eq | 4.08E-12 | kg/kg | 2.66E-12 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Phosphoric acid | air high population density | kg | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Sulfuric acid | air low population density | kg | 0.65 | kg SO2-Eq | 2.43E-13 | kg/kg | 1.58E-13 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Phoenhorus | air high population density | ka | 2.06 | kg PO4-Eq | 4.14E-08 | kalka | 1.02E-02 1.27E-07 | Fedingent V/2 managementum phosphoto as N. at regional starchouse PED |
| Phosphorus Phosphorus | air high population density air low population density | kg ka | 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 4.14E-08 1.48E-09 | kg/kg kg/kg | 1.27E-07 4.53E-09 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Phosphorus | air low population density, long-term | kg | 3.06 | kg PO4-Eq | 6.61E-09 | kg/kg | 2.02E-08 | Ecoinvent V2, monoammonium priospirate, as N, at regional storehouse, RER |
| Phosphorus | air unspecified | kg | 3.06 | kg PO4-Eq | 1.74E-10 | kg/kg | 5.32E-10 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Phosphorus | soil agricultural | kg | 3.06 | kg PO4-Eq | 1.22E-07 | kg/kg | 3.74E-07 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| Phosphorus | soil industrial | kg | 3.06 | kg PO4-Eq | 6.73E-07 | kg/kg | 2.06E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| | | | | | | | | |

Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER

APPENDIX C EMISSION FACTOR DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 3.59E-03 | kg/kg | 7.89E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
|--|----------|--|-----|--------|-----------|----------|--------|----------|---|
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 5.47E-06 | kg/kg | 1.20E-07 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| OD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 3.62E-03 | kg/kg | 7.97E-05 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| OD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 5.55E-06 | kg/kg | 1.22E-07 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| nosphate | water | river | kg | 1 | kg PO4-Eq | 2.97E-06 | kg/kg | 2.97E-06 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| nosphorus | water | river | kg | 3.06 | kg PO4-Eq | 1.33E-07 | kg/kg | 4.07E-07 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| osphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 1.90E-09 | kg/kg | 5.81E-09 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| osphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| | | | | | | | | 1.65E-04 | |
| oal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 1.14E-01 | kg/kg | 1.13E+00 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| pal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 9.64E-02 | kg/kg | 1.84E+00 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| s, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 9.43E-04 | Nm3/kg | 3.75E-02 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| as, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 9.41E-01 | Nm3/kg | 3.60E+01 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| , crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 3.23E-01 | kg/kg | 1.48E+01 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| at, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 2.79E-05 | kg/kg | 2.76E-04 | Ecoinvent V2, monoammonium phosphate, as N, at regional storehouse, RER |
| · • | | | · · | | • | | 0 0 | 5.38E+01 | |
| | | the state of the s | | | | | | | |

Ammonium sulphate, The unit process inventory takes into account the use of energy resources cited in Kongshaug (1998), needed for the production of ammonium sulphate as by-product during the manufacture of nylon (caprolactam). These values must be considered

| | | as uncertain, because the system boundaries were not clearly defined by | | | | | | | |
|---|------------|---|----------|------------------|------------------------|----------------------|----------------|----------------------|--|
| | | Kongshaug. Infrastructure was included by means of a proxy module. | | | | | | | |
| back to top | | | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 2.12E+00 | kg/kg | 2.12E+00 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 2.81E-01 | kg/kg | 2.81E-01 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 1.54E-06 | kg/kg | 1.54E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Carbon dioxide, fossil | air air | unspecified | kg | 1 | kg CO2-Eq | 1.43E-01 | kg/kg | 1.43E-01 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Carbon monoxide, fossil Carbon monoxide, fossil | air | high population density low population density | kg ka | 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq | 3.99E-04 2.76E-04 | kg/kg kg/kg | 6.26E-04 4.33E-04 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | ka | 1.5714 | kg CO2-Eq | 1.81E-09 | kg/kg | 2.85E-09 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.28E-03 | kg/kg | 2.01E-03 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 2.50E-09 | kg/kg | 7.49E-08 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 7.16E-12 | kg/kg | 2.15E-10 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Chloroform | air air | unspecified high population density | kg ka | 30 298 | kg CO2-Eq kg CO2-Eq | 1.29E-17 1.99E-05 | kg/kg | 3.88E-16 5.93E-03 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Dinitrogen monoxide Dinitrogen monoxide | air | low population density | ka | 298 | kg CO2-Eq | 4.67E-06 | kg/kg kg/kg | 1.39E-03 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.47E-11 | kg/kg | 4.38E-09 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 6.27E-06 | kg/kg | 1.87E-03 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 3.11E-10 | kg/kg | 4.44E-07 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 1.94E-10 | kg/kg | 2.77E-07 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air air | unspecified high population density | kg kg | 1430 6130 | kg CO2-Eq kg CO2-Eq | 1.40E-07 1.35E-10 | kg/kg kg/kg | 2.00E-04 8.28E-07 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | ka | 6130 | kg CO2-Eq | 1.55E-10 | kg/kg | 0.00E+00 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 2.34E-10 | kg/kg | 2.90E-08 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 3.35E-09 | kg/kg | 3.35E-05 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 | air air | unspecified high population density | kg ka | 609 12200 | kg CO2-Eq kg CO2-Eq | 9.31E-09 | kg/kg kg/kg | 0.00E+00 1.14E-04 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | ka | 12200 | kg CO2-Eq | 5.73E-08 | kg/kg | 6.99E-04 | Econivent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 2.60E-07 | kg/kg | 6.50E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 5.23E-06 | kg/kg | 1.31E-04 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 3.50E-06 | kg/kg | 8.76E-05 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 3.50E-17 | kg/kg | 1.75E-16 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, bromochlorodifluoro-, Halon 1211 Methane, bromotrifluoro-, Halon 1301 | air air | low population density high population density | kg ka | 1890 7140 | kg CO2-Eq kg CO2-Eq | 3.86E-08 2.74E-15 | kg/kg kg/kg | 7.30E-05 1.96E-11 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | ka | 7140 | kg CO2-Eq | 6.37E-09 | kg/kg | 4.55E-05 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 4.58E-09 | kg/kg | 8.29E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.34E-07 | kg/kg | 2.43E-04 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | 0.445.44 | kg/kg | 0.00E+00 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, dichloro-, HCC-30 Methane, dichloro-, HCC-30 | air air | high population density low population density | kg ka | 8.7 8.7 | kg CO2-Eq kg CO2-Eq | 9.41E-11 2.12E-11 | kg/kg kg/kg | 8.18E-10 1.84E-10 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 3.46E-10 | kg/kg | 3.77E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 1.32E-10 | kg/kg | 1.44E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 2.33E-17 | kg/kg | 2.54E-13 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 8.84E-13 | kg/kg | 1.86E-10 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, fossil Methane, fossil | air air | high population density | kg kg | 25 25 | kg CO2-Eq kg CO2-Eq | 1.37E-04 5.13E-03 | kg/kg kg/kg | 3.41E-03 1.28E-01 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, fossil | air | low population density lower stratosphere + upper troposphere | ka | 25 | kg CO2-Eq | 2.45E-11 | kg/kg | 6.12E-10 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 6.98E-06 | kg/kg | 1.75E-04 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 1.25E-09 | kg/kg | 1.75E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 1.04E-14 | kg/kg | 1.46E-11 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, tetrafluoro-, R-14 Methane, tetrafluoro-, R-14 | air air | high population density | kg ka | 7390 7390 | kg CO2-Eq | 1.20E-11 5.16E-07 | kg/kg kg/kg | 8.90E-08 3.81E-03 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, trichlorofluoro-, CFC-11 | air | unspecified high population density | kg kg | 4750 | kg CO2-Eq kg CO2-Eq | 1.43E-12 | kg/kg | 6.81E-09 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 2.81E-10 | kg/kg | 4.16E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.69E-10 | kg/kg | 3.85E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 3.73E-08 | kg/kg | 8.51E-04 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 | air air | high population density low population density | kg ka | 13 13 | kg CO2-Eq kg CO2-Eq | 2.27E-12 3.87E-11 | kg/kg kg/kg | 2.95E-11 5.03E-10 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Carbon dioxide, land transformation | air | low population density | ka | 1 | kg CO2-Eq | 3.19E-05 | kg/kg | 3.19E-05 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| | | | | | | | | 2.69E+00 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 2.15E-06 | kg/kg | 4.03E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Ammonia | air air | low population density | kg ka | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 2.75E-06 3.72E-05 | kg/kg kg/kg | 5.17E-06 7.00E-05 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Ammonia Hydrogen chloride | air | unspecified high population density | kg | 0.88 | kg SO2-Eq | 8.55E-05 | kg/kg kg/kg | 7.52E-05 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 1.84E-05 | kg/kg | 1.62E-05 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 8.62E-06 | kg/kg | 7.58E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 3.20E-06 | kg/kg | 5.13E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Hydrogen fluoride | air | low population density | kg ka | 1.6 | kg SO2-Eq | 4.06E-06 | kg/kg | 6.49E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Hydrogen fluoride Hydrogen sulfide | air air | unspecified high population density | kg ka | 1.6 1.88 | kg SO2-Eq kg SO2-Eq | 2.11E-06 1.35E-09 | kg/kg kg/kg | 3.38E-06 2.54E-09 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 1.88E-05 | kg/kg | 3.53E-05 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.80E-07 | kg/kg | 5.27E-07 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 1.82E-03 | kg/kg | 1.28E-03 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| | | | | | | | | | |

| Nitrogen oxides | oir | low population density | ka | 0.7 | kg SO2-Eq | 7.84E-04 | kg/kg | 5.49E-04 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
|--|----------|-----------------------------------|----------|--------|-----------|----------|--------|----------|---|
| Nitrogen oxides | oir | unspecified | ka | 0.7 | kg SO2-Eq | 1.23E-03 | kg/kg | 8.64E-04 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Sulfur dioxide | oir | high population density | ka | 1 | kg SO2-Eq | 3.14E-03 | kg/kg | 3.14E-03 | Ecoinvent V2. ammonium sulphate, as N, at regional storehouse. RER |
| Sulfur dioxide | all | low population density | kg | 1 | kg SO2-Eq | 2.24E-03 | kg/kg | 2.24E-03 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Sulfur dioxide Sulfur dioxide | aii | unspecified | kg ka | 1 | kg SO2-Eq | 8.31E-05 | kg/kg | 8.31E-05 | Econivent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Hydrogen sulfide | water | • | kg | 1.88 | kg SO2-Eq | 2.75E-08 | | 5.16E-08 | Econivent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Sulfuric acid | soil | river agricultural | kg | 0.65 | kg SO2-Eq | 3.69E-12 | kg/kg | 2.40E-12 | |
| Phosphoric acid | SOII | | kg l | 0.65 | | 3.69E-12 | kg/kg | 0.00E+00 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| | air | high population density | kg | | kg SO2-Eq | 0.005.40 | kg/kg | | |
| Sulfuric acid | air | low population density | кд | 0.65 | kg SO2-Eq | 2.32E-13 | kg/kg | 1.51E-13 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Di I | | | | 0.00 | 1 0015 | 4 505 07 | | 8.38E-03 | 5 · |
| Phosphorus | air | high population density | кg | 3.06 | kg PO4-Eq | 1.52E-07 | kg/kg | 4.66E-07 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 1.44E-09 | kg/kg | 4.40E-09 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 6.35E-09 | kg/kg | 1.94E-08 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 1.62E-10 | kg/kg | 4.97E-10 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 1.15E-07 | kg/kg | 3.52E-07 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 4.25E-07 | kg/kg | 1.30E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.96E-03 | kg/kg | 4.32E-05 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 5.24E-06 | kg/kg | 1.15E-07 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.99E-03 | kg/kg | 4.37E-05 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 5.30E-06 | kg/kg | 1.17E-07 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 2.68E-06 | kg/kg | 2.68E-06 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 1.04E-07 | kg/kg | 3.19E-07 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 1.59E-09 | kg/kg | 4.88E-09 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| | | | | | | | | 9.23E-05 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 1.09E-01 | kg/kg | 1.08E+00 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 1.77E-01 | kg/kg | 3.38E+00 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 1.72E-03 | Nm3/kg | 6.86E-02 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 7.60E-01 | Nm3/kg | 2.91E+01 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.79E-01 | kg/kg | 8.22E+00 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 2.43E-05 | kg/kg | 2.41E-04 | Ecoinvent V2, ammonium sulphate, as N, at regional storehouse, RER |
| | | | | | | | 3 3 | 4.18E+01 | |

Transport fertilizer See Transport Lorry > 16 t

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| B3 | Produce pesticide/ herbicide | | | | | | | | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
|--|---------------------------------|--|----------|-----------|------------------------|----------------------|----------------|----------------------|--|
| back to top | pesticide | Fuel and energy consumption for the production process of the pesticide. | | | | | | | |
| | unspecified, at | Infrastructure requirements and transports to the regional storage are included. | | | | | | | |
| | regional storehouse | Waste generation is also considered. | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 4.43E+00 | kg/kg | 4.43E+00 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 2.05E+00 | kg/kg | 2.05E+00 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 9.18E-07 | kg/kg | 9.18E-07 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.42E-01 | kg/kg | 1.42E-01 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 6.29E-04 | kg/kg | 9.89E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 1.40E-03 | kg/kg | 2.19E-03 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Carbon monoxide, fossil | air air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 1.08E-09 | kg/kg | 1.69E-09 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Carbon monoxide, fossil | | unspecified | kg | 1.5714 | kg CO2-Eq | 1.50E-03 | kg/kg | 2.36E-03 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Chloroform | air air | high population density | kg | 30 | kg CO2-Eq | 2.45E-09 | kg/kg | 7.34E-08 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Chloroform | | low population density | kg | 30 | kg CO2-Eq | 4.87E-11 | kg/kg | 1.46E-09 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Chloroform | air | unspecified | kg | 30 298 | kg CO2-Eq | 7.14E-18 8.51E-05 | kg/kg | 2.14E-16 2.53E-02 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Dinitrogen monoxide | air air | high population density | kg | 298 | kg CO2-Eq | | kg/kg | 1.09E-02 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Dinitrogen monoxide | air | low population density | kg ka | 298 | kg CO2-Eq | 3.66E-05 8.74E-12 | kg/kg | 2.61E-09 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Dinitrogen monoxide | air air | lower stratosphere + upper troposphere | kg ka | 298 | kg CO2-Eq kg CO2-Eq | 8.74E-12 3.47E-05 | kg/kg kg/kg | 1.03E-02 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg ka | 1430 | | 3.47E-05 1.46E-10 | | 2.09E-07 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | air | high population density | kg | 1430 | kg CO2-Eq | 2.36E-09 | kg/kg | 3.37E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | | low population density | kg | 1430 | kg CO2-Eq | 2.36E-09 9.17E-08 | kg/kg | 1.31E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 6130 | kg CO2-Eq | 5.90E-11 | kg/kg | 3.62E-07 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg ka | 6130 | kg CO2-Eq kg CO2-Eq | 5.90E-11 | kg/kg | 0.00E+00 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air air | unspecified | kg | 124 | | 2.30E-09 | kg/kg | 2.86E-07 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq kg CO2-Eq | 2.30E-09 | kg/kg | 0.00E+00 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 4.34E-08 | kg/kg | 4.34E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Ethane, 2-chloro-1,1,2,2-tetrafluoro-, HCFC-124 | air | low population density unspecified | kg | 609 | kg CO2-Eq | 4.34E-06 | kg/kg kg/kg | 0.00E+00 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | ka | 12200 | kg CO2-Eq | 4.13E-09 | kg/kg | 5.03E-05 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | ka | 12200 | kg CO2-Eq | 3.40E-08 | kg/kg | 4.15E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, biogenic | air | high population density | ka | 25 | kg CO2-Eq | 5.40E-06 5.15E-07 | kg/kg | 1.29E-05 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, biogenic | air | low population density | kg kg | 25 | kg CO2-Eq | 3.76E-05 | kg/kg | 9.40E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, biogenic | air | · · · · · · · · · · · · · · · · · · · | kg kg | 25 | kg CO2-Eq | 3.11E-05 | kg/kg | 7.78E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, bromo-, Halon 1001 | air | unspecified unspecified | kg kg | 5 | kg CO2-Eq | 1.94E-17 | kg/kg | 9.68E-17 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg kg | 1890 | kg CO2-Eq | 6.54E-08 | kg/kg | 1.24E-04 | Econvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | ka | 7140 | kg CO2-Eq | 7.83E-15 | kg/kg | 5.59E-11 | Econvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | ka | 7140 | kg CO2-Eq | 8.20E-08 | kg/kg | 5.85E-04 | Econvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | ka | 1810 | kg CO2-Eq | 2.17E-09 | kg/kg | 3.92E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | ka | 1810 | kg CO2-Eq | 2.46E-07 | kg/kg | 4.45E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | 2.40E-07 | kg/kg | 0.00E+00 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 1.50E-10 | kg/kg | 1.31E-09 | Econvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, dichloro-, HCC-30 | air | low population density | ka | 8.7 | kg CO2-Eq | 1.44E-10 | kg/kg | 1.25E-09 | Econvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.77E-10 | kg/kg | 1.93E-06 | Econvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | ka | 10900 | kg CO2-Eq | 2.66E-10 | kg/kg | 2.90E-06 | Econvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 1.29E-17 | kg/kg | 1.40E-13 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | ka | 210 | kg CO2-Eq | 4.16E-13 | kg/kg | 8.74E-11 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 3.04E-04 | kg/kg | 7.60E-03 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, fossil | air | low population density | ka | 25 | kg CO2-Eq | 1.50E-02 | ka/ka | 3.74E-01 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 1.46E-11 | kg/kg | 3.64E-10 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 3.98E-06 | kg/kg | 9.94E-05 | Econvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg kg | 1400 | kg CO2-Eq | 3.69E-09 | kg/kg | 5.17E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | ka | 1400 | kg CO2-Eq | 5.75E-15 | kg/kg | 8.06E-12 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | ka | 7390 | kg CO2-Eq | 1.18E-10 | kg/kg | 8.75E-07 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | ka | 7390 | kg CO2-Eq | 3.06E-07 | kg/kg | 2.26E-03 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | ka | 4750 | kg CO2-Eq | 6.76E-13 | kg/kg | 3.21E-09 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | ka | 14800 | kg CO2-Eq | 1.32E-10 | kg/kg | 1.96E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Sulfur hexafluoride | air | high population density | ka | 22800 | kg CO2-Eq | 1.026-10 | kg/kg | 0.00E+00 | Econvent V2, pesticide unspecified, at regional storehouse, CH |
| Sulfur hexaliuoride | air | low population density | ny. | 22800 | kg CO2-Eq | 2.06E-10 | kg/kg | 4.69E-06 | Econvent V2, pesticide unspecified, at regional storehouse, CH |

| | | and the second s | | | | | | | |
|--|-----------|--|----------|--------|-----------|----------|--------|----------|---|
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 4.09E-07 | kg/kg | 9.33E-03 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 2.44E-12 | kg/kg | 3.17E-11 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Methane, monochloro-, R-40 | air | low population density | ka | 13 | kg CO2-Eg | 2.63E-10 | kg/kg | 3.42E-09 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Carbon dioxide, land transformation | air | low population density | ka | 1 | kg CO2-Eq | 2.03E-04 | kg/kg | 2.03E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | air | | 3 | 47000 | | 2.03L-04 | | | |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | | | | | | | | 7.08E+00 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 1.15E-05 | kg/kg | 2.16E-05 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Ammonia | air | low population density | ka | 1.88 | kg SO2-Eg | 1.46E-05 | kg/kg | 2.75E-05 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Ammonia | air | unspecified | ka | 1.88 | kg SO2-Eq | 5.32E-05 | kg/kg | 1.00E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Hydrogen chloride | oir. | | ka | 0.88 | kg SO2-Eq | 6.77E-05 | kg/kg | 5.96E-05 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | all | high population density | kg | | | | | | |
| Hydrogen chloride | aır | low population density | кд | 0.88 | kg SO2-Eq | 1.45E-04 | kg/kg | 1.28E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 5.84E-06 | kg/kg | 5.14E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eg | 4.81E-06 | kg/kg | 7.70E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Hydrogen fluoride | air | low population density | ka | 1.6 | kg SO2-Eq | 3.22E-05 | kg/kg | 5.15E-05 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Hydrogen fluoride | air | unspecified | ka | 1.6 | kg SO2-Eg | 1.40E-06 | kg/kg | 2.24E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | an oir | • | kg | 1.88 | | 2.06E-09 | | 3.87E-09 | |
| Hydrogen sulfide | air | high population density | kg | | kg SO2-Eq | | kg/kg | | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 3.56E-05 | kg/kg | 6.70E-05 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 7.15E-07 | kg/kg | 1.34E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 5.80E-03 | kg/kg | 4.06E-03 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Nitrogen oxides | air | low population density | ka | 0.7 | kg SO2-Eg | 5.44E-03 | kg/kg | 3.81E-03 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eg | 1.17E-03 | kg/kg | 8.18E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | cii | • | kg | 0.7 | | 1.70E-02 | | 1.70E-02 | |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | | kg/kg | | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Sulfur dioxide | aır | low population density | kg | 1 | kg SO2-Eq | 1.34E-02 | kg/kg | 1.34E-02 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 8.94E-05 | kg/kg | 8.94E-05 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eg | 5.22E-08 | kg/kg | 9.82E-08 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Sulfuric acid | soil | agricultural | ka | 0.65 | kg SO2-Eg | 1.61E-12 | kg/kg | 1.05E-12 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Phosphoric acid | air | high population density | ka | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | -:- | | kg L- | 0.65 | | 2.29E-12 | | | |
| Sulfuric acid | air | low population density | кд | 0.65 | kg SO2-Eq | 2.29E-12 | kg/kg | 1.49E-12 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | | | | | | | | 3.96E-02 | |
| Phosphorus | aır | high population density | kg | 3.06 | kg PO4-Eq | 5.00E-07 | kg/kg | 1.53E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 6.08E-09 | kg/kg | 1.86E-08 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eg | 7.76E-08 | kg/kg | 2.38E-07 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Phosphorus | air | unspecified | ka | 3.06 | kg PO4-Eg | 9.82E-11 | kg/kg | 3.00E-10 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 7.72E-07 | kg/kg | 2.36E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | | | kg | | | | | | |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 3.20E-06 | kg/kg | 9.79E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 2.15E-02 | kg/kg | 4.74E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 7.20E-06 | kg/kg | 1.58E-07 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eg | 2.17E-02 | kg/kg | 4.77E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| COD, Chemical Oxygen Demand | water | unspecified | ka | 0.022 | kg PO4-Eg | 7.30E-06 | kg/kg | 1.61E-07 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Phosphate | water | river | ka | 1 | kg PO4-Eq | 2.30E-05 | kg/kg | 2.30E-05 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | | | Ny I | 0.00 | | | | | |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 5.44E-07 | kg/kg | 1.67E-06 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 3.18E-09 | kg/kg | 9.73E-09 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | | | | | | | | 9.90E-04 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 8.95E-01 | kg/kg | 8.86E+00 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Coal, hard, unspecified, in ground | resource | in ground | ka | 19.1 | MJ-Eq | 6.09E-01 | kg/kg | 1.16E+01 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | | • | | 39.8 | | | | | |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | | MJ-Eq | 5.94E-03 | Nm3/kg | 2.36E-01 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 1.54E+00 | Nm3/kg | 5.90E+01 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 2.16E+00 | kg/kg | 9.91E+01 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 2.06E-05 | kg/kg | 2.04E-04 | Ecoinvent V2, pesticide unspecified, at regional storehouse, CH |
| | | | <u> </u> | | | | | 1.79E+02 | |
| | | | | | | | | 1.736702 | |

| | herbicide | Gee Trailsport, John 2 Tot. | |
|-------------|------------------|----------------------------------|--|
| back to top | | | |
| | | | |
| | | | |
| B4 | Transport manure | See transport, lorry >32t, EURO4 | |

B9 Apply Manure see Cereal Activities, Cereal and Forage Activities

Solid manure loading and spreading, by hydraulic loader and spreader, CH

Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH

agricultural machinery and of the shed, which has to be attributed to the manure loading and spreading. Also taken into consideration is the amount of emissions to the air from combustion and the emission to the soil from tyre abrasion diving the work process. The following activities where considered part of the work process: preliminary work at the farm, like attaching the adequate machine to the tractor; transfer to field (with an assumed distance of 1 km); field work (for a parcel of land of 1 ha surface); transfer to farm and concluding work, like uncoupling the machine. The overlapping during the field work is considered. The amount of spread material is not taken into account. Not included are dust other than from combustion and

The overlapping during the field work is considered. The amount of spread material is not taken into account. Not included are dust other than from combustion and back to top Carbon dioxide, fossil high population density Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH kg CO2-Eq kg CO2-Eq 1.98E-03 3.85E-11 Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Carbon dioxide, fossil low population density kg/kg 1.98E-03 Carbon dioxide, fossil 3.85E-11 lower stratosphere + upper troposphere Carbon dioxide, fossil Carbon monoxide, fossil unspecified high population density kg CO2-Eq kg CO2-Eq 4.36E-04 2.63E-07 4.36E-04 4.13E-07 Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH 1.5714 1.5714 1.5714 kg CO2-Eq kg CO2-Eq 3.84E-06 4.53E-14 6.03E-06 7.11E-14 Carbon monoxide, fossil low population density Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Carbon monoxide, fossil lower stratosphere + upper troposphere 9.43E-06 3.17E-13 Carbon monoxide, fossil unspecified 1.5714 1.48E-05 Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH ka CO2-Ea 9.52E-12 Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Chloroform high population density 30 Chloroform low population density kg CO2-Eq 1.19E-14 3.58E-13 2.93E-20 1.15E-08 Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Chloroform unspecified kg CO2-Eg 8.80E-19 298 kg CO2-Eq 3.44E-06 Dinitrogen monoxide high population density kg CO2-Eq kg CO2-Eq 7.08E-08 3.67E-16 Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Dinitrogen monoxide low population density 298 298 2.11E-05 lower stratosphere + upper troposphere 1.09E-13 Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a kg CO2-Eq kg CO2-Eq 5.98E-09 7.61E-15 1.78E-06 1.09E-11 unspecified 298 1430 Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH high population density Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a 1430 1430 kg CO2-Eq 3.84E-13 1.04E-10 5.49E-10 1.49E-07 low population density Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH unspecified Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH 6130 6130 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 high population density kg CO2-Eq 2.75E-15 1.69E-11 Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 unspecified ka CO2-Ea kg/kg 0.00E+00 Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ethane, 1,1-difluoro-, HFC-152a kg CO2-Eq 2.65E-13 3.28E-11 Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH high population density

| E. 4.4.10 LIEO 450 | | 1 12 1 2 | | 404 | 1 000 F | | 1 0 | 0.005.00 | |
|---|---|--|--|---|---|--|--|--|---|
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 7.40E-12 | kg/kg | 7.40E-08 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 1.96E-13 | kg/kg | 2.39E-09 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 6.65E-11 | kg/kg | 8.12E-07 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | | | | | | | | | |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 1.22E-09 | kg/kg | 3.04E-08 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 4.87E-09 | kg/kg | 1.22E-07 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 2.90E-09 | kg/kg | 7.24E-08 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 7.95E-20 | kg/kg | 3.98E-19 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 3.66E-12 | kg/kg | 6.91E-09 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 1.74E-16 | kg/kg | 1.24E-12 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | | | 7140 | | 3.08E-11 | | 2.20E-07 | |
| | | low population density | kg | | kg CO2-Eq | | kg/kg | | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 1.59E-13 | kg/kg | 2.87E-10 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.41E-11 | kg/kg | 2.55E-08 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eg | 1.63E-14 | kg/kg | 1.42E-13 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eg | 3.53E-14 | kg/kg | 3.07E-13 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 9.83E-15 | kg/kg | 1.07E-10 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | | | | | | | | | |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 1.32E-14 | kg/kg | 1.44E-10 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 5.29E-20 | kg/kg | 5.76E-16 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 2.16E-17 | kg/kg | 4.54E-15 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 2.21E-07 | kg/kg | 5.52E-06 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 4.42E-06 | kg/kg | 1.10E-04 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, fossil | air | | kg | 25 | kg CO2-Eq | 6.12E-16 | kg/kg | 1.53E-14 | Econivent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | | lower stratosphere + upper troposphere | | | | | | | |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 7.03E-09 | kg/kg | 1.76E-07 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 1.72E-12 | kg/kg | 2.41E-09 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 2.36E-17 | kg/kg | 3.31E-14 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.36E-14 | kg/kg | 1.01E-10 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 5.99E-10 | kg/kg | 4.43E-06 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, trichlorofluoro-, CFC-11 | air | | | 4750 | kg CO2-Eq | 3.51E-17 | | 1.67E-13 | |
| | | high population density | kg | | | | kg/kg | | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 6.89E-15 | kg/kg | 1.02E-10 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.25E-13 | kg/kg | 2.86E-09 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 4.03E-11 | kg/kg | 9.19E-07 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | air | | kg | 13 | kg CO2-Eq | 2.69E-16 | kg/kg | 3.50E-15 | |
| Methane, monochloro-, R-40 | | high population density | | | | | | | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 6.45E-14 | kg/kg | 8.39E-13 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 2.18E-08 | kg/kg | 2.18E-08 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | | | | | | | | 3.18E-03 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 3.59E-09 | kg/kg | 6.75E-09 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Ammonia | air | | | 1.88 | | 1.74E-08 | | 3.26E-08 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | all | low population density | kg | | kg SO2-Eq | | kg/kg | | |
| Ammonia | air | unspecified | кg | 1.88 | kg SO2-Eq | 4.51E-08 | kg/kg | 8.47E-08 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 2.47E-08 | kg/kg | 2.17E-08 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 1.20E-08 | kg/kg | 1.05E-08 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 1.60E-08 | kg/kg | 1.41E-08 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eg | 8.72E-10 | kg/kg | 1.40E-09 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | oir | | . • | 1.6 | kg SO2-Eq | 2.81E-09 | kg/kg | 4.49E-09 | |
| Hydrogen fluoride | all | low population density | kg | | | | | | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Hydrogen fluoride | aır | unspecified | kg | 1.6 | kg SO2-Eq | 4.24E-09 | kg/kg | 6.78E-09 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 6.99E-11 | kg/kg | 1.31E-10 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 6.95E-09 | kg/kg | 1.31E-08 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Hydrogen sulfide | air | unspecified | ka | 1.88 | kg SO2-Eq | 2.88E-09 | kg/kg | 5.41E-09 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 5.61E-07 | kg/kg | 3.93E-07 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | e.i. | | · · · · · · · · · · · · · · · · · · · | | | | | | |
| Nitrogen oxides | aır | low population density | kg | 0.7 | kg SO2-Eq | 2.57E-05 | kg/kg | 1.80E-05 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 1.19E-06 | kg/kg | 8.30E-07 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 1.11E-06 | kg/kg | 1.11E-06 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 3.06E-06 | kg/kg | 3.06E-06 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 4.65E-07 | kg/kg | 4.65E-07 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Hydrogen sulfide | water | river | ka | 1.88 | kg SO2-Eq | 3.03E-10 | kg/kg | 5.69E-10 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | soil | | kg ka | 0.65 | | 7.52E-17 | | 4.89E-17 | |
| Sulfuric acid | | agricultural | kg | | kg SO2-Eq | 1.32E-11 | kg/kg | | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 2.63E-16 | kg/kg | 1.71E-16 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | | | | | | | | 2.41E-05 | |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 6.60E-11 | kg/kg | 2.02E-10 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus | air | low population density | ka | 3.06 | kg PO4-Eq | 1.31E-11 | kg/kg | 4.01E-11 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | oir | | kg ka | 3.06 | | | | | |
| Phosphorus | all | low population density, long-term | kg | | kg PO4-Eq | 1.25E-11 | kg/kg | 3.81E-11 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus | aır | unspecified | kg | 3.06 | kg PO4-Eq | 1.90E-13 | kg/kg | 5.81E-13 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| | soil | agricultural | kg | 3.06 | kg PO4-Eq | 7.10E-11 | kg/kg | 2.17E-10 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus | | industrial | kg | 3.06 | kg PO4-Eq | 8.27E-10 | kg/kg | 2.53E-09 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus Phosphorus | soil | river | kg | 0.022 | kg PO4-Eq | 5.54E-06 | kg/kg | 1.22E-07 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus | | | 9 | 0.022 | kg PO4-Eq | 4.16E-08 | kg/kg | 9.16E-10 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand | water | | ka | | kg PO4-Eq | 5.63E-06 | | 1.24E-07 | Econivent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Econivent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand | water water | unspecified | kg ka | 0.022 | | | kg/kg | 1.240-07 | ECULIVEIT VZ. SUID MANUE IDADING AND SPIERGING, DV NVGIRUIC IDADEL AND SPIERGEL, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | water water water | unspecified river | kg | 0.022 | | 4.40=.00 | 1 // | 0.005.40 | |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | water water water water | unspecified river unspecified | kg kg | 0.022 0.022 | kg PO4-Eq | 4.19E-08 | kg/kg | 9.22E-10 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | water water water water water | unspecified river | kg | 0.022 1 | kg PO4-Eq kg PO4-Eq | 1.10E-09 | kg/kg | 1.10E-09 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | water water water water | unspecified river unspecified | kg kg | | kg PO4-Eq | | kg/kg | | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | water water water water water water | unspecified river unspecified river river | kg kg kg kg | 0.022 1 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.10E-09 6.76E-10 | kg/kg kg/kg | 1.10E-09 2.07E-09 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus | water water water water water water water | unspecified river unspecified river river unspecified | kg kg kg kg kg | 0.022 1 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.10E-09 | kg/kg kg/kg kg/kg | 1.10E-09 2.07E-09 2.14E-11 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | water water water water water water | unspecified river unspecified river river | kg kg kg kg | 0.022 1 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.10E-09 6.76E-10 | kg/kg kg/kg | 1.10E-09 2.07E-09 2.14E-11 0.00E+00 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid | water water water water water water water air | unspecified river unspecified river river unspecified high population density | kg kg kg kg kg | 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.10E-09 6.76E-10 7.01E-12 | kg/kg kg/kg kg/kg kg/kg | 1.10E-09 2.07E-09 2.14E-11 0.00E+00 2.54E-07 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground | water water water water water water water water air resource | unspecified river unspecified river river unspecified high population density in ground | kg kg kg kg kg kg | 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.10E-09 6.76E-10 7.01E-12 7.42E-05 | kg/kg kg/kg kg/kg kg/kg | 1.10E-09 2.07E-09 2.14E-11 0.00E+00 2.54E-07 7.35E-04 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid | water water water water water water water air | unspecified river unspecified river river unspecified high population density | kg kg kg kg kg kg | 0.022 1 3.06 3.06 0.97 9.9 19.1 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq | 1.10E-09 6.76E-10 7.01E-12 7.42E-05 3.31E-04 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.10E-09 2.07E-09 2.14E-11 0.00E+00 2.54E-07 7.35E-04 6.33E-03 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground | water water water water water water water water air resource | unspecified river unspecified river river unspecified high population density in ground | kg kg kg kg kg kg | 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.10E-09 6.76E-10 7.01E-12 7.42E-05 | kg/kg kg/kg kg/kg kg/kg | 1.10E-09 2.07E-09 2.14E-11 0.00E+00 2.54E-07 7.35E-04 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | water water water water water water water water air resource resource | unspecified river unspecified river river river unspecified high population density in ground in ground in ground | kg kg kg kg kg kg Nm3 | 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 1.10E-09 6.76E-10 7.01E-12 7.42E-05 3.31E-04 3.23E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg Nm3/kg | 1.10E-09 2.07E-09 2.14E-11 0.00E+00 2.54E-07 7.35E-04 6.33E-03 1.28E-04 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | water water water water water water water water air resource resource resource resource | unspecified river unspecified river river river unspecified high population density in ground in ground in ground in ground | kg kg kg kg kg kg Nm3 Nm3 | 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.10E-09 6.76E-10 7.01E-12 7.42E-05 3.31E-04 3.23E-06 1.24E-04 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg Nm3/kg Nm3/kg | 1.10E-09 2.07E-09 2.14E-11 0.00E+00 2.54E-07 7.35E-04 6.33E-03 1.28E-04 4.73E-03 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphoris Phosphoris acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | water water water water water water water water air resource resource resource resource resource | unspecified river unspecified river river river unspecified high population density in ground in ground in ground in ground in ground in ground | kg kg kg kg kg kg Nm3 Nm3 | 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.10E-09 6.76E-10 7.01E-12 7.42E-05 3.31E-04 3.23E-06 1.24E-04 7.34E-04 | kg/kg kg/kg kg/kg kg/kg kg/kg Nm3/kg Nm3/kg kg/kg | 1.10E-09 2.07E-09 2.14E-11 0.00E+00 2.54E-07 7.35E-04 6.33E-03 1.28E-04 4.73E-03 3.36E-02 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | water water water water water water water water air resource resource resource resource | unspecified river unspecified river river river unspecified high population density in ground in ground in ground in ground | kg kg kg kg kg kg Nm3 Nm3 | 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.10E-09 6.76E-10 7.01E-12 7.42E-05 3.31E-04 3.23E-06 1.24E-04 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg Nm3/kg Nm3/kg | 1.10E-09 2.07E-09 2.14E-11 0.00E+00 2.54E-07 7.35E-04 6.33E-03 1.28E-04 4.73E-03 3.36E-02 2.50E-07 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |
| Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | water water water water water water water water air resource resource resource resource resource | unspecified river unspecified river river river unspecified high population density in ground in ground in ground in ground in ground in ground | kg kg kg kg kg kg Nm3 Nm3 | 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.10E-09 6.76E-10 7.01E-12 7.42E-05 3.31E-04 3.23E-06 1.24E-04 7.34E-04 | kg/kg kg/kg kg/kg kg/kg kg/kg Nm3/kg Nm3/kg kg/kg | 1.10E-09 2.07E-09 2.14E-11 0.00E+00 2.54E-07 7.35E-04 6.33E-03 1.28E-04 4.73E-03 3.36E-02 | Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH Ecoinvent V2, solid manure loading and spreading, by hydraulic loader and spreader, CH |

| | | 1.032+03 |
|------|---------------|----------|
| | | |
| D.C. | Indicate Com | |
| B3 | irrigate Grop | |

proxy of Tillage, cultivating, chiseling

see Cereal Activities, Cereal and Forage Activities

Incorporate Manure

back to top

Irrigating

The inventory takes into account electricity and diesel fuel consumption, the amount of agricultural machinery, of the shed and the further infrastructure like pump or water hose, etc., which has to be attributed to the irrigation. Also taken into consideration is the amount of emissions to the air from combustion and the emission to the soil from tyre abrasion during the work process. The following activities where considered part of the work process: preliminary work at the farm, like attaching the adequate machine to the tractor; transfer to field (with an assumed distance of 1 km); field work (for a parcel of land of 1 ha surface); transfer to farm and concluding work, like uncoupling the machine. The overlapping during the field work is considered. The amount of water irrigated is taken into account. Not included are dust other than from combustion and noise.

| | | the field work is considered. The amount of water irrigated is taken into account. | | | | | | | |
|--|------------|--|----------|--------------|------------------------|----------------------|----------------|----------------------|--------------------------|
| Carbon dioxide, fossil | air | Not included are dust other than from combustion and noise. | ka | 1 | kg CO2-Eq | 1.14E+02 | ka/ha | 1.14E+02 | Irrigating |
| Carbon dioxide, fossil | air | high population density | . 3 | 1 | kg CO2-Eq | 1.06E+02 | kg/ha kg/ha | 1.06E+02 | Irrigating |
| | | low population density | kg | | | | | 4.38E-06 | Irrigating |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | | kg CO2-Eq | 4.38E-06 | kg/ha | | Irrigating |
| Carbon dioxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 5.03E+01 | kg/ha | 5.03E+01 | Irrigating |
| Carbon monoxide, fossil | air air | high population density | kg | | kg CO2-Eq | 3.22E-01 | kg/ha | 5.05E-01 | Irrigating |
| Carbon monoxide, fossil | | low population density | kg | 1.5714 | kg CO2-Eq | 1.16E-01 | kg/ha | 1.82E-01 | Irrigating |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 5.14E-09 | kg/ha | 8.08E-09 | Irrigating |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.03E+00 | kg/ha | 1.61E+00 | Irrigating |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 4.14E-07 | kg/ha | 1.24E-05 | Irrigating |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 1.17E-08 | kg/ha | 3.51E-07 | Irrigating |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 1.38E-15 | kg/ha | 4.14E-14 | Irrigating |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 2.38E-03 | kg/ha | 7.08E-01 | Irrigating |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 2.94E-03 | kg/ha | 8.77E-01 | Irrigating |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 4.17E-11 | kg/ha | 1.24E-08 | Irrigating |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 5.68E-03 | kg/ha | 1.69E+00 | Irrigating |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 1.88E-09 | kg/ha | 2.69E-06 | Irrigating |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 5.34E-07 | kg/ha | 7.63E-04 | Irrigating |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 7.64E-06 | kg/ha | 1.09E-02 | Irrigating |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 2.17E-10 | kg/ha | 1.33E-06 | Irrigating |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/ha | 0.00E+00 | Irrigating |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 2.86E-07 | kg/ha | 3.55E-05 | Irrigating |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/ha | 0.00E+00 | Irrigating |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 1.06E-05 | kg/ha | 1.06E-01 | Irrigating |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/ha | 0.00E+00 | Irrigating |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 2.20E-08 | kg/ha | 2.69E-04 | Irrigating . |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 2.30E-06 | kg/ha | 2.80E-02 | Irrigating . |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 2.38E-03 | kg/ha | 5.95E-02 | Irrigating |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 3.79E-03 | kg/ha | 9.48E-02 | Irrigating |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 2.34E-03 | kg/ha | 5.86E-02 | Irrigating |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 3.74E-15 | kg/ha | 1.87E-14 | Irrigating |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 9.79E-07 | kg/ha | 1.85E-03 | Irrigating |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 3.05E-12 | kg/ha | 2.18E-08 | Irrigating |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 7.34E-07 | kg/ha | 5.24E-03 | Irrigating |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 3.35E-08 | kg/ha | 6.07E-05 | Irrigating |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 4.71E-06 | kg/ha | 8.53E-03 | Irrigating |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | 12 00 | kg/ha | 0.00E+00 | Irrigating |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 1.01E-07 | kg/ha | 8.75E-07 | Irrigating |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 3.46E-08 | kg/ha | 3.01E-07 | Irigating Irrigating |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 2.52E-09 | kg/ha | 2.75E-05 | Irrigating |
| | air | low population density | • | 10900 | kg CO2-Eq | 2.56E-09 | kg/ha | 2.79E-05 | |
| Methane, dichlorodifluoro-, CFC-12 | air | | kg | 10900 | | | | 2.79E-05 2.71E-11 | Irrigating |
| Methane, dichlorodifluoro-, CFC-12 | | unspecified | kg | | kg CO2-Eq | 2.49E-15 | kg/ha | | Irrigating |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 5.34E-12 | kg/ha | 1.12E-09 | Irrigating |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 3.51E-01 | kg/ha | 8.78E+00 | Irrigating |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 4.94E-01 | kg/ha | 1.24E+01 | Irrigating |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 6.95E-11 | kg/ha | 1.74E-09 | Irrigating |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 7.22E-04 | kg/ha | 1.80E-02 | Irrigating |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 2.31E-07 | kg/ha | 3.23E-04 | Irrigating |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 1.11E-12 | kg/ha | 1.56E-09 | Irrigating |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.47E-08 | kg/ha | 1.09E-04 | Irrigating |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 2.07E-05 | kg/ha | 1.53E-01 | Irrigating |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 8.67E-12 | kg/ha | 4.12E-08 | Irrigating |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 1.70E-09 | kg/ha | 2.52E-05 | Irrigating |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/ha | 0.00E+00 | Irrigating |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 3.23E-08 | kg/ha | 7.35E-04 | Irrigating |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 4.67E-05 | kg/ha | 1.06E+00 | Irrigating |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 1.97E-10 | kg/ha | 2.55E-09 | Irrigating |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 6.32E-08 | kg/ha | 8.22E-07 | Irrigating |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 9.83E-03 | kg/ha | 9.83E-03 | Irrigating |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/ha | 0.00E+00 | Irrigating |
| | | | | | | | | 2.99E+02 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 6.13E-04 | kg/ha | 1.15E-03 | Irrigating |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 1.16E-03 | kg/ha | 2.19E-03 | Irrigating |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 7.53E-03 | kg/ha | 1.42E-02 | Irrigating |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 4.00E-03 | kg/ha | 3.52E-03 | Irrigating |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 4.63E-03 | kg/ha | 4.07E-03 | Irrigating |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 1.85E-03 | kg/ha | 1.63E-03 | Irrigating |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.33E-04 | kg/ha | 2.12E-04 | Irrigating . |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 1.35E-03 | kg/ha | 2.16E-03 | Irrigating . |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 3.75E-04 | kg/ha | 6.00E-04 | Irrigating |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 1.40E-05 | kg/ha | 2.64E-05 | Irrigating |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 1.04E-03 | kg/ha | 1.95E-03 | Irrigating |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 3.42E-04 | kg/ha | 6.43E-04 | Irrigating |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 1.68E-01 | kg/ha | 1.18E-01 | Irrigating |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 3.80E-01 | kg/ha | 2.66E-01 | Irrigating |
| Nitrogen oxides | air | unspecified | ka | 0.7 | kg SO2-Eq | 1.59E-01 | kg/ha | 1.11E-01 | Irrigating |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eq | 2.05E-01 | kg/ha | 2.05E-01 | Irrigating |
| Sulfur dioxide | air | low population density | ka | 1 | kg SO2-Eq | 3.36E-01 | kg/ha | 3.36E-01 | Irrigating |
| Sulfur dioxide | air | unspecified | ka | 1 | kg SO2-Eq | 5.11E-02 | kg/ha | 5.11E-02 | Irrigating |
| Hydrogen sulfide | water | river | ka | 1.88 | kg SO2-Eq | 3.45E-05 | kg/ha | 6.49E-05 | Irrigating |
| Sulfuric acid | soil | agricultural | ka | 0.65 | kg SO2-Eq | 5.93E-12 | kg/ha | 3.85E-12 | Irrigating |
| Phosphoric acid | air | high population density | ka | 0.98 | kg SO2-Eq | 5.00L .E | kg/ha | 0.00E+00 | Irrigating Irrigating |
| Sulfuric acid | air | low population density | ka | 0.65 | kg SO2-Eq | 2.85E-10 | kg/ha | 1.85E-10 | Irrigating Irrigating |
| | u | ion population definity | ng ng | 0.00 | g 002 Lq | 2.00L 10 | мулта | 1.12E+00 | gag |
| Sulfulle acid | | | | | | | | | |
| | air | high population density | ka | 3.06 | ka PO4-Fa | 1.76F-05 | ka/ha | | Irrigating |
| Phosphorus Phosphorus | air air | high population density low population density | kg kg | 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 1.76E-05 2.35E-06 | kg/ha kg/ha | 5.40E-05 7.21E-06 | Irrigating Irrigating |

| Di I | | | | 0.00 | L DO4.5 | 1 705 05 | | 5.005.05 | |
|---|-------------------------------------|--|-----------|-------------------|------------------------|----------------------|-----------------------|----------------------|--|
| Phosphorus Phosphorus | air air | low population density, long-term unspecified | kg ka | 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 1.73E-05 6.52E-09 | kg/ha kg/ha | 5.30E-05 1.99E-08 | Irrigating Irrigating |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 5.44E-05 | kg/ha | 1.67E-04 | Irrigating |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 2.57E-05 | kg/ha | 7.85E-05 | Irrigating |
| BOD5, Biological Oxygen Demand | water water | river | kg ka | 0.022 0.022 | kg PO4-Eq kg PO4-Eq | 1.59E-01 4.54E-03 | kg/ha kg/ha | 3.49E-03 9.98E-05 | Irrigating |
| BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | water | unspecified river | kg ka | 0.022 | kg PO4-Eq | 4.54E-03 1.71E-01 | kg/ha | 3.76E-03 | Irrigating Irrigating |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 4.56E-03 | kg/ha | 1.00E-04 | Irrigating |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 9.25E-05 | kg/ha | 9.25E-05 | Irrigating |
| Phosphorus Phosphorus | water water | river unspecified | kg ka | 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 6.68E-05 6.88E-07 | kg/ha kg/ha | 2.05E-04 2.11E-06 | Irrigating Irrigating |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | 0.002 07 | kg/ha | 0.00E+00 | Irrigating |
| | | | | | | | | 8.11E-03 | |
| Coal, bord, unapposited in ground | resource | in ground | kg | 9.9 19.1 | MJ-Eq MJ-Eq | 4.12E+01 6.28E+01 | kg/ha kg/ha | 4.08E+02 1.20E+03 | Irrigating |
| Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | resource resource | in ground in ground | kg Nm3 | 39.8 | MJ-Eq | 5.94E-01 | Nm3/ha | 2.36E+01 | Irrigating Irrigating |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 3.65E+01 | Nm3/ha | 1.40E+03 | Irrigating |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 4.02E+01 | kg/ha | 1.84E+03 | Irrigating |
| Peat, in ground | resource | biotic | кд | 9.9 | MJ-Eq | 4.89E-02 | kg/ha | 4.84E-01 4.87E+03 | Irrigating |
| | | | | | | | | 4.072+03 | |
| E1 | Produce crude | | | | | | | | |
| back to top | crude oil, at production onshore | | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 2.41E-02 | kg/kg | 2.41E-02 | crude oil, at production onshore, RME |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 6.69E-02 | kg/kg | 6.69E-02 | crude oil, at production onshore, RME |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 4.92E-10 | kg/kg | 4.92E-10 | crude oil, at production onshore, RME |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 3.49E-03 | kg/kg | 3.49E-03 | crude oil, at production onshore, RME |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 3.03E-06 | kg/kg | 4.76E-06 | crude oil, at production onshore, RME |
| Carbon monoxide, fossil Carbon monoxide, fossil | | low population density lower stratosphere + upper troposphere | кg kg | 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq | 2.64E-04 5.78E-13 | kg/kg kg/kg | 4.15E-04 9.08E-13 | crude oil, at production onshore, RME crude oil, at production onshore, RME |
| Carbon monoxide, fossil | | unspecified | kø | 1.5714 | kg CO2-Eq | 4.67E-05 | kg/kg kg/kg | 7.35E-05 | crude oil, at production onshore, RME |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 2.10E-12 | kg/kg | 6.31E-11 | crude oil, at production onshore, RME |
| Chloroform | air | low population density | kg | | kg CO2-Eq | 6.58E-14 | kg/kg | 1.98E-12 | crude oil, at production onshore, RME |
| Chloroform | air | unspecified | kg | | kg CO2-Eq | 1.27E-20 | kg/kg | 3.80E-19 | crude oil, at production onshore, RME |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 7.34E-07 | kg/kg | 2.19E-04 | crude oil, at production onshore, RME |
| Dinitrogen monoxide Dinitrogen monoxide | air | low population density | kg | 298 298 | kg CO2-Eq kg CO2-Eq | 2.29E-06 4.69E-15 | kg/kg | 6.82E-04 1.40E-12 | crude oil, at production onshore, RME crude oil, at production onshore, RME |
| Dinitrogen monoxide Dinitrogen monoxide | | lower stratosphere + upper troposphere unspecified | kg | 298 | kg CO2-Eq | 4.69E-15 1.25E-07 | kg/kg kg/kg | 3.72E-05 | crude oil, at production onshore, RME |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | | high population density | kg | 1430 | kg CO2-Eq | 7.99E-14 | kg/kg | 1.14E-10 | crude oil, at production onshore, RME |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | | low population density | kg | 1430 | kg CO2-Eq | 3.40E-12 | kg/kg | 4.87E-09 | crude oil, at production onshore, RME |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 5.04E-10 | kg/kg | 7.20E-07 | crude oil, at production onshore, RME |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 2.56E-14 | kg/kg | 1.57E-10 | crude oil, at production onshore, RME |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | crude oil, at production onshore, RME |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 4.39E-12 | kg/kg | 5.44E-10 | crude oil, at production onshore, RME |
| Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | | low population density low population density | kg kg | 124 10000 | kg CO2-Eq kg CO2-Eq | 5.89E-11 | kg/kg kg/kg | 0.00E+00 5.89E-07 | crude oil, at production onshore, RME crude oil, at production onshore, RME |
| Ethane, 2-chloro-1,1,2,2-tetrafluoro-, HCFC-124 | | unspecified | kg kg | | kg CO2-Eq | J.05E-11 | kg/kg | | crude oil, at production onshore, RME |
| Ethane, hexafluoro-, HFC-116 | | high population density | kg | 12200 | kg CO2-Eq | 1.87E-12 | kg/kg | 2.28E-08 | crude oil, at production onshore, RME |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 4.85E-11 | kg/kg | | crude oil, at production onshore, RME |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 3.48E-09 | kg/kg | 8.71E-08 | crude oil, at production onshore, RME |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.01E-07 | kg/kg | 2.53E-06 | crude oil, at production onshore, RME |
| Methane, biogenic Methane, bromo-, Halon 1001 | | unspecified | kg | 25 | kg CO2-Eq kg CO2-Eq | 6.60E-08 3.43E-20 | kg/kg | 1.65E-06 1.72E-19 | crude oil, at production onshore, RME crude oil, at production onshore, RME |
| Methane, bromochlorodifluoro-, Halon 1211 | | unspecified low population density | kg kg | 1890 | kg CO2-Eq | 3.94E-11 | kg/kg kg/kg | 7.45E-08 | crude oil, at production onshore, RME |
| Methane, bromotrifluoro-, Halon 1301 | | high population density | kg | 7140 | kg CO2-Eq | 1.63E-17 | kg/kg | 1.16E-13 | |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 5.88E-08 | kg/kg | 4.20E-04 | crude oil, at production onshore, RME |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 1.60E-12 | kg/kg | 2.90E-09 | crude oil, at production onshore, RME |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.69E-10 | kg/kg | | crude oil, at production onshore, RME |
| Methane, chlorotrifluoro-, CFC-13 | | unspecified | kg | 14400 8.7 | kg CO2-Eq | 9.00E 19 | kg/kg | 0.00E+00 | crude oil, at production onshore, RME |
| Methane, dichloro-, HCC-30 Methane, dichloro-, HCC-30 | | high population density | кg kg | 8.7 | kg CO2-Eq kg CO2-Eg | 2.99E-13 1.95E-13 | kg/kg kg/kg | 2.60E-12 1.70E-12 | crude oil, at production onshore, RME crude oil, at production onshore, RME |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.37E-13 | kg/kg | 1.49E-09 | crude oil, at production onshore, RME |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 1.78E-13 | kg/kg | 1.94E-09 | crude oil, at production onshore, RME |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 2.28E-20 | kg/kg | 2.49E-16 | crude oil, at production onshore, RME |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 2.27E-16 | kg/kg | 4.77E-14 | crude oil, at production onshore, RME |
| Methane, fossil | air | high population density | kg | 25 25 | kg CO2-Eq | 2.82E-06 | kg/kg | 7.04E-05 | crude oil, at production onshore, RME |
| Methane, fossil Methane, fossil | | low population density lower stratosphere + upper troposphere | кg kg | 25 25 | kg CO2-Eq kg CO2-Eq | 8.16E-04 7.81E-15 | kg/kg kg/kg | 2.04E-02 1.95E-13 | crude oil, at production onshore, RME crude oil, at production onshore, RME |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 1.55E-07 | kg/kg | 3.87E-06 | crude oil, at production onshore, RME |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 8.89E-11 | kg/kg | 1.25E-07 | crude oil, at production onshore, RME |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 1.02E-17 | kg/kg | 1.43E-14 | crude oil, at production onshore, RME |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 2.26E-13 | kg/kg | 1.67E-09 | crude oil, at production onshore, RME |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 4.37E-10 | kg/kg | 3.23E-06 | crude oil, at production onshore, RME |
| Methane, trichlorofluoro-, CFC-11 Methane, trifluoro-, HFC-23 | air | high population density high population density | kg | 4750 14800 | kg CO2-Eq kg CO2-Eq | 3.69E-16 7.23E-14 | kg/kg kg/kg | 1.75E-12 1.07E-09 | crude oil, at production onshore, RME crude oil, at production onshore, RME |
| Sulfur hexafluoride | | high population density | kø | 22800 | kg CO2-Eq | 1.202-14 | kg/kg kg/kg | 0.00E+00 | crude oil, at production onshore, RME |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 3.05E-13 | kg/kg | 6.94E-09 | crude oil, at production onshore, RME |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 7.49E-10 | kg/kg | 1.71E-05 | crude oil, at production onshore, RME |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 3.52E-15 | kg/kg | 4.58E-14 | crude oil, at production onshore, RME |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 3.56E-13 | kg/kg | 4.63E-12 | crude oil, at production onshore, RME |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 2.37E-06 | kg/kg | 2.37E-06 | crude oil, at production onshore, RME |
| Nitrogen fluoride Total Carbon Dioxide Equivalents | air air | high population density | kg | 17200 1 | kg CO2-Eq kg CO2-Eq | 2.13E-01 | kg/kg kg/kg | 0.00E+00 2.13E-01 | crude oil, at production onshore, RME See values below from Pembina |
| . C.M. Our DONING Equivalents | all | | ĸy | | ng OOZ-Eq | 2.102-01 | ng/ng | 2.13E-01 | CCC VALUES DETON HOTH I CHIDINA |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 1.45E-07 | kg/kg | 2.73E-07 | crude oil, at production onshore, RME |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 8.78E-08 | kg/kg | 1.65E-07 | crude oil, at production onshore, RME |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.26E-07 | kg/kg | 4.24E-07 | crude oil, at production onshore, RME |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 4.11E-07 | kg/kg | 3.62E-07 | crude oil, at production onshore, RME |
| Hydrogen chloride Hydrogen chloride | air | low population density | kg | 0.88 0.88 | kg SO2-Eq | 3.43E-07 8.77E-08 | kg/kg | 3.02E-07 7.72E-08 | crude oil, at production onshore, RME |
| rryurogen unonue | all | unspecified | кg | 0.88 | kg SO2-Eq | 8.77E-08 | kg/kg | 1.12E-00 | crude oil, at production onshore, RME |

| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 3.86E-08 | kg/kg | 6.18E-08 | crude oil, at production onshore, RME |
|---------------------------------------|----------|-----------------------------------|-----|--------|-------------|----------|--------|----------|--|
| drogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 7.42E-08 | kg/kg | 1.19E-07 | crude oil, at production onshore, RME |
| drogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 1.62E-08 | kg/kg | 2.59E-08 | crude oil, at production onshore, RME |
| drogen sulfide | | high population density | kg | 1.88 | kg SO2-Eq | | kg/kg | | crude oil, at production onshore, RME |
| | | | kg | 1.88 | kg SO2-Eq | 3.85E-08 | kg/kg | 7.25E-08 | |
| | | | kg | 1.88 | kg SO2-Eq | 1.30E-08 | kg/kg | 2.44E-08 | |
| Irogen Sulfide | air | | kg | 1.88 | kg SO2-Eq | 3.83E-05 | kg/kg | 7.21E-05 | See values below from Pembina |
| ogen oxides | | | kg | 0.7 | kg SO2-Eq | | kg/kg | | |
| | | | kg | 0.7 | kg SO2-Eq | 6.95E-04 | kg/kg | 4.86E-04 | |
| | | | kg | 0.7 | kg SO2-Eq | | kg/kg | | |
| ogen oxides | air | | kg | 0.7 | kg SO2-Eq | 1.04E-04 | kg/kg | 7.27E-05 | See values below from Pembina |
| | | | kg | 1 | kg SO2-Eq | 1.15E-04 | kg/kg | 1.15E-04 | |
| | | | kg | 1 | kg SO2-Eq | 8.41E-05 | kg/kg | 8.41E-05 | |
| | | | kg | 1 | kg SO2-Eq | 2.47E-06 | kg/kg | 2.47E-06 | |
| fur dioxide | air | | kg | 1 | kg SO2-Eq | 3.72E-04 | kg/kg | 3.72E-04 | See values below from Pembina |
| drogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 1.32E-09 | kg/kg | 2.49E-09 | crude oil, at production onshore, RME |
| furic acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 6.99E-16 | kg/kg | 4.55E-16 | crude oil, at production onshore, RME |
| sphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | crude oil, at production onshore, RME |
| uric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 4.36E-15 | kg/kg | 2.83E-15 | crude oil, at production onshore, RME |
| | | · · | | | | | | 5.18E-04 | · |
| sphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 6.45E-10 | kg/kg | 1.98E-09 | crude oil, at production onshore, RME |
| sphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 5.99E-11 | kg/kg | 1.83E-10 | crude oil, at production onshore, RME |
| sphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eg | 1.13E-10 | kg/kg | 3.46E-10 | crude oil, at production onshore, RME |
| sphorus | air | unspecified | kg | 3.06 | kg PO4-Eg | 1.53E-13 | kg/kg | 4.67E-13 | crude oil, at production onshore, RME |
| sphorus | soil | agricultural | kg | 3.06 | kg PO4-Eg | 1.68E-09 | kg/kg | 5.15E-09 | crude oil, at production onshore, RME |
| sphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 2.18E-07 | kg/kg | 6.68E-07 | crude oil, at production onshore, RME |
| D5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 2.43E-04 | kg/kg | 5.35E-06 | crude oil, at production onshore, RME |
| D5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eg | 2.99E-07 | kg/kg | 6.59E-09 | crude oil, at production onshore, RME |
| D, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eg | 2.66E-04 | kg/kg | 5.86E-06 | crude oil, at production onshore, RME |
| D, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 3.05E-07 | kg/kg | 6.72E-09 | crude oil, at production onshore, RME |
| osphate | water | river | kg | 1 | kg PO4-Eg | 1.14E-08 | kg/kg | 1.14E-08 | crude oil, at production onshore, RME |
| sphorus | water | river | kg | 3.06 | kg PO4-Eg | 9.92E-09 | kg/kg | 3.04E-08 | crude oil, at production onshore, RME |
| sphorus | water | unspecified | kø | 3.06 | kg PO4-Eq | 2.03E-10 | kg/kg | 6.21E-10 | crude oil, at production onshore, RME |
| sphoric acid | air | high population density | kø | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | crude oil, at production onshore, RME |
| | | 8 LL | 8 | | 9 4 | | | 1.19E-05 | |
| l, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 2.02E-03 | kg/kg | 2.00E-02 | crude oil, at production onshore, RME |
| l, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 2.26E-03 | kg/kg | 4.32E-02 | crude oil, at production onshore, RME |
| , mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 2.20E-05 | Nm3/ha | 8.77E-04 | crude oil, at production onshore, RME |
| , natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 1.67E-02 | Nm3/ha | 6.41E-01 | crude oil, at production onshore, RME |
| crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.02E+00 | kg/kg | 4.66E+01 | crude oil, at production onshore, RME |
| t, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 3.30E-08 | kg/kg | 3.27E-07 | crude oil, at production onshore, RME |
| , b. vana | resource | Diotic | δ | 0.0 | WO Eq | 0.00L 00 | ng/ng | 4.73E+01 | crace on, as production of shore, farm |
| | | | | | Produce | | | 4.73ET01 | |
| | | | | | Crude Oil - | | | | |
| | | | | | Pembina | | | | |

| | | | Pembina | | | | |
|---|-------|----------------------|-----------------|----------|------------------|--------|-------------------|
| | | | Institute | | | | |
| | | For light a | ind medium crud | de oil | (Canada average) | | |
| These emissions replace Ecoinvent emissions below | CO2eq | | 29.47 | Air | | kg/bbl | |
| | NOx | | 14.36 | Air | | g/bbl | |
| | CO | | 22.59 | Air | | g/bbl | |
| | SO2 | | 51.44 | Air | | g/bbl | |
| | H2S | | 5.30 | Air | | g/bbl | |
| | 1 | bbl | = | 1.59E+02 | L | | |
| | | Density of crude oil | = | 8.70E+02 | kg/m3 | | The Engineering T |

The Engineering Toolbox. Available at: http://www.engineeringtoolbox.com/liquids-densities-d_743.html

| 4 | Transport crude | | | | Tr | ransport crude - Pembina | | | |
|--|--|---|-------------------------------|--------|--|--------------------------|----------------|--|--|
| | | | 1000000 lkm | | | Institute | | | |
| ack to top | | | CO CO2 NOx PM SO2 | | 5.23E-02 9.03E+00 2.43E-01 1.71E-02 1.60E-02 | | | kg/1000000 lkm kg/1000000 lkm kg/1000000 lkm kg/1000000 lkm kg/1000000 lkm | Pembina Institute Pembina Institute Pembina Institute Pembina Institute Pembina Institute Pembina Institute |
| | | | CO2 Equivalents | | 9.02E+00 | | | kg CO2 Eq./100000lkm | |
| | crude oil, production , at long distance transport | Transportation of crude oil from exploration site to refinery in Europe. Includes transport service requirements and emissions from oil handling and evaporation. Ecoinvent V2, crude oil, production NO, at long distance transport | | | | | | | |
| arbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 2.62E-03 | kg/kg | 2.62E-03 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| arbon dioxide, fossil | air | low population density | kg | i i | kg CO2-Eq | 6.15E-02 | kg/kg | 6.15E-02 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| arbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | i i | kg CO2-Eq | 4.16E-10 | kg/kg | 4.16E-10 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| arbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.53E-03 | kg/kg | 1.53E-03 | Econvent V2, crude oil, production NO, at long distance transport |
| arbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 8.79E-07 | kg/kg | 1.38E-06 | Econvent V2, crude oil, production NO, at long distance transport |
| arbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 1.61E-04 | | 2.53E-04 | Econvent V2, crude oil, production NO, at long distance transport |
| arbon monoxide, fossil | dii | lower stratosphere + upper troposphere | kg kg | 1.5714 | kg CO2-Eq | 4.89E-13 | kg/kg | 7.68E-13 | Econvent V2, crude oil, production NO, at long distance transport Econvent V2, crude oil, production NO, at long distance transport |
| arbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 2.20E-05 | kg/kg kg/kg | 3.45E-05 | Econvent V2, crude oil, production NO, at long distance transport Econvent V2, crude oil, production NO, at long distance transport |
| hloroform | air | high population density | kg | 30 | kg CO2-Eq | 1.59E-12 | kg/kg | 4.77E-11 | Econvent V2, crude oil, production NO, at long distance transport Econvent V2, crude oil, production NO, at long distance transport |
| hloroform | air | low population density | kg | 30 | kg CO2-Eq | 4.04E-14 | kg/kg | 1.21E-12 | Econvent V2, crude oil, production NO, at long distance transport |
| hloroform | air | unspecified | ng ka | 30 | kg CO2-Eq | 1.43E-20 | kg/kg | 4.28E-19 | Econvent V2, crude oil, production NO, at long distance transport Econvent V2, crude oil, production NO, at long distance transport |
| initrogen monoxide | dii | high population density | ng ka | 298 | kg CO2-Eq | 4.95E-07 | kg/kg | 1.47E-04 | Econvent V2, crude oil, production NO, at long distance transport |
| initrogen monoxide | air | low population density | ng ka | 298 | kg CO2-Eq | 9.20E-07 | kg/kg | 2.74E-04 | Econvent V2, crude oil, production NO, at long distance transport Econvent V2, crude oil, production NO, at long distance transport |
| nitrogen monoxide | air | lower stratosphere + upper troposphere | ng ka | 298 | kg CO2-Eq | 3.96E-15 | kg/kg | 1.18E-12 | Econvent V2, crude oil, production NO, at long distance transport Econvent V2, crude oil, production NO, at long distance transport |
| initrogen monoxide | air | unspecified | ng ka | 298 | kg CO2-Eq | 4.87E-08 | kg/kg | 1.45E-05 | Econvent V2, crude oil, production NO, at long distance transport Econvent V2, crude oil, production NO, at long distance transport |
| thane, 1.1.1.2-tetrafluoro-, HFC-134a | dii | high population density | ng kg | 1430 | kg CO2-Eq | 8.30E-14 | | 1.19E-10 | Econvent V2, crude oil, production NO, at long distance transport Econvent V2, crude oil, production NO, at long distance transport |
| thane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | ng ka | 1430 | kg CO2-Eq | 2.03E-12 | kg/kg | 2.90E-09 | Econvent V2, crude oil, production NO, at long distance transport Econvent V2, crude oil, production NO, at long distance transport |
| Cthane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | ng L. | 1430 | kg CO2-Eq | 2.03E-12 2.20E-10 | kg/kg kg/kg | 3.14E-07 | Econvent V2, crude oil, production NO, at long distance transport Econvent V2, crude oil, production NO, at long distance transport |

| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | | | | | | | | | |
|--|--|--|---|--|--|---|---|---|---|
| | air | high population density | kg | 6130 | kg CO2-Eq | 3.07E-14 | kg/kg | 1.88E-10 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| | | | | | | 9.00E 19 | | | |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 2.60E-12 | kg/kg | 3.23E-10 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 3.52E-11 | kg/kg | 3.52E-07 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| | air | | | | | | | | |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 2.18E-12 | kg/kg | 2.66E-08 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 7.23E-11 | kg/kg | 8.83E-07 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| | air | | kg | 25 | | 4.63E-09 | | 1.16E-07 | |
| Methane, biogenic | | high population density | | | kg CO2-Eq | | kg/kg | | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 7.75E-07 | kg/kg | 1.94E-05 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 3.91E-08 | kg/kg | 9.76E-07 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| o de la companya de l | air | | | 5 | kg CO2-Eq | 3.87E-20 | | 1.93E-19 | |
| Methane, bromo-, Halon 1001 | | unspecified | kg | | | | kg/kg | | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 7.55E-10 | kg/kg | 1.43E-06 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 8.49E-18 | kg/kg | 6.06E-14 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.67E-10 | kg/kg | 1.19E-06 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| | | | | | | | | | |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 1.38E-12 | kg/kg | 2.50E-09 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.07E-10 | kg/kg | 1.93E-07 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| | | | | | | 4.47E.40 | | | |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 4.17E-13 | kg/kg | 3.63E-12 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 1.20E-13 | kg/kg | 1.04E-12 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.36E-13 | kg/kg | 1.48E-09 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| | | | | | | | | | |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 9.69E-14 | kg/kg | 1.06E-09 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 2.57E-20 | kg/kg | 2.80E-16 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 2.36E-16 | kg/kg | 4.96E-14 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, fossil | air | | kg | 25 | | 3.72E-06 | | 9.30E-05 | |
| | | high population density | | | kg CO2-Eq | | kg/kg | | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 2.35E-04 | kg/kg | 5.86E-03 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 6.60E-15 | kg/kg | 1.65E-13 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 1.13E-07 | kg/kg | 2.82E-06 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| | | | | | | | | | |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 9.46E-11 | kg/kg | 1.32E-07 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 1.15E-17 | kg/kg | 1.61E-14 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.34E-13 | kg/kg | 9.89E-10 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| | | | | | | | | | |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 6.51E-10 | kg/kg | 4.81E-06 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 3.83E-16 | kg/kg | 1.82E-12 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 7.51E-14 | kg/kg | 1.11E-09 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| | | | | | | 7.51E-14 | | | |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 2.00E-13 | kg/kg | 4.56E-09 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 4.44E-10 | kg/kg | 1.01E-05 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| | air | | | | | | | | |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 2.29E-15 | kg/kg | 2.97E-14 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 2.18E-13 | kg/kg | 2.84E-12 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 5.65E-07 | kg/kg | 5.65E-07 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Mitogen nuonue | an | nigh population density | кg | 17200 | kg CO2-Lq | | kg/kg | 7.24E-02 | Econivent v2, crude on, production vo, at long distance transport |
| • . | | 11.1 1.0 1.6 | , | 4.00 | 1 000 F | 0.04E.05 | 1 0 | | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 2.21E-07 | kg/kg | 4.15E-07 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 5.53E-07 | kg/kg | 1.04E-06 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Ammonia | air | unspecified | ka | 1.88 | kg SO2-Eq | 1.26E-07 | kg/kg | 2.37E-07 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| | an | • | "8 | 1.00 | | 1.202 07 | ng/ng | 2.01L 01 | |
| | | | | 0.00 | 1 000 5 | 0.000.00 | 1 // | 0.400.00 | |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 3.96E-08 | kg/kg | 3.49E-08 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride | air air | high population density low population density | kg kg | 0.88 0.88 | kg SO2-Eq kg SO2-Eq | 3.96E-08 2.78E-07 | kg/kg kg/kg | 3.49E-08 2.45E-07 | Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride | air air air | low population density | kg | 0.88 | kg SO2-Eq | 2.78E-07 | kg/kg | 2.45E-07 | Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride Hydrogen chloride | air | low population density unspecified | kg kg | 0.88 0.88 | kg SO2-Eq kg SO2-Eq | 2.78E-07 4.29E-08 | kg/kg kg/kg | 2.45E-07 3.78E-08 | Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride Hydrogen chloride Hydrogen fluoride | air air | low population density unspecified high population density | kg kg kg | 0.88 0.88 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.78E-07 4.29E-08 2.00E-09 | kg/kg kg/kg kg/kg | 2.45E-07 3.78E-08 3.19E-09 | Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride Hydrogen chloride | air | low population density unspecified | kg kg | 0.88 0.88 | kg SO2-Eq kg SO2-Eq | 2.78E-07 4.29E-08 | kg/kg kg/kg | 2.45E-07 3.78E-08 | Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride | air air | low population density unspecified high population density low population density | kg kg kg | 0.88 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.78E-07 4.29E-08 2.00E-09 5.23E-08 | kg/kg kg/kg kg/kg kg/kg | 2.45E-07 3.78E-08 3.19E-09 8.37E-08 | Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride | air air air air | low population density unspecified high population density low population density unspecified | kg kg kg kg kg | 0.88 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.78E-07 4.29E-08 2.00E-09 5.23E-08 1.09E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg | 2.45E-07 3.78E-08 3.19E-09 8.37E-08 1.74E-08 | Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide | air air air air air | low population density unspecified high population density low population density unspecified high population density | kg kg kg kg kg kg | 0.88 0.88 1.6 1.6 1.8 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.78E-07 4.29E-08 2.00E-09 5.23E-08 1.09E-08 1.17E-11 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 2.45E-07 3.78E-08 3.19E-09 8.37E-08 1.74E-08 2.20E-11 | Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride | air air air air | low population density unspecified high population density low population density unspecified | kg kg kg kg kg | 0.88 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.78E-07 4.29E-08 2.00E-09 5.23E-08 1.09E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg | 2.45E-07 3.78E-08 3.19E-09 8.37E-08 1.74E-08 | Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide | air air air air air | low population density unspecified high population density low population density unspecified high population density low population density | kg kg kg kg kg kg | 0.88 0.88 1.6 1.6 1.6 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.78E-07 4.29E-08 2.00E-09 5.23E-08 1.09E-08 1.17E-11 2.19E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 2.45E-07 3.78E-08 3.19E-09 8.37E-08 1.74E-08 2.20E-11 4.13E-08 | Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide | air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified | kg kg kg kg kg kg | 0.88 0.88 1.6 1.6 1.6 1.88 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.78E-07 4.29E-08 2.00E-09 5.23E-08 1.09E-08 1.17E-11 2.19E-08 6.57E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 2.45E-07 3.78E-08 3.19E-09 8.37E-08 1.74E-08 2.20E-11 4.13E-08 1.23E-08 | Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport |
| Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen sulfide Nitrogen oxides | air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density hyperified high population density | kg kg kg kg kg kg | 0.88 0.88 1.6 1.6 1.8 1.88 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.78E-07 4.29E-08 2.00E-09 5.23E-08 1.09E-08 1.17E-11 2.19E-08 6.57E-09 3.74E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 2.45E-07 3.78E-08 3.19E-09 8.37E-08 1.74E-08 2.20E-11 4.13E-08 1.23E-08 2.62E-06 | Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport Ecoinvent V2, crude oil, production NO, at long distance transport |
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| E7a | Refine crude into | | | | | Refine Crude Oil - Pembina | | | |
|---|-------------------------|---|---|------------------|--|---|-----------------------|--------------------------------------|---|
| | diesel | | | | | Institute (kg/L crude refined) | | | |
| back to top | | These emissions replace Ecoinvent emissions below | CO CO2 NOx SO2 Sulphuric Acid | | 2.85E-04 7.08E-02 6.75E-05 2.32E-04 2.96E-08 | (specific for Alberta) Air Air Air Air Air | | kg/l kg/l kg/l kg/l kg/l | Pembina Institute Pembina Institute Pembina Institute Pembina Institute Pembina Institute |
| | | | Density of crude oil | = | 8.70E+02 | kg/m3 | | | Average value from: http://www.simetric.co.uk/si_liquids.htm |
| back to top | Diesel, at refinery | Description of all flows of materials and energy due to the throughput of 1kg crude oil in the refinery. The multi-output-process 'crude oil, in refinery' delivers the coproducts petrol, unleaded, bitumen, diesel, light fuel oil, heavy fuel oil, kerosene, naphtha, propane/ butane, refinery gas, secondary sulphur and electricity. The impacts of processing are allocated to the different products. | | | | | | | |
| Carbon dioxide, fossil Carbon dioxide, fossil | air air | high population density low population density | kg kg | 1 1 | kg CO2-Eq kg CO2-Eq | 2.27E-01 1.92E-01 | kg/kg kg/kg | 2.27E-01 1.92E-01 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Carbon dioxide, fossil Carbon dioxide, fossil | air air | lower stratosphere + upper troposphere unspecified | kg kg | 1 1 | kg CO2-Eq kg CO2-Eq | 1.36E-08 1.66E-02 | kg/kg kg/kg | 1.36E-08 1.66E-02 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Carbon Dioxide Carbon monoxide, fossil | air air | high population density | kg | 1 1.5714 | kg CO2-Eq kg CO2-Eq | 8.14E-02 5.36E-05 | kg/kg kg/kg | 8.14E-02 8.42E-05 | See values above from Pembina Ecoinvent V2, diesel, at refinery, RER |
| Carbon monoxide, fossil Carbon monoxide, fossil | air air | low population density lower stratosphere + upper troposphere | kg kg | 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq | 3.88E-04 1.60E-11 | kg/kg kg/kg | 6.10E-04 2.51E-11 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 2.37E-04 | kg/kg | 3.72E-04 | Ecoinvent V2, diesel, at refinery, RER |
| Carbon Monoxide Chloroform | <mark>air</mark> air | high population density | kg | 1.5714 30 | kg CO2-Eq kg CO2-Eq | 3.27E-04 2.38E-11 | kg/kg kg/kg | 5.14E-04 7.14E-10 | See values above from Pembina Ecoinvent V2, diesel, at refinery, RER |
| Chloroform | air air | low population density | kg ka | 30 30 | kg CO2-Eq | 8.61E-13 9.87E-20 | kg/kg | 2.58E-11 2.96E-18 | Ecoinvent V2, diesel, at refinery, RER |
| Chloroform Dinitrogen monoxide | air | unspecified high population density | kg kg | 298 | kg CO2-Eq kg CO2-Eq | 3.05E-06 | kg/kg kg/kg | 9.08E-04 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Dinitrogen monoxide Dinitrogen monoxide | air air | low population density lower stratosphere + upper troposphere | kg kg | 298 298 | kg CO2-Eq kg CO2-Eq | 3.95E-06 1.30E-13 | kg/kg kg/kg | 1.18E-03 3.86E-11 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air air | unspecified high population density | kg kg | 298 1430 | kg CO2-Eq kg CO2-Eq | 1.01E-06 6.09E-13 | kg/kg kg/kg | 3.00E-04 8.71E-10 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 4.52E-11 | kg/kg | 6.46E-08 | Ecoinvent V2, diesel, at refinery, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air air | unspecified high population density | kg kg | 1430 6130 | kg CO2-Eq kg CO2-Eq | 2.56E-09 1.41E-13 | kg/kg kg/kg | 3.67E-06 8.67E-10 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a | air air | unspecified high population density | kg ka | 6130 124 | kg CO2-Eq kg CO2-Eq | 5.87E-11 | kg/kg kg/kg | 0.00E+00 7.27E-09 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air air | low population density | kg | 124 10000 | kg CO2-Eq kg CO2-Eq | 7.81E-10 | kg/kg kg/kg | 0.00E+00 7.81E-06 | Ecoinvent V2, diesel, at refinery, RER |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | low population density unspecified | kg kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 | air air | high population density unspecified | kg kg | 12200 12200 | kg CO2-Eq kg CO2-Eq | 1.12E-11 3.91E-10 | kg/kg kg/kg | 1.36E-07 4.78E-06 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, biogenic Methane, biogenic | air air | high population density low population density | kg kg | 25 25 | kg CO2-Eq kg CO2-Eq | 2.38E-08 1.24E-06 | kg/kg kg/kg | 5.94E-07 3.09E-05 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 8.85E-07 | kg/kg | 2.21E-05 | Ecoinvent V2, diesel, at refinery, RER |
| Methane, bromo-, Halon 1001 Methane, bromochlorodifluoro-, Halon 1211 | air air | unspecified low population density | kg kg | 5 1890 | kg CO2-Eq kg CO2-Eq | 2.68E-19 5.74E-10 | kg/kg kg/kg | 1.34E-18 1.09E-06 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 | air air | high population density low population density | kg ka | 7140 7140 | kg CO2-Eq kg CO2-Eq | 1.53E-16 3.79E-08 | kg/kg kg/kg | 1.09E-12 2.71E-04 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 | air air | high population density | kg kg | 1810 1810 | kg CO2-Eq kg CO2-Eq | 1.05E-11 2.21E-09 | kg/kg kg/kg | 1.90E-08 4.00E-06 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, chlorotrifluoro-, CFC-13 | air | low population density unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, diesel, at refinery, RER |
| Methane, dichloro-, HCC-30 Methane, dichloro-, HCC-30 | air air | high population density Iow population density | kg kg | 8.7 8.7 | kg CO2-Eq kg CO2-Eq | 2.30E-12 2.55E-12 | kg/kg kg/kg | 2.00E-11 2.22E-11 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorodifluoro-, CFC-12 | air air | high population density low population density | kg kg | 10900 10900 | kg CO2-Eq kg CO2-Eq | 1.19E-12 4.85E-12 | kg/kg kg/kg | 1.29E-08 5.28E-08 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 1.78E-19 | kg/kg | 1.94E-15 | Ecoinvent V2, diesel, at refinery, RER |
| Methane, dichlorofluoro-, HCFC-21 Methane, fossil | air air | high population density high population density | kg kg | 210 25 | kg CO2-Eq kg CO2-Eq | 1.73E-15 6.90E-05 | kg/kg kg/kg | 3.64E-13 1.73E-03 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, fossil Methane, fossil | air air | low population density lower stratosphere + upper troposphere | kg ka | 25 25 | kg CO2-Eq kg CO2-Eq | 1.77E-03 2.16E-13 | kg/kg kg/kg | 4.43E-02 5.40E-12 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, fossil Methane, tetrachloro-, R-10 | air air | unspecified high population density | kg kg | 25 1400 | kg CO2-Eq kg CO2-Eq | 7.37E-07 5.29E-10 | kg/kg kg/kg | 1.84E-05 7.41E-07 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 7.95E-17 | kg/kg | 1.11E-13 | Ecoinvent V2, diesel, at refinery, RER |
| Methane, tetrafluoro-, R-14 Methane, tetrafluoro-, R-14 | air air | high population density unspecified | kg kg | 7390 7390 | kg CO2-Eq kg CO2-Eq | 3.02E-12 3.52E-09 | kg/kg kg/kg | 2.23E-08 2.60E-05 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, trichlorofluoro-, CFC-11 Methane, trifluoro-, HFC-23 | air air | high population density high population density | kg kg | 4750 14800 | kg CO2-Eq kg CO2-Eq | 2.81E-15 5.51E-13 | kg/kg kg/kg | 1.34E-11 8.16E-09 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Sulfur hexafluoride | air | high population density | kg | 22800 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 8.48E-08 | Ecoinvent V2, diesel, at refinery, RER |
| Sulfur hexafluoride Sulfur hexafluoride | air air | low population density unspecified | kg kg | 22800 | kg CO2-Eq kg CO2-Eq | 3.72E-12 1.01E-08 | kg/kg kg/kg | 2.31E-04 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 | air air | high population density low population density | kg kg | 13 13 | kg CO2-Eq kg CO2-Eq | 4.17E-14 4.65E-12 | kg/kg kg/kg | 5.42E-13 6.05E-11 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Carbon dioxide, land transformation Nitrogen fluoride | air air | low population density high population density | kg kg | 1 17200 | kg CO2-Eq kg CO2-Eq | 1.41E-05 | kg/kg | 1.41E-05 0.00E+00 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| | | | • | | | | kg/kg | 1.31E-01 | |
| Ammonia Ammonia | air air | high population density low population density | kg kg | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 7.60E-07 3.45E-06 | kg/kg kg/kg | 1.43E-06 6.49E-06 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Ammonia Hydrogen chloride | air air | unspecified high population density | kg kg | 1.88 0.88 | kg SO2-Eq kg SO2-Eq | 1.56E-06 2.13E-06 | kg/kg kg/kg | 2.93E-06 1.87E-06 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 4.95E-06 | kg/kg | 4.36E-06 | Ecoinvent V2, diesel, at refinery, RER |
| Hydrogen chloride Hydrogen fluoride | air air | unspecified high population density | kg kg | 0.88 1.6 | kg SO2-Eq kg SO2-Eq | 4.32E-07 1.99E-07 | kg/kg kg/kg | 3.80E-07 3.18E-07 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Hydrogen fluoride Hydrogen fluoride | air air | low population density unspecified | kg kg | 1.6 1.6 | kg SO2-Eq kg SO2-Eq | 1.02E-06 8.56E-08 | kg/kg kg/kg | 1.64E-06 1.37E-07 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Hydrogen sulfide | air | high population density | kg | 1.88 1.88 | kg SO2-Eq | 6.73E-11 2.85E-07 | kg/kg | 1.26E-10 5.36E-07 | Ecoinvent V2, diesel, at refinery, RER |
| Hydrogen sulfide Hydrogen sulfide | air air | low population density unspecified | kg kg | 1.88 | kg SO2-Eq kg SO2-Eq | 7.45E-08 | kg/kg kg/kg | 1.40E-07 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Nitrogen oxides Nitrogen oxides | air air | high population density low population density | kg kg | 0.7 0.7 | kg SO2-Eq kg SO2-Eq | 2.99E-04 1.24E-03 | kg/kg kg/kg | 2.09E-04 8.70E-04 | Ecoinvent V2, diesel, at refinery, RER Ecoinvent V2, diesel, at refinery, RER |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 1.11E-04 | kg/kg | 7.79E-05 | Ecoinvent V2, diesel, at refinery, RER |
| Nitrogen oxides | air | | кд | 0.7 | kg SO2-Eq | 7.76E-05 | kg/kg | 5.43E-05 | See values above from Pembina |

| 0.1/. 15 1.1 | | 12.1 1.2 1.3 | | 4 | 1 000 5 | 1 005 00 | 1 0 | 1.005.00 | F 1 1/0 / 1 1 1 / 1 PEP |
|---|----------|-----------------------------------|-----|--------|-----------|----------|--------|----------|--|
| Sulfur dioxide | air | high population density | кд | 1 | kg SO2-Eq | 1.06E-03 | kg/kg | 1.06E-03 | Ecoinvent V2, diesel, at refinery, RER |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 3.15E-03 | kg/kg | 3.15E-03 | Ecoinvent V2, diesel, at refinery, RER |
| ulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 1.25E-05 | kg/kg | 1.25E-05 | Ecoinvent V2, diesel, at refinery, RER |
| ulfur dioxide | air | | kg | 1 | kg SO2-Eq | 2.67E-04 | kg/kg | 2.67E-04 | See values above from Pembina |
| lydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 7.21E-09 | kg/kg | 1.35E-08 | Ecoinvent V2, diesel, at refinery, RER |
| ulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 3.86E-15 | kg/kg | 2.51E-15 | Ecoinvent V2, diesel, at refinery, RER |
| hosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | |
| ulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 5.82E-14 | kg/kg | 3.78E-14 | Ecoinvent V2, diesel, at refinery, RER |
| ulfuric acid | air | | kg | 0.65 | kg SO2-Eq | 3.40E-08 | kg/kg | 2.21E-08 | See values above from Pembina |
| | | | | | | | | 3.41E-04 | |
| hosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 6.05E-09 | kg/kg | 1.85E-08 | Ecoinvent V2, diesel, at refinery, RER |
| hosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 3.69E-10 | kg/kg | 1.13E-09 | Ecoinvent V2, diesel, at refinery, RER |
| hosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 1.50E-09 | kg/kg | 4.60E-09 | Ecoinvent V2, diesel, at refinery, RER |
| hosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 1.90E-12 | kg/kg | 5.80E-12 | Ecoinvent V2, diesel, at refinery, RER |
| nosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 2.21E-08 | kg/kg | 6.77E-08 | Ecoinvent V2, diesel, at refinery, RER |
| hosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 1.64E-06 | kg/kg | 5.01E-06 | Ecoinvent V2, diesel, at refinery, RER |
| OD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.29E-02 | kg/kg | 2.84E-04 | Ecoinvent V2, diesel, at refinery, RER |
| OD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 1.47E-06 | kg/kg | 3.23E-08 | Ecoinvent V2, diesel, at refinery, RER |
| OD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.30E-02 | kg/kg | 2.85E-04 | Ecoinvent V2, diesel, at refinery, RER |
| OD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 1.51E-06 | kg/kg | 3.32E-08 | Ecoinvent V2, diesel, at refinery, RER |
| hosphate | water | river | kg | 1 | kg PO4-Eq | 6.19E-08 | kg/kg | 6.19E-08 | Ecoinvent V2, diesel, at refinery, RER |
| hosphorus | water | river | kg | 3.06 | kg PO4-Eq | 1.65E-07 | kg/kg | 5.05E-07 | Ecoinvent V2, diesel, at refinery, RER |
| hosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 1.27E-09 | kg/kg | 3.89E-09 | Ecoinvent V2, diesel, at refinery, RER |
| hosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, diesel, at refinery, RER |
| • | | | - | | | | | 2.89E-04 | |
| oal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 2.70E-02 | kg/kg | 2.68E-01 | Ecoinvent V2, diesel, at refinery, RER |
| oal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 2.09E-02 | kg/kg | 3.99E-01 | Ecoinvent V2, diesel, at refinery, RER |
| as, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 2.04E-04 | Nm3/kg | 8.11E-03 | Ecoinvent V2, diesel, at refinery, RER |
| as, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 5.54E-02 | Nm3/kg | 2.12E+00 | Ecoinvent V2, diesel, at refinery, RER |
| il, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.10E+00 | kg/kg | 5.06E+01 | Ecoinvent V2, diesel, at refinery, RER |
| eat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 2.43E-07 | kg/kg | 2.40E-06 | Ecoinvent V2, diesel, at refinery, RER |
| ,, 3 | | | 9 | | . = 1 | .= • | | 5.34E+01 | , , , |

| 9a | Transport diesel | | | | | | | | Ecoinvent V2, diesel, at regional storage, RER |
|--|-------------------------|---|----------|--------|-----------|----------|----------------|----------|--|
| ck to top | diesel, at regional | Transportation of product from the refinery to the end user. Operation of storage | | | | | | | |
| | storage (transport to t | anks and petrol stations. Emissions from evaporation and treatment of effluents. | | | | | | | |
| | end user) | Excluding emissions from car-washing at petrol stations. | | | | | | | |
| | | | | | | | | | |
| on dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 2.32E-01 | kg/kg | 2.32E-01 | Ecoinvent V2, diesel, at regional storage, RER |
| on dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 2.05E-01 | kg/kg | 2.05E-01 | Ecoinvent V2, diesel, at regional storage, RER |
| n dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 1.46E-08 | kg/kg | 1.46E-08 | Ecoinvent V2, diesel, at regional storage, RER |
| n dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 2.29E-02 | kg/kg | 2.29E-02 | Ecoinvent V2, diesel, at regional storage, RER |
| n monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 5.49E-05 | kg/kg | 8.62E-05 | Ecoinvent V2, diesel, at regional storage, RER |
| n monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 3.96E-04 | kg/kg | 6.23E-04 | Ecoinvent V2, diesel, at regional storage, RER |
| n monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 1.71E-11 | kg/kg | 2.69E-11 | Ecoinvent V2, diesel, at regional storage, RER |
| n monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 2.82E-04 | kg/kg | 4.43E-04 | Ecoinvent V2, diesel, at regional storage, RER |
| form | air | high population density | kg | 30 | kg CO2-Eq | 2.90E-11 | kg/kg | 8.70E-10 | Ecoinvent V2, diesel, at regional storage, RER |
| form | air | low population density | kg | 30 | kg CO2-Eq | 1.04E-12 | kg/kg | 3.11E-11 | Ecoinvent V2, diesel, at regional storage, RER |
| form | air | unspecified | kg | 30 | kg CO2-Eq | 3.40E-19 | kg/kg | 1.02E-17 | Ecoinvent V2, diesel, at regional storage, RER |
| gen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 3.17E-06 | kg/kg | 9.46E-04 | Ecoinvent V2, diesel, at regional storage, RER |
| gen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 4.30E-06 | kg/kg | 1.28E-03 | Ecoinvent V2, diesel, at regional storage, RER |
| gen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.39E-13 | kg/kg | 4.13E-11 | Ecoinvent V2, diesel, at regional storage, RER |
| gen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 1.30E-06 | kg/kg | 3.88E-04 | Ecoinvent V2, diesel, at regional storage, RER |
| , 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 8.32E-13 | kg/kg | 1.19E-09 | Ecoinvent V2, diesel, at regional storage, RER |
| e, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 5.29E-11 | kg/kg | 7.56E-08 | Ecoinvent V2, diesel, at regional storage, RER |
| e, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 1.13E-08 | kg/kg | 1.62E-05 | Ecoinvent V2, diesel, at regional storage, RER |
| e, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 2.18E-13 | kg/kg | 1.34E-09 | Ecoinvent V2, diesel, at regional storage, RER |
| e, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, diesel, at regional storage, RER |
| e, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 6.83E-11 | kg/kg | 8.47E-09 | Ecoinvent V2, diesel, at regional storage, RER |
| , 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, diesel, at regional storage, RER |
| , 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 9.14E-10 | kg/kg | 9.14E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| , 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, diesel, at regional storage, RER |
| hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 1.67E-11 | kg/kg | 2.04E-07 | Ecoinvent V2, diesel, at regional storage, RER |
| , hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 7.54E-10 | kg/kg | 9.20E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 3.06E-08 | kg/kg | 7.65E-07 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.53E-06 | kg/kg | 3.82E-05 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, biogenic | air | unspecified | kg | 25 | kg CO2-Eg | 1.03E-06 | kg/kg | 2.57E-05 | Ecoinvent V2, diesel, at regional storage, RER |
| ine, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 9.22E-19 | kg/kg | 4.61E-18 | Ecoinvent V2, diesel, at regional storage, RER |
| ine, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 6.39E-10 | kg/kg | 1.21E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| ine, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eg | 3.06E-16 | kg/kg | 2.19E-12 | Ecoinvent V2, diesel, at regional storage, RER |
| ine, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 3.81E-08 | kg/kg | 2.72E-04 | Ecoinvent V2, diesel, at regional storage, RER |
| ane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eg | 3.65E-11 | kg/kg | 6.61E-08 | Ecoinvent V2, diesel, at regional storage, RER |
| ane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eg | 2.51E-09 | kg/kg | 4.55E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| ine, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eg | | kg/kg | 0.00E+00 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.64E-12 | kg/kg | 2.29E-11 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, dichloro-, HCC-30 | air | low population density | ka | 8.7 | kg CO2-Eq | 3.07E-12 | kg/kg | 2.67E-11 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eg | 1.51E-12 | kg/kg | 1.64E-08 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, dichlorodifluoro-, CFC-12 | air | low population density | ka | 10900 | kg CO2-Eg | 5.07E-12 | kg/kg | 5.53E-08 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, dichlorodifluoro-, CFC-12 | air | unspecified | ka | 10900 | kg CO2-Eg | 6.13E-19 | kg/kg | 6.68E-15 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, dichlorofluoro-, HCFC-21 | air | high population density | ka | 210 | kg CO2-Eg | 2.37E-15 | kg/kg | 4.97E-13 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, fossil | air | high population density | kg | 25 | kg CO2-Eq | 7.04E-05 | kg/kg | 1.76E-03 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, fossil | air | low population density | kg | 25 | kg CO2-Eq | 1.81E-03 | kg/kg | 4.51E-02 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 2.31E-13 | kg/kg | 5.78E-12 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 1.13E-06 | kg/kg | 2.82E-05 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 5.65E-10 | kg/kg | 7.91E-07 | Ecoinvent V2, diesel, at regional storage, RER |
| e, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 2.74E-16 | kg/kg | 3.84E-13 | Ecoinvent V2, diesel, at regional storage, RER |
| e, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 3.51E-12 | kg/kg | 2.60E-08 | Ecoinvent V2, diesel, at regional storage, RER |
| , tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 6.79E-09 | kg/kg | 5.02E-05 | Ecoinvent V2, diesel, at regional storage, RER |
| e. trichlorofluoro-, CFC-11 | air | high population density | ka | 4750 | kg CO2-Eq | 3.84E-15 | kg/kg | 1.83E-11 | Ecoinvent V2, diesel, at regional storage, RER |
| e, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 7.53E-13 | kg/kg | 1.11E-08 | Econivert V2, diesel, at regional storage, RER |
| nexafluoride | air | high population density | kg ka | 22800 | kg CO2-Eq | 1.00E-10 | kg/kg kg/kg | 0.00E+00 | Econvent V2, diesel, at regional storage, RER Econvent V2, diesel, at regional storage, RER |
| nexamuoride hexafluoride | air | | kg ka | 22800 | kg CO2-Eq | 4.59E-12 | kg/kg kg/kg | 1.05E-07 | Econvent V2, diesel, at regional storage, RER Econvent V2, diesel, at regional storage, RER |
| | air air | low population density | 3 | | | | | | |
| hexafluoride | an an | unspecified | kg | 22800 | kg CO2-Eq | 1.18E-08 | kg/kg | 2.69E-04 | Ecoinvent V2, diesel, at regional storage, RER |
| ne, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 5.98E-14 | kg/kg | 7.77E-13 | Ecoinvent V2, diesel, at regional storage, RER |
| ane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 5.61E-12 | kg/kg | 7.29E-11 | Ecoinvent V2, diesel, at regional storage, RER |
| on dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.62E-05 | kg/kg | 1.62E-05 | Ecoinvent V2, diesel, at regional storage, RER |

| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, diesel, at regional storage, RER |
|--|------------|-----------------------------------|----------|--------|------------------------|----------------------|----------------|----------------------|--|
| | | | | | | | | 5.12E-01 | |
| mmonia | air | high population density | kg | 1.88 | kg SO2-Eq | 7.94E-07 | kg/kg | 1.49E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 3.90E-06 | kg/kg | 7.32E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| mmonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 4.01E-06 | kg/kg | 7.53E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 2.17E-06 | kg/kg | 1.91E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 5.74E-06 | kg/kg | 5.05E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 1.50E-06 | kg/kg | 1.32E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eg | 2.01E-07 | kg/kg | 3.21E-07 | Ecoinvent V2, diesel, at regional storage, RER |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eg | 1.19E-06 | kg/kg | 1.90E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eg | 1.07E-07 | kg/kg | 1.71E-07 | Ecoinvent V2, diesel, at regional storage, RER |
| Hydrogen sulfide | air | high population density | ka | 1.88 | kg SO2-Eg | 1.32E-10 | kg/kg | 2.48E-10 | Ecoinvent V2, diesel, at regional storage, RER |
| Hydrogen sulfide | air | low population density | ka | 1.88 | kg SO2-Eg | 3.30E-07 | kg/kg | 6.21E-07 | Ecoinvent V2, diesel, at regional storage, RER |
| Hydrogen sulfide | air | unspecified | ka | 1.88 | kg SO2-Eg | 8.57E-08 | kg/kg | 1.61E-07 | Ecoinvent V2, diesel, at regional storage, RER |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eg | 3.06E-04 | kg/kg | 2.14E-04 | Ecoinvent V2, diesel, at regional storage, RER |
| Nitrogen oxides | air | low population density | ka | 0.7 | kg SO2-Eq | 1.30E-03 | kg/kg | 9.12E-04 | Ecoinvent V2, diesel, at regional storage, RER |
| Nitrogen oxides | air | unspecified | ka | 0.7 | kg SO2-Eq | 1.69E-04 | kg/kg | 1.18E-04 | Ecoinvent V2, diesel, at regional storage, RER |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eq | 1.07E-03 | kg/kg | 1.07E-03 | Ecoinvent V2, diesel, at regional storage, RER |
| Sulfur dioxide | air | low population density | ka | 1 | kg SO2-Eq | 3.25E-03 | kg/kg | 3.25E-03 | Ecoinvent V2, diesel, at regional storage, RER |
| Sulfur dioxide | air | unspecified | ka | 1 | kg SO2-Eq | 1.49E-05 | kg/kg | 1.49E-05 | Ecoinvent V2, diesel, at regional storage, RER |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 8.31E-09 | kg/kg | 1.56E-08 | Ecoinvent V2, diesel, at regional storage, RER |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 5.96E-15 | kg/kg | 3.87E-15 | Ecoinvent V2, diesel, at regional storage, RER |
| Phosphoric acid | air | | kg la | 0.98 | kg SO2-Eq | 5.96E-15 | | 0.00E+00 | Ecoinvent V2, diesel, at regional storage, RER Ecoinvent V2, diesel, at regional storage, RER |
| Sulfuric acid | aii air | high population density | kg L | 0.96 | | 6.78E-14 | kg/kg | 4.41E-14 | Ecoinvent V2, diesel, at regional storage, RER Ecoinvent V2, diesel, at regional storage, RER |
| Sullunc acid | all | low population density | ку | 0.05 | kg SO2-Eq | 6.70E-14 | kg/kg | 5.60E-03 | Econiverit v2, diesel, at regional storage, KEK |
| Phosphorus | air | high population density | lea. | 3.06 | kg PO4-Eg | 7.14E-09 | kg/kg | 2.19E-08 | Ecoinvent V2, diesel, at regional storage, RER |
| Phosphorus | all | low population density | kg | 3.06 | kg PO4-Eq | 4.26E-10 | kg/kg | 1.30E-09 | Ecoinvent V2, diesel, at regional storage, RER |
| Phosphorus | all | | kg la | 3.06 | kg PO4-Eq ka PO4-Ea | 4.26E-10 1.76E-09 | kg/kg kg/kg | 5.38E-09 | Ecoinvent V2, diesel, at regional storage, RER Ecoinvent V2, diesel, at regional storage, RER |
| Phosphorus | all air | low population density, long-term | kg ka | 3.06 | kg PO4-Eq | 2.93E-12 | kg/kg kg/kg | 8.97E-12 | Ecoinvent V2, diesel, at regional storage, RER Ecoinvent V2, diesel, at regional storage, RER |
| Phosphorus | soil | unspecified | kg L | 3.06 | kg PO4-Eq ka PO4-Ea | 2.60E-08 | | 7.96E-08 | Ecoinvent V2, diesel, at regional storage, RER Ecoinvent V2, diesel, at regional storage, RER |
| | soil | agricultural | kg | 3.06 | | 2.60E-08 1.64E-06 | kg/kg | 7.96E-08 5.03E-06 | |
| Phosphorus | | industrial | kg | | kg PO4-Eq | | kg/kg | | Ecoinvent V2, diesel, at regional storage, RER |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.29E-02 | kg/kg | 2.84E-04 | Ecoinvent V2, diesel, at regional storage, RER |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 1.70E-06 | kg/kg | 3.75E-08 | Ecoinvent V2, diesel, at regional storage, RER |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.30E-02 | kg/kg | 2.86E-04 | Ecoinvent V2, diesel, at regional storage, RER |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 1.74E-06 | kg/kg | 3.84E-08 | Ecoinvent V2, diesel, at regional storage, RER |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.25E-07 | kg/kg | 1.25E-07 | Ecoinvent V2, diesel, at regional storage, RER |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 1.69E-07 | kg/kg | 5.16E-07 | Ecoinvent V2, diesel, at regional storage, RER |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 1.34E-09 | kg/kg | 4.11E-09 | Ecoinvent V2, diesel, at regional storage, RER |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, diesel, at regional storage, RER |
| | | | | | | | | 5.76E-04 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 3.15E-02 | kg/kg | 3.12E-01 | Ecoinvent V2, diesel, at regional storage, RER |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 2.43E-02 | kg/kg | 4.64E-01 | Ecoinvent V2, diesel, at regional storage, RER |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 2.37E-04 | Nm3/kg | 9.43E-03 | Ecoinvent V2, diesel, at regional storage, RER |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 5.69E-02 | Nm3/kg | 2.18E+00 | Ecoinvent V2, diesel, at regional storage, RER |
| Dil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.11E+00 | kg/kg | 5.08E+01 | Ecoinvent V2, diesel, at regional storage, RER |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 3.43E-07 | kg/kg | 3.40E-06 | Ecoinvent V2, diesel, at regional storage, RER |
| | | | - | | | | | 5.37E+01 | |

| | <u>rrude into Diesel E7a</u> Assumed | |
|-------------------|--------------------------------------|--|
| Refine crude into | combustion/production/ | |
| coloured diesel | delivery of coloured diesel | |
| | same as regular diesel | |

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| E9D | <u>see transport Dieser E9a</u> Assumed | |
|--------------------|---|--|
| Transport coloured | combustion/production/ | |
| diesel | combustion/production/ delivery of coloured diesel same as regular diesel | |
| | | |
| back to top | | |

| E7c | Refine crude into | petrol, unleaded, at refinery RER | | | R | efine Crude Oil - Pembina | | |
|-------------|-------------------|---|----------------------|---|----------|------------------------------|------|-------------------|
| | gasoline | | | | In | stitute (kg/L crude refined) | | |
| back to top | | | | | | (specific for Alberta) | | |
| | | These emissions replace Ecoinvent emissions below | CO | | 4.11E-04 | Air | kg/l | Pembina Institute |
| | | | CO2 | | 1.02E-01 | Air | kg/l | Pembina Institute |
| | | | NOx | | 9.75E-05 | Air | kg/l | Pembina Institute |
| | | | SO2 | | 3.35E-04 | Air | kg/l | Pembina Institute |
| | | | Sulphuric Acid | | 4.28E-08 | Air | kg/l | Pembina Institute |
| | | | Density of crude oil | = | 8.70E+02 | kg/m3 | | |

| | | | Density of crude oil | = | 8.70E+02 | kg/m3 | | | |
|-------------------------|------------|---|----------------------|--------|-----------|----------|-------|----------|------------------------------------|
| back to top | oil pro | cription of all flows of materials and energy due to the throughput of 1kg crude in the refinery. The multi-output-process 'crude oil, in refinery' delivers the co-ducts petrol, unleaded, bitumen, diesel, light fuel oil, heavy fuel oil, kerosene, aphtha, propane/ butane, refinery gas, secondary sulphur and electricity. The impacts of processing are allocated to the different products. | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 3.97E-01 | kg/kg | 3.97E-01 | petrol, unleaded, at refinery, RER |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 2.09E-01 | kg/kg | 2.09E-01 | petrol, unleaded, at refinery, RER |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 2.37E-07 | kg/kg | 2.37E-07 | petrol, unleaded, at refinery, RER |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.81E-02 | kg/kg | 1.81E-02 | petrol, unleaded, at refinery, RER |
| Carbon Dioxide | air | | | 1 | kg CO2-Eq | 1.18E-01 | kg/kg | 1.18E-01 | See values above from Pembina |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 1.19E-04 | kg/kg | 1.87E-04 | petrol, unleaded, at refinery, RER |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 4.00E-04 | kg/kg | 6.28E-04 | petrol, unleaded, at refinery, RER |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 2.79E-10 | kg/kg | 4.38E-10 | petrol, unleaded, at refinery, RER |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 2.53E-04 | kg/kg | 3.98E-04 | petrol, unleaded, at refinery, RER |
| Carbon Monoxide | air | | | 1.5714 | kg CO2-Eq | 4.73E-04 | kg/kg | 7.43E-04 | See values above from Pembina |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 5.77E-11 | kg/kg | 1.73E-09 | petrol, unleaded, at refinery, RER |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 1.12E-12 | kg/kg | 3.35E-11 | petrol, unleaded, at refinery, RER |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 2.10E-19 | kg/kg | 6.30E-18 | petrol, unleaded, at refinery, RER |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 4.19E-06 | kg/kg | 1.25E-03 | petrol, unleaded, at refinery, RER |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 4.25E-06 | kg/kg | 1.27E-03 | petrol, unleaded, at refinery, RER |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 2.26E-12 | kg/kg | 6.74E-10 | petrol, unleaded, at refinery, RER |

| Dinitrogen monoxide | air | unspecified | kσ | 298 | kg CO2-Eq | 1.24E-06 | kg/kg | 3.70E-04 | petrol, unleaded, at refinery, RER |
|--|---|--|---|---|--|---|---|--|---|
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 2.35E-12 | kg/kg | 3.36E-09 | petrol, unleaded, at refinery, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | ka | 1430 | kg CO2-Eq | 5.76E-11 | kg/kg | 8.24E-08 | petrol, unleaded, at refinery, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | | kg log | | | | | | |
| | | unspecified | kg | 1430 | kg CO2-Eq | 3.61E-09 | kg/kg | 5.17E-06 | petrol, unleaded, at refinery, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 8.65E-13 | kg/kg | 5.30E-09 | petrol, unleaded, at refinery, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | petrol, unleaded, at refinery, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 7.48E-11 | kg/kg | 9.27E-09 | petrol, unleaded, at refinery, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | petrol, unleaded, at refinery, RER |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 9.96E-10 | kg/kg | 9.96E-06 | petrol, unleaded, at refinery, RER |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | petrol, unleaded, at refinery, RER |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 6.15E-11 | kg/kg | 7.50E-07 | petrol, unleaded, at refinery, RER |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 7.61E-10 | kg/kg | 9.28E-06 | petrol, unleaded, at refinery, RER |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 1.82E-07 | kg/kg | 4.54E-06 | petrol, unleaded, at refinery, RER |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.53E-06 | kg/kg | 3.82E-05 | petrol, unleaded, at refinery, RER |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 1.13E-06 | kg/kg | 2.82E-05 | petrol, unleaded, at refinery, RER |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 5.70E-19 | kg/kg | 2.85E-18 | petrol, unleaded, at refinery, RER |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | • | 1890 | kg CO2-Eq | 9.14E-10 | kg/kg | 1.73E-06 | |
| | | | kg | | | | | | petrol, unleaded, at refinery, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 2.00E-16 | kg/kg | 1.43E-12 | petrol, unleaded, at refinery, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 3.86E-08 | kg/kg | 2.76E-04 | petrol, unleaded, at refinery, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 3.62E-11 | kg/kg | 6.55E-08 | petrol, unleaded, at refinery, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 3.51E-09 | kg/kg | 6.36E-06 | petrol, unleaded, at refinery, RER |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | petrol, unleaded, at refinery, RER |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 3.03E-12 | kg/kg | 2.64E-11 | petrol, unleaded, at refinery, RER |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 3.31E-12 | kg/kg | 2.88E-11 | petrol, unleaded, at refinery, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 3.23E-12 | kg/kg | 3.52E-08 | petrol, unleaded, at refinery, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 6.05E-12 | kg/kg | 6.60E-08 | petrol, unleaded, at refinery, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 3.79E-19 | kg/kg | 4.13E-15 | petrol, unleaded, at refinery, RER |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 6.68E-15 | kg/kg | 1.40E-12 | petrol, unleaded, at refinery, RER |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 1.70E-04 | kg/kg | 4.26E-03 | petrol, unleaded, at refinery, RER |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 1.87E-03 | kg/kg | 4.68E-02 | petrol, unleaded, at refinery, RER |
| Methane, fossil | air | | kg | 25 | | 3.77E-12 | | 9.42E-11 | |
| | | lower stratosphere + upper troposphere | U | | kg CO2-Eq | | kg/kg | | petrol, unleaded, at refinery, RER |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 6.95E-07 | kg/kg | 1.74E-05 | petrol, unleaded, at refinery, RER |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 8.93E-10 | kg/kg | 1.25E-06 | petrol, unleaded, at refinery, RER |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 1.69E-16 | kg/kg | 2.37E-13 | petrol, unleaded, at refinery, RER |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 3.85E-12 | kg/kg | 2.84E-08 | petrol, unleaded, at refinery, RER |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 6.85E-09 | kg/kg | 5.06E-05 | petrol, unleaded, at refinery, RER |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.08E-14 | kg/kg | 5.15E-11 | petrol, unleaded, at refinery, RER |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 2.12E-12 | kg/kg | 3.14E-08 | petrol, unleaded, at refinery, RER |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | petrol, unleaded, at refinery, RER |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 5.51E-12 | kg/kg | 1.26E-07 | petrol, unleaded, at refinery, RER |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.29E-08 | kg/kg | 2.95E-04 | petrol, unleaded, at refinery, RER |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 6.38E-14 | kg/kg | 8.29E-13 | petrol, unleaded, at refinery, RER |
| Methane, monochloro-, R-40 | air | low population density | ko | 13 | kg CO2-Eq | 6.04E-12 | kg/kg | 7.86E-11 | petrol, unleaded, at refinery, RER |
| Carbon dioxide, land transformation | air | low population density | ka | 1 | kg CO2-Eq | 1.58E-05 | kg/kg | 1.58E-05 | petrol, unleaded, at refinery, RER |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | 1.3012-03 | kg/kg | 0.00E+00 | petrol, unleaded, at refinery, RER |
| i via ogen naonae | an | ingli population density | kg | 17200 | kg CO2-Lq | | kg/kg | 1.73E-01 | petrol, unleaded, at reinlery, NEW |
| Ammonia | | 1.5 | | | | 8.06E-07 | lea/lea | 1.52E-06 | petrol, unleaded, at refinery, RER |
| Allillollid | | | | | | | | | |
| | air | high population density | kg | 1.88 | kg SO2-Eq | | kg/kg | | |
| Ammonia | air | low population density | kg kg | 1.88 | kg SO2-Eq | 3.59E-06 | kg/kg | 6.76E-06 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia | air air | low population density unspecified | kg kg | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 | kg/kg kg/kg | 6.76E-06 3.71E-06 | petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride | air air air | low population density unspecified high population density | | 1.88 1.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 | kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 | petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride | air air air air | low population density unspecified high population density low population density | kg kg | 1.88 1.88 0.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 | kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 | petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride | air air air air air | low population density unspecified high population density low population density unspecified | kg kg | 1.88 1.88 0.88 0.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 | petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride | air air air air | low population density unspecified high population density low population density | kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride | air air air air air | low population density unspecified high population density low population density unspecified | kg kg | 1.88 1.88 0.88 0.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 | petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride | air air air air air air | low population density unspecified high population density low population density unspecified high population density | kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride | air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified | kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide | air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density | kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide | air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density | kg kg | 1.88 1.88 0.88 0.88 1.6 1.6 1.6 1.8 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide | air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified | kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides | air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified high population density | kg kg | 1.88 1.88 0.88 0.88 1.6 1.6 1.6 1.8 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide | air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified | kg kg | 1.88 1.88 0.88 0.88 1.6 1.6 1.6 1.8 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen gluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides | air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified high population density | kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 0.7 0.7 | kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides | air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified | kg kg | 1.88 1.88 0.88 0.88 1.6 1.6 1.6 1.8 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.29E-04 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide | air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density | kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 0.7 0.7 | kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.12E-04 1.82E-03 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.03E-05 7.85E-05 1.82E-03 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen gluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide | air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified | kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 0.7 0.7 | kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.28E-03 1.23E-04 1.82E-03 3.76E-03 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density | kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 0.7 0.7 | kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-03 1.33E-05 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified | kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.89 1.7 0.7 0.7 1 1 1 | kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 1.35E-05 3.86E-04 | petrol, unleaded, at refinery, RER See values above from Pembina petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen gluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified river | kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.7 0.7 0.7 1 1 1 1.88 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.41E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 7.74E-09 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 1.35E-05 3.86E-04 1.45E-08 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur dioxide | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified river agricultural | kg kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.7 0.7 0.7 1 1 1.88 0.65 | kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 1.35E-05 3.86E-04 1.45E-08 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen gluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified river | kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.7 0.7 0.7 1 1 1 1.88 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 7.74E-09 2.36E-14 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 1.82E-03 3.76E-03 1.33E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen gluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur dioxide Hydrogen sulfide Sulfuric acid | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified river agricultural | kg kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 | kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.22E-04 1.22E-03 1.33E-05 3.86E-04 7.74E-09 2.36E-14 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur dioxide | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified river agricultural | kg kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.7 0.7 0.7 1 1 1.88 0.65 | kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 7.74E-09 2.36E-14 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.03E-05 7.85E-05 1.82E-03 3.76E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-14 3.20E-08 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfur dioxide | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified river agricultural high population density unspecified | kg kg kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 1.33E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-14 3.20E-08 4.89E-04 | petrol, unleaded, at refinery, RER See values above from Pembina petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfuri cacid Phosphoric acid Sulfuric acid | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified river agricultural high population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.9 1 1 1.88 0.65 0.65 0.65 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.22E-04 1.22E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 8.63E-05 1.82E-05 1.82E-03 3.76E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-14 3.20E-08 4.89E-04 4.33E-08 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Phosphorus Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density low population density unspecified river agricultural high population density low population density low population density | kg kg kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 0.65 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.12E-04 1.82E-03 3.76E-03 1.35E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.88E-14 3.20E-08 4.89E-04 2.35E-08 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density low population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 0.65 3.06 3.06 3.06 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-04 7.74E-09 2.36E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.03E-05 7.85E-05 1.82E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-14 3.20E-08 4.89E-04 2.33E-08 1.26E-09 5.87E-09 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuri cacid Phosphoria acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus | air | low population density unspecified high population density low population density low population density low population density low population density unspecified high population density low population density low population density low population density low population density unspecified river agricultural high population density low population density, long-term unspecified | kg kg kg kg kg kg kg kg kg kg kg kg kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1.88 0.65 0.65 0.65 3.06 3.06 3.06 3.06 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.22E-04 1.82E-03 3.76E-03 1.33E-05 3.86E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 1.82E-03 3.76E-03 1.35E-05 1.82E-08 1.54E-14 0.00E+00 4.83E-04 4.85E-04 4.85E-04 4.85E-04 2.35E-08 1.26E-09 5.87E-09 9.04E-12 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur cacid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 0.65 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-03 1.35E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.89E-04 2.35E-08 4.89E-04 2.35E-08 1.26E-09 9.04E-12 8.66E-08 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density low population density low population density low population density unspecified high population density low population density low population density low population density low population density unspecified river agricultural high population density low population density, long-term unspecified | kg kg kg kg kg kg kg kg kg kg kg kg kg k | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 0.65 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 1.67E-06 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-14 3.20E-08 4.89E-04 2.35E-08 4.89E-04 2.35E-08 4.89E-04 2.35E-08 4.89E-04 2.35E-08 4.66E-08 5.10E-06 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur cacid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.85 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 0.022 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-03 1.35E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 1.35E-05 1.82E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-14 3.20E-08 1.26E-09 5.87E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 0.65 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 1.67E-06 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 1.35E-05 3.86E-04 1.45E-08 4.89E-04 2.35E-08 4.89E-04 2.35E-08 4.26E-09 5.87E-09 9.04E-12 8.66E-08 5.10E-06 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur cacid Phosphoria caid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.85 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 0.022 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.22E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 1.67E-06 1.31E-02 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 1.35E-05 1.82E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-14 3.20E-08 1.26E-09 5.87E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 | petrol, unleaded, at refinery, RER see values above from Pembina petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg kg kg kg kg kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.0 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 1.67E-06 1.31E-02 3.20E-06 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-14 3.20E-08 4.89E-04 2.35E-08 1.26E-09 5.87E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Cob, Chemical Oxygen Demand Cob, Chemical Oxygen Demand Cob, Chemical Oxygen Demand Cob, Chemical Oxygen Demand | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2 | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 1.67E-06 1.31E-02 3.20E-06 1.32E-02 6.09E-06 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.03E-05 1.82E-03 3.76E-03 1.35E-05 1.82E-08 1.26E-08 1.26E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 7.04E-08 2.90E-04 1.34E-07 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density unspecified river agricultural high population density low population dens | kg kg kg kg kg kg kg kg kg kg kg kg kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 1.88 | kg SO2-Eq kg PO4-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.22E-04 1.22E-03 1.23E-04 1.22E-04 1.22E-06 1.31E-02 3.20E-06 1.31E-02 3.20E-06 1.31E-02 6.09E-06 8.39E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.89E-04 2.35E-08 1.26E-09 5.87E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 7.04E-08 2.90E-04 1.34E-07 8.39E-08 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low po | kg kg kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 1.88 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.2E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 1.67E-06 1.31E-02 3.20E-06 1.32E-02 6.09E-06 8.39E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.53E-05 7.85E-05 1.82E-03 3.76E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.81E-14 3.20E-08 4.89E-04 2.35E-08 1.26E-09 5.87E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 7.04E-08 2.90E-04 1.34E-07 8.39E-08 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population dens | kg kg kg kg kg kg kg kg kg kg kg kg kg k | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2 | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.22E-04 1.22E-03 1.23E-04 1.22E-04 1.22E-06 1.31E-02 3.20E-06 1.31E-02 3.20E-06 1.31E-02 6.09E-06 8.39E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 4.36E-07 5.38E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.03E-05 7.85E-05 1.82E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-14 3.20E-08 4.89E-04 2.35E-08 1.26E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 7.04E-08 2.90E-04 1.34E-07 8.39E-08 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low po | kg kg kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 1.88 | kg SO2-Eq | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.2E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 1.67E-06 1.31E-02 3.20E-06 1.32E-02 6.09E-06 8.39E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 8.63E-05 1.82E-05 1.82E-05 1.82E-05 1.82E-05 1.82E-05 1.82E-05 1.82E-08 1.54E-14 0.00E+00 4.83E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-04 1.34E-07 8.36E-08 1.26E-09 5.87E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 7.04E-08 2.90E-04 1.34E-07 8.39E-08 5.25E-07 2.85E-07 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density river unspecified river unspecified river river unspecified high population density | kg kg kg kg kg kg kg kg kg kg kg kg kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 0.65 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2 | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.23E-04 1.82E-03 3.76E-03 1.35E-05 3.86E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 1.67E-06 1.31E-02 3.20E-06 1.32E-02 6.09E-06 8.39E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 7.85E-05 1.82E-03 3.76E-03 1.35E-05 3.86E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-14 3.20E-08 4.89E-04 2.35E-08 1.26E-09 5.87E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 1.34E-07 8.39E-04 | petrol, unleaded, at refinery, RER See values above from Pembina petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuria caid Phosphoric acid Sulfuria caid Phosphorus Phosphoric acid | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low po | kg k | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.0 | kg SO2-Eq kg SO2 | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.32E-04 1.82E-03 3.76E-04 7.74E-09 2.36E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 1.67E-06 1.31E-02 3.20E-06 8.39E-08 1.71E-07 9.31E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.03E-05 7.85E-05 1.82E-03 1.35E-05 3.86E-04 1.45E-08 4.89E-04 1.45E-08 4.89E-04 2.35E-08 4.89E-04 2.35E-08 4.89E-04 2.35E-08 4.89E-04 1.45E-09 5.87E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 7.04E-08 2.90E-04 1.34E-07 8.39E-08 5.25E-07 2.85E-07 0.00E+00 5.85E-07 0.85E-04 3.42E-01 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur idoxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density low population density low population density unspecified high population density low population density in ground in ground in ground in ground | kg k | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 1.88 | kg SO2-Eq kg SO2 | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.22E-04 1.82E-03 1.33E-05 3.66E-04 7.74E-09 2.36E-14 7.42E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 1.67E-06 1.31E-02 3.20E-06 1.31E-02 3.20E-06 8.39E-08 1.71E-07 9.31E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 5.46E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.63E-05 1.82E-03 3.76E-03 1.35E-05 1.82E-03 1.35E-05 1.82E-08 1.54E-14 0.00E+00 4.83E-04 1.45E-08 1.54E-14 0.00E+00 4.83E-04 1.26E-09 5.87E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 7.04E-08 2.90E-04 1.34E-07 8.39E-08 5.25E-07 0.00E+00 5.85E-07 0.00E+00 5.85E-07 | petrol, unleaded, at refinery, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuria caid Phosphoric acid Sulfuria caid Phosphorus Phosphoric acid | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.0 | kg SO2-Eq kg SO2 | 3.59E-06 1.97E-06 3.68E-06 6.20E-06 4.95E-07 3.36E-07 1.30E-06 1.02E-07 1.41E-10 4.47E-07 8.12E-08 5.30E-04 1.29E-03 1.32E-04 1.82E-03 3.76E-04 7.74E-09 2.36E-14 4.92E-08 7.68E-09 4.11E-10 1.92E-09 2.95E-12 2.83E-08 1.67E-06 1.31E-02 3.20E-06 8.39E-08 1.71E-07 9.31E-08 | kg/kg | 6.76E-06 3.71E-06 3.23E-06 4.36E-07 5.38E-07 2.07E-06 1.63E-07 2.66E-10 8.41E-07 1.53E-07 3.71E-04 9.04E-04 8.03E-05 7.85E-05 1.82E-03 1.35E-05 3.86E-04 1.45E-08 4.89E-04 1.45E-08 4.89E-04 2.35E-08 4.89E-04 2.35E-08 4.89E-04 2.35E-08 4.89E-04 1.45E-09 5.87E-09 9.04E-12 8.66E-08 5.10E-06 2.88E-04 7.04E-08 2.90E-04 1.34E-07 8.39E-08 5.25E-07 2.85E-07 0.00E+00 5.85E-07 0.85E-04 3.42E-01 | petrol, unleaded, at refinery, RER |

| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 7.17E-02 | Nm3/kg | 2.74E+00 | petrol, unleaded, at refinery, RER |
|-------------------------|----------|-----------|-----|--------|-------|----------|--------|----------|------------------------------------|
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.14E+00 | kg/kg | 5.23E+01 | petrol, unleaded, at refinery, RER |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 4.22E-06 | kg/kg | 4.18E-05 | petrol, unleaded, at refinery, RER |
| | | | | | | | | 5.59E+01 | petrol, unleaded, at refinery, RER |
| | | | | | | | | | |

| ck to top rbon dioxide, fossil rbon dioxide, fossil | | petrol, unleaded, at regional storage RER ransportation of product from the refinery to the end user. Operation of storage | | | | | | | |
|---|--------------------------|--|----------|------------------|-------------------------------------|----------------------------------|-------------------------|----------------------------------|---|
| rbon dioxide, fossil rbon dioxide, fossil | | representation of product from the refinery to the end user. Operation of ctorage | | | | | | | |
| rbon dioxide, fossil rbon dioxide, fossil | | | | | | | | | |
| bon dioxide, fossil | | inks and petrol stations. Emissions from evaporation and treatment of effluents | | | | | | | |
| oon dioxide, fossil | air | Excluding emissions from car-washing at petrol stations. high population density | kg | 1 | kg CO2-Eq | 4.03E-01 | kg/kg | 4.03E-01 | petrol, unleaded, at regional storage RER |
| | air | low population density | kg | 1 | kg CO2-Eq | 2.22E-01 | kg/kg | 2.22E-01 | petrol, unleaded, at regional storage RER |
| on dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 2.38E-07 | kg/kg | 2.38E-07 | petrol, unleaded, at regional storage RER |
| on dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 2.44E-02 | kg/kg | 2.44E-02 | petrol, unleaded, at regional storage RER |
| on monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 1.20E-04 | kg/kg | 1.89E-04 | petrol, unleaded, at regional storage RER |
| on monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 4.08E-04 | kg/kg | 6.41E-04 | petrol, unleaded, at regional storage RER |
| on monoxide, fossil on monoxide, fossil | air air | lower stratosphere + upper troposphere | kg | 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq | 2.80E-10 2.99E-04 | kg/kg kg/kg | 4.40E-10 4.69E-04 | petrol, unleaded, at regional storage RER |
| oform | air | unspecified high population density | kg kg | 30 | kg CO2-Eq | 6.30E-11 | kg/kg | 1.89E-09 | petrol, unleaded, at regional storage RER petrol, unleaded, at regional storage RER |
| roform | air | low population density | kg | 30 | kg CO2-Eq | 1.30E-12 | kg/kg | 3.90E-11 | petrol, unleaded, at regional storage RER |
| oform | air | unspecified | kg | 30 | kg CO2-Eq | 4.78E-19 | kg/kg | 1.43E-17 | petrol, unleaded, at regional storage RER |
| rogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 4.32E-06 | kg/kg | 1.29E-03 | petrol, unleaded, at regional storage RER |
| rogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 4.61E-06 | kg/kg | 1.37E-03 | petrol, unleaded, at regional storage RER |
| rogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 2.27E-12 | kg/kg | 6.76E-10 | petrol, unleaded, at regional storage RER |
| rogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 1.54E-06 | kg/kg | 4.58E-04 | petrol, unleaded, at regional storage RER |
| ne, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 2.57E-12 | kg/kg | 3.68E-09 | petrol, unleaded, at regional storage RER |
| ne, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 6.53E-11 | kg/kg | 9.34E-08 | petrol, unleaded, at regional storage RER |
| ne, 1,1,1,2-tetrafluoro-, HFC-134a ne, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air air | unspecified high population density | kg kg | 1430 6130 | kg CO2-Eq kg CO2-Eq | 1.24E-08 9.42E-13 | kg/kg kg/kg | 1.77E-05 5.78E-09 | petrol, unleaded, at regional storage RER petrol, unleaded, at regional storage RER |
| ne, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | J.42E-13 | kg/kg | 0.00E+00 | petrol, unleaded, at regional storage RER |
| ne, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 8.45E-11 | kg/kg | 1.05E-08 | petrol, unleaded, at regional storage RER |
| ne, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | petrol, unleaded, at regional storage RER |
| ne, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 1.13E-09 | kg/kg | 1.13E-05 | petrol, unleaded, at regional storage RER |
| ne, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | petrol, unleaded, at regional storage RER |
| ne, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 6.70E-11 | kg/kg | 8.18E-07 | petrol, unleaded, at regional storage RER |
| ne, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 1.15E-09 | kg/kg | 1.40E-05 | petrol, unleaded, at regional storage RER |
| nane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 1.89E-07 | kg/kg | 4.72E-06 | petrol, unleaded, at regional storage RER |
| ane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.82E-06 | kg/kg | 4.54E-05 | petrol, unleaded, at regional storage RER |
| ane, biogenic ane, bromo-, Halon 1001 | air air | unspecified | kg kg | 25 5 | kg CO2-Eq kg CO2-Eq | 1.27E-06 1.30E-18 | kg/kg | 3.18E-05 6.48E-18 | petrol, unleaded, at regional storage RER |
| ane, bromochlorodifluoro-, Halon 1211 | air | unspecified low population density | kg | 1890 | kg CO2-Eq | 9.79E-10 | kg/kg kg/kg | 1.85E-06 | petrol, unleaded, at regional storage RER petrol, unleaded, at regional storage RER |
| ane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 3.54E-16 | kg/kg | 2.53E-12 | petrol, unleaded, at regional storage RER |
| ane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 3.87E-08 | kg/kg | 2.77E-04 | petrol, unleaded, at regional storage RER |
| ane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 6.49E-11 | kg/kg | 1.18E-07 | petrol, unleaded, at regional storage RER |
| ane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 3.82E-09 | kg/kg | 6.91E-06 | petrol, unleaded, at regional storage RER |
| ane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | petrol, unleaded, at regional storage RER |
| ane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 3.38E-12 | kg/kg | 2.94E-11 | petrol, unleaded, at regional storage RER |
| ane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 3.85E-12 | kg/kg | 3.35E-11 | petrol, unleaded, at regional storage RER |
| nane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 3.55E-12 | kg/kg | 3.87E-08 | petrol, unleaded, at regional storage RER |
| nane, dichlorodifluoro-, CFC-12 nane, dichlorodifluoro-, CFC-12 | air air | low population density | kg kg | 10900 10900 | kg CO2-Eq | 6.28E-12 8.61E-19 | kg/kg | 6.84E-08 9.39E-15 | petrol, unleaded, at regional storage RER petrol, unleaded, at regional storage RER |
| nane, dichlorofluoro-, CFC-12 | air | unspecified high population density | kg kg | 210 | kg CO2-Eq kg CO2-Eq | 7.31E-15 | kg/kg kg/kg | 9.59E-15 1.54E-12 | petrol, unleaded, at regional storage RER |
| nane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 1.72E-04 | kg/kg | 4.30E-03 | petrol, unleaded, at regional storage RER |
| nane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 1.91E-03 | kg/kg | 4.77E-02 | petrol, unleaded, at regional storage RER |
| ane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 3.78E-12 | kg/kg | 9.46E-11 | petrol, unleaded, at regional storage RER |
| nane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 1.09E-06 | kg/kg | 2.72E-05 | petrol, unleaded, at regional storage RER |
| nane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 9.30E-10 | kg/kg | 1.30E-06 | petrol, unleaded, at regional storage RER |
| nane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 3.85E-16 | kg/kg | 5.39E-13 | petrol, unleaded, at regional storage RER |
| ane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 4.34E-12 | kg/kg | 3.21E-08 | petrol, unleaded, at regional storage RER |
| nane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 1.03E-08 | kg/kg | 7.64E-05 | petrol, unleaded, at regional storage RER |
| ane, trichlorofluoro-, CFC-11 ane, trifluoro-, HFC-23 | air air | high population density | kg kg | 4750 14800 | kg CO2-Eq kg CO2-Eq | 1.19E-14 2.33E-12 | kg/kg | 5.64E-11 3.44E-08 | petrol, unleaded, at regional storage RER petrol, unleaded, at regional storage RER |
| ane, trifluoro-, HFC-23 r hexafluoride | air | high population density high population density | кд kg | 22800 | kg CO2-Eq | 2.33E-12 | kg/kg kg/kg | 3.44E-08 0.00E+00 | petrol, unleaded, at regional storage RER |
| r hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 6.41E-12 | kg/kg | 1.46E-07 | petrol, unleaded, at regional storage RER |
| r hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.46E-08 | kg/kg | 3.33E-04 | petrol, unleaded, at regional storage RER |
| ane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 8.30E-14 | kg/kg | 1.08E-12 | petrol, unleaded, at regional storage RER |
| ane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 7.02E-12 | kg/kg | 9.13E-11 | petrol, unleaded, at regional storage RER |
| on dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.80E-05 | kg/kg | 1.80E-05 | petrol, unleaded, at regional storage RER |
| gen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | petrol, unleaded, at regional storage RER |
| | | 111 10 10 | | | | 0.405.05 | | 7.06E-01 | petrol, unleaded, at regional storage RER |
| onia | air | high population density | kg | 1.88 | kg SO2-Eq | 8.42E-07 | kg/kg | 1.58E-06 | petrol, unleaded, at regional storage RER |
| onia onia | air air | low population density | kg kg | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 4.04E-06 4.68E-06 | kg/kg | 7.60E-06 8.80E-06 | petrol, unleaded, at regional storage RER |
| onia ogen chloride | air air | unspecified high population density | кg kg | 0.88 | kg SO2-Eq kg SO2-Eq | 4.68E-06 3.72E-06 | kg/kg kg/kg | 3.28E-06 | petrol, unleaded, at regional storage RER petrol, unleaded, at regional storage RER |
| gen chloride gen chloride | air | low population density | kg kg | 0.88 | kg SO2-Eq | 6.99E-06 | kg/kg kg/kg | 6.15E-06 | petrol, unleaded, at regional storage RER |
| gen chloride gen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 1.68E-06 | kg/kg | 1.48E-06 | petrol, unleaded, at regional storage RER |
| gen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 3.39E-07 | kg/kg | 5.42E-07 | petrol, unleaded, at regional storage RER |
| gen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 1.46E-06 | kg/kg | 2.34E-06 | petrol, unleaded, at regional storage RER |
| gen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 1.24E-07 | kg/kg | 1.99E-07 | petrol, unleaded, at regional storage RER |
| | air | high population density | kg | 1.88 | kg SO2-Eq | 2.11E-10 | kg/kg | 3.96E-10 | petrol, unleaded, at regional storage RER |
| | air | low population density | kg | 1.88 | kg SO2-Eq | 4.93E-07 | kg/kg | 9.27E-07 | petrol, unleaded, at regional storage RER |
| ogen sulfide ogen sulfide | | unspecified | kg | 1.88 | kg SO2-Eq | 9.26E-08 | kg/kg | 1.74E-07 | petrol, unleaded, at regional storage RER |
| ogen sulfide ogen sulfide ogen sulfide | air | | | 0.7 | kg SO2-Eq | 5.37E-04 | kg/kg | 3.76E-04 | |
| ogen sulfide ogen sulfide ogen sulfide gen oxides | air | high population density | kg | | | | | | petrol, unleaded, at regional storage RER |
| ogen sulfide ogen sulfide ogen sulfide gen oxides gen oxides | air air | high population density low population density | kg | 0.7 | kg SO2-Eq | 1.35E-03 | kg/kg | 9.46E-04 | petrol, unleaded, at regional storage RER |
| ogen sulfide ogen sulfide ogen sulfide gen oxides gen oxides gen oxides | air air air | high population density low population density unspecified | kg kg | | kg SO2-Eq kg SO2-Eq | 1.35E-03 1.81E-04 | kg/kg kg/kg | 9.46E-04 1.27E-04 | petrol, unleaded, at regional storage RER petrol, unleaded, at regional storage RER |
| rogen sulfide rogen sulfide rogen sulfide ogen oxides ogen oxides ur dioxide ur dioxide | air air air air | high population density low population density unspecified high population density | kg | 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.35E-03 1.81E-04 1.83E-03 | kg/kg kg/kg kg/kg | 9.46E-04 1.27E-04 1.83E-03 | petrol, unleaded, at regional storage RER petrol, unleaded, at regional storage RER petrol, unleaded, at regional storage RER |
| rogen sulfide rogen sulfide rogen sulfide ogen oxides ogen oxides ogen oxides | air air air | high population density low population density unspecified | kg kg | 0.7 | kg SO2-Eq kg SO2-Eq | 1.35E-03 1.81E-04 | kg/kg kg/kg | 9.46E-04 1.27E-04 | petrol, unleaded, at regional storage RER petrol, unleaded, at regional storage RER |

| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 2.57E-14 | kg/kg | 1.67E-14 | petrol, unleaded, at regional storage RER |
|--|-------------------------------|---|--|-----------------|---|--------------------------|----------------|---|--|
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | petrol, unleaded, at regional storage RER |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 8.38E-14 | kg/kg | 5.45E-14 | petrol, unleaded, at regional storage RER |
| | | | | | | | | 7.19E-03 | petrol, unleaded, at regional storage RER |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 8.78E-09 | kg/kg | 2.69E-08 | petrol, unleaded, at regional storage RER |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 4.69E-10 | kg/kg | 1.44E-09 | petrol, unleaded, at regional storage RER |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 2.17E-09 | kg/kg | 6.65E-09 | petrol, unleaded, at regional storage RER |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 4.06E-12 | kg/kg | 1.24E-11 | petrol, unleaded, at regional storage RER |
| Phosphorus | soil soil | agricultural | kg | 3.06 3.06 | kg PO4-Eq | 3.23E-08 1.67E-06 | kg/kg | 9.87E-08 5.12E-06 | petrol, unleaded, at regional storage RER |
| Phosphorus BOD5, Biological Oxygen Demand | son water | industrial river | Kg les | 0.022 | kg PO4-Eq kg PO4-Eg | 1.67E-06 1.31E-02 | kg/kg kg/kg | 5.12E-06 2.89E-04 | petrol, unleaded, at regional storage RER petrol, unleaded, at regional storage RER |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand | water | unspecified | kg ka | 0.022 | kg PO4-Eq | 3.44E-06 | kg/kg | 7.57E-08 | petrol, unieaded, at regional storage RER petrol, unieaded, at regional storage RER |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.32E-02 | kg/kg | 2.91E-04 | petrol, unieaded, at regional storage RER petrol, unieaded, at regional storage RER |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 6.33E-06 | kg/kg | 1.39E-07 | petrol, unleaded, at regional storage RER |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.47E-07 | kg/kg | 1.47E-07 | petrol, unleaded, at regional storage RER |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 1.75E-07 | kg/kg | 5.36E-07 | petrol, unleaded, at regional storage RER |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 9.32E-08 | kg/kg | 2.85E-07 | petrol, unleaded, at regional storage RER |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | petrol, unleaded, at regional storage RER |
| | | | | | | | | 5.87E-04 | petrol, unleaded, at regional storage RER |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 3.89E-02 | kg/kg | 3.85E-01 | petrol, unleaded, at regional storage RER |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 2.92E-02 | kg/kg | 5.58E-01 | petrol, unleaded, at regional storage RER |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 2.81E-04 | Nm3/kg | 1.12E-02 | petrol, unleaded, at regional storage RER |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 7.32E-02 | Nm3/kg | 2.80E+00 | petrol, unleaded, at regional storage RER |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.15E+00 | kg/kg | 5.25E+01 | petrol, unleaded, at regional storage RER |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 4.32E-06 | kg/kg | 4.28E-05 | petrol, unleaded, at regional storage RER |
| | | | | | | | | 5.63E+01 | petrol, unleaded, at regional storage RER |
| | | | | | | | | | |
| E12a and E12b Combust Diesel in Agricultural | | | | | | | | | |
| Equipment - Off-Road Mobile Sources and | | | | | | | | | |
| Machinery (Agriculture - Diesel) | | | | | | | | | |
| back to top | | | | | | | | | |
| Carbon Dioxide | air | | | | kg/TJ | 7.41E+04 | kg/kg | 2.93E+00 | Intergovernmental Panel on Climate Change (IPCC). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 2. Chapter 3: |
| | | | | | 3 | | 3 3 | | Mobile Combustion. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_3_Ch3_Mobile_Combustion.pdf |
| Methane | air | | | | kg/TJ | 4.15E+00 | kg/kg | 4.11E-03 | Intergovernmental Panel on Climate Change (IPCC). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 2. Chapter 3: Mahilo Combustion Available at https://www.ios.org/in/pub.ios.org/in |
| | | | | | | | | | Mobile Combustion. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_3_Ch3_Mobile_Combustion.pdf |
| | | | | | | | | | Intergovernmental Panel on Climate Change (IPCC). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 2. Chapter 3: |
| Dinitrogen Monoxide | air | | | | kg/TJ | 2.86E+01 | kg/kg | 3.38E-01 | Mobile Combustion. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_3_Ch3_Mobile_Combustion.pdf |
| | | | | | | | | 3.28E+00 | |
| 540 O 1 40 11 1 A 1 11 15 1 | • | | | | | | | | |
| E12c Combust Gasoline in Agricultural Equipmen | ent | | | | | | | | |
| - Off-Road Mobile Sources and Machinery (Agriculture - Gasoline) | | | | | | | | | |
| (Agriculture - Gasoline) | | | | | | | | | |
| Ondress Districts | _!_ | | | | I /T. I | 0.005.04 | 1// | 0.445.00 | Intergovernmental Panel on Climate Change (IPCC). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 2. Chapter 3: |
| Carbon Dioxide | air | | | | kg/TJ | 6.93E+04 | kg/kg | 3.11E+00 | Mobile Combustion. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_3_Ch3_Mobile_Combustion.pdf |
| Methane | air | | | | kg/TJ | 1.80E+02 | kg/kg | 2.02E-01 | Intergovernmental Panel on Climate Change (IPCC). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 2. Chapter 3: |
| Mediane | all | | | | Ng/ 10 | 1.002102 | ng/ng | 2.022 01 | Mobile Combustion. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_3_Ch3_Mobile_Combustion.pdf |
| Dinitrogen Monoxide | air | | | | kg/TJ | 4.00E-01 | kg/kg | 5.35E-03 | Intergovernmental Panel on Climate Change (IPCC). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 2. Chapter 3: |
| | | | | | | | | 3.32E+00 | Mobile Combustion. Available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_3_Ch3_Mobile_Combustion.pdf |
| Assumed combustion/production/ delivery of coloured | ed | | | | | | | 0.022.700 | |
| diesel same as regular diesel | | | | | | | | | |
| | | | | | | | | | |
| F0 F5 F0 F40 | Natural Car Bandurdian Bana | i Distribution/Delius-/Ossebus-t | | | | | | | |
| E2, E5, E8, E10 back to top | Natural Gas Production, Proce | essing, Distribution/ Deliver / Combust | | | | | | | |
| back to top | | | Natural Gas End-Use | | | | | | |
| | | | Combustion Efficiency | | | | | | |
| | | | Furnace Efficiency | | 8.25E-01 | | | | Selected from options below |
| | | | | | | | | | |
| | | | Low efficiency (residential) | | 6.00E-01 | | | | NRCan (2005). Heating with Gas. Accessed online June 2008 at |
| | | | Oten deed officiency | | 0.005.04 | | | | http://oee.nrcan.gc.ca/publications/infosource/pub/home/Heating_With_Gas_Contents.cfm?text=N&printview=N |
| | | | Standard efficiency (residential) | | 8.00E-01 | | | | NRCan (2005). Heating with Gas. Accessed online June 2008 at http://oee.nrcan.gc.ca/publications/infosource/pub/home/Heating With Gas Contents.cfm?text=N&printview=N |
| | | | High efficiency (residential) | | 9.25E-01 | | | | nup://dee.incan.gc.ca/publications/innosource/pub/inner-leating_win_bas_Contents.cim/rext=iv&print/lew=iv NRCan (2005). Heating with Gas. Accessed online June 2008 at |
| | | | .g | | | | | | http://oee.nrcan.gc.ca/publications/infosource/pub/home/Heating_With_Gas_Contents.cfm?text=N&printview=N |
| | | | Standard efficiency | | 6.45E-01 | | | | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html |
| | | | | | | | | | |
| | | | (commercial) | | | | | | |
| | | | (commercial) Mid efficiency (commercial) | | 8.25E-01 | | | | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html |
| | | | (commercial) Mid efficiency (commercial) Condensing efficiency | | 8.25E-01 9.35E-01 | | | | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html |
| | | | (commercial) Mid efficiency (commercial) | | | | | | |
| | | | (commercial) Mid efficiency (commercial) Condensing efficiency | | | | | | |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) | | | air | | kg/10 ⁶ m³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide | | 9.35E-01 1.92E+06 | | | · · | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - | | 9.35E-01 | air air | | kg/10 ⁶ m³ kg/10 ⁶ m³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential | | 9.35E-01 1.92E+06 | | | · · | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace | | 9.35E-01 1.92E+06 6.40E+02 | air | | kg/10 ⁶ m ³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace Dinitrogen Monoxide - | | 9.35E-01 1.92E+06 | | | · · | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace | | 9.35E-01 1.92E+06 6.40E+02 | air | | kg/10 ⁶ m ³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace Dinitrogen Monoxide - Uncontrolled Furnace | | 9.35E-01 1.92E+06 6.40E+02 3.52E+01 3.68E+01 | air | | kg/10 ⁶ m ³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace Dinitrogen Monoxide - Uncontrolled Furnace Methane Nitrogen Oxides- | | 9.35E-01 1.92E+06 6.40E+02 3.52E+01 | air | | kg/10 ⁶ m ³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace Dinitrogen Monoxide - Uncontrolled Furnace Methane Nitrogen Oxides- Uncontrolled Residential | | 9.35E-01 1.92E+06 6.40E+02 3.52E+01 3.68E+01 | air air air | | kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace Dinitrogen Monoxide - Uncontrolled Furnace Methane Nitrogen Oxides- Uncontrolled Residential Furnace | | 9.35E-01 1.92E+06 6.40E+02 3.52E+01 3.68E+01 1.50E+03 | air air air | | kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace Dinitrogen Monoxide - Uncontrolled Furnace Methane Nitrogen Oxides- Uncontrolled Residential | | 9.35E-01 1.92E+06 6.40E+02 3.52E+01 3.68E+01 | air air air | | kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace Dinitrogen Monoxide - Uncontrolled Furnace Methane Nitrogen Oxides- Uncontrolled Residential Furnace | | 9.35E-01 1.92E+06 6.40E+02 3.52E+01 3.68E+01 1.50E+03 | air air air | | kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. |
| | | These emissions replace Ecoinvent emissions below | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace Dinitrogen Monoxide - Uncontrolled Furnace Methane Nitrogen Oxides- Uncontrolled Residential Furnace | eessing, and Di | 9.35E-01 1.92E+06 6.40E+02 3.52E+01 3.68E+01 1.50E+03 9.60E+00 | air air air | | kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chiel/ap42/ch01/index.html. |
| | ** Va | lues inserted into the production of natural gas as they are combined | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace Dinitrogen Monoxide - Uncontrolled Furnace Methane Nitrogen Oxides- Uncontrolled Residential Furnace Sulphur Dioxide | essing, and Di | 9.35E-01 1.92E+06 6.40E+02 3.52E+01 3.68E+01 1.50E+03 9.60E+00 | air air air | | kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Canadian Association of Petroleum Producers. 2005. A National Inventory of Greenhouse Gas (GHG), Criteria Air Contaminant (CAC) and |
| | ** Val | | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace Dinitrogen Monoxide - Uncontrolled Furnace Methane Nitrogen Oxides- Uncontrolled Residential Furnace Sulphur Dioxide | eessing, and Di | 9.35E-01 1.92E+06 6.40E+02 3.52E+01 3.68E+01 1.50E+03 9.60E+00 | air air air air | | kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ | Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Canadian Association of Petroleum Producers. 2005. A National Inventory of Greenhouse Gas (GHG), Criteria Air Contaminant (CAC) and Hydrogen Sulphide (H2S) Emissions by the Upstream Oil and Gas Industry, Volume 1, Overview of the GHG Emissions Inventory, |
| | ** Va | lues inserted into the production of natural gas as they are combined | (commercial) Mid efficiency (commercial) Condensing efficiency (commercial) Natural Gas Combustion Carbon Dioxide Carbon Monoxide - Uncontrolled Residential Furnace Dinitrogen Monoxide - Uncontrolled Furnace Methane Nitrogen Oxides- Uncontrolled Residential Furnace Sulphur Dioxide | essing, and Di | 9.35E-01 1.92E+06 6.40E+02 3.52E+01 3.68E+01 1.50E+03 9.60E+00 | air air air air | | kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ kg/10 ⁶ m ³ | Government of Alberta. Utilities Consumer Advocate. Natural Gas Furnaces. Available at: http://www.ucahelps.gov.ab.ca/141.html Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Environmental Protection Agency. 1998. AP 42, Fifth Edition, Volume I Chapter 1: External Combustion Sources 1.4 Natural Gas Combustion, http://www.epa.gov/ttn/chief/ap42/ch01/index.html. Canadian Association of Petroleum Producers. 2005. A National Inventory of Greenhouse Gas (GHG), Criteria Air Contaminant (CAC) and |

| These emissions replace Ecoinvent emissions below | Methane | 8.50E+00 | air | g/m³ | Canadian Association of Petroleum Producers. 2005. A National Inventory of Greenhouse Gas (GHG), Criteria Air Contaminant (CAC) and Hydrogen Sulphide (H2S) Emissions by the Upstream Oil and Gas Industry, Volume 1, Overview of the GHG Emissions Inventory, |
|--|---|----------|-----|---------|---|
| (doesn't include natural gas transmission by pipeline) | Nitrogen Oxides | 9.79E-03 | air | g / m³ | http://www.capp.ca/library/publications/climateChange/Pages/default.aspx. Canadian Association of Petroleum Producers. 2005. A National Inventory of Greenhouse Gas (GHG), Criteria Air Contaminant (CAC) and Hydrogen Sulphide (H2S) Emissions by the Upstream Oil and Gas Industry, Volume 1, Overview of the GHG Emissions Inventory, http://www.capp.ca/library/publications/climateChange/Pages/default.aspx. |
| | Natural Gas Production (Canada - 2000) | 2.18E+11 | | m³/year | Canadian Association of Petroleum Producers. 2005. A National Inventory of Greenhouse Gas (GHG), Criteria Air Contaminant (CAC) and Hydrogen Sulphide (H2S) Emissions by the Upstream Oil and Gas Industry, Volume 1, Overview of the GHG Emissions Inventory, http://www.capp.ca/library/publications/climateChange/Pages/default.aspx. |
| | Emissions - Upstream NG (Produce, Process, Transport) CO2 | 4.49E+04 | | kt/year | Canadian Association of Petroleum Producers. 2005. A National Inventory of Greenhouse Gas (GHG), Criteria Air Contaminant (CAC) and Hydrogen Sulphide (H2S) Emissions by the Upstream Oil and Gas Industry, Volume 1, Overview of the GHG Emissions Inventory, http://www.capp.ca/library/bublications/climate/Chanee/Pages/default.aspx. |
| | Emissions - Upstream NG (Produce, Process, Transport) CH4 | 1.85E+03 | | kt/year | Canadian Association of Petroleum Producers. 2005. A National Inventory of Greenhouse Gas (GHG), Criteria Air Contaminant (CAC) and Hydrogen Sulphide (H2S) Emissions by the Upstream Oil and Gas Industry, Volume 1, Overview of the GHG Emissions Inventory, http://www.capp.ca/library/publications/climateChange/Pages/default.aspx. |
| | Emissions - Upstream NG (Produce, Process, Transport) NOx | 2.13E+00 | | kt/year | Canadian Association of Petroleum Producers. 2005. A National Inventory of Greenhouse Gas (GHG), Criteria Air Contaminant (CAC) and Hydrogen Sulphide (H2S) Emissions by the Upstream Oil and Gas Industry, Volume 1, Overview of the GHG Emissions Inventory, http://www.capp.ca/library/publications/climateChange/Pages/default.aspx. |

| 2 | Produce natural ga | 2 | | | | | | | |
|--|---------------------|--|-----------------------|---------------------|-------------------------------------|----------------------------------|-----------------------------|----------------------------------|--|
| | . rounds matural ga | The dataset includes data for natural gas extracted from onshore and offshore | | | | | | | |
| ack to top | | wells. Furthermore, the dataset includes data for natural gas extracted from onshire and onshore wells. Furthermore, the dataset includes data for natural gas co-extracted with crude oil as well as for wells that produce only natural gas. | | | | | | | |
| rbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 1.08E-03 | kg/m3 | 1.08E-03 | natural gas, unprocessed, at extraction, RNA |
| on dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 1.71E-02 | kg/m3 | 1.71E-02 | natural gas, unprocessed, at extraction, RNA |
| on dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 4.89E-11 | kg/m3 | 4.89E-11 | natural gas, unprocessed, at extraction, RNA |
| on dioxide, fossil | air | unspecified | kg | | kg CO2-Eq ka CO2-Ea | 3.53E-03 2.06E-01 | kg/m3 | 3.53E-03 2.06E-01 | natural gas, unprocessed, at extraction, RNA |
| on dioxide on monoxide, fossil | air air | high population density | <mark>kg</mark> kg | 1.5714 | kg CO2-Eq | 2.37E-07 | <mark>kg/m3</mark> kg/m3 | 3.72E-07 | See calculations above for producing, processing and distributing natural gas natural gas, unprocessed, at extraction, RNA |
| on monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 2.27E-06 | kg/m3 | 3.57E-06 | natural gas, unprocessed, at extraction, RNA |
| on monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 5.74E-14 | kg/m3 | 9.02E-14 | natural gas, unprocessed, at extraction, NVA |
| on monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 6.46E-06 | kg/m3 | 1.01E-05 | natural gas, unprocessed, at extraction, RNA |
| roform | air | high population density | kg | 30 | kg CO2-Eq | 6.45E-12 | kg/m3 | 1.93E-10 | natural gas, unprocessed, at extraction, RNA |
| roform | air | low population density | kg | 30 | kg CO2-Eq | 3.27E-10 | kg/m3 | 9.82E-09 | natural gas, unprocessed, at extraction, RNA |
| roform | air | unspecified | kg | 30 | kg CO2-Eq | 3.08E-16 | kg/m3 | 9.25E-15 | natural gas, unprocessed, at extraction, RNA |
| ogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 9.51E-08 | kg/m3 | 2.83E-05 | natural gas, unprocessed, at extraction, RNA |
| ogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 5.42E-07 | kg/m3 | 1.61E-04 | natural gas, unprocessed, at extraction, RNA |
| rogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 4.65E-16 7.44E-08 | kg/m3 | 1.39E-13 2.22E-05 | natural gas, unprocessed, at extraction, RNA |
| rogen monoxide ne, 1,1,1,2-tetrafluoro-, HFC-134a | air air | unspecified high population density | kg | 298 1430 | kg CO2-Eq kg CO2-Eq | 7.44E-08 2.35E-14 | kg/m3 kg/m3 | 2.22E-05 3.36E-11 | natural gas, unprocessed, at extraction, RNA natural gas, unprocessed, at extraction, RNA |
| ne, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg kg | 1430 | kg CO2-Eq | 2.35E-14 3.11E-11 | kg/m3 | 4.44E-08 | natural gas, unprocessed, at extraction, RNA |
| ne, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 5.25E-11 | kg/m3 | 7.51E-08 | natural gas, unprocessed, at extraction, RNA |
| ine, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 1.68E-15 | kg/m3 | 1.03E-11 | natural gas, unprocessed, at extraction, RNA |
| ine, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | 1.002 10 | kg/m3 | 0.00E+00 | natural gas, unprocessed, at extraction, RNA |
| ne, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 4.01E-12 | kg/m3 | 4.97E-10 | natural gas, unprocessed, at extraction, RNA |
| ne, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/m3 | 0.00E+00 | natural gas, unprocessed, at extraction, RNA |
| ne, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 4.40E-10 | kg/m3 | 4.40E-06 | natural gas, unprocessed, at extraction, RNA |
| ne, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/m3 | 0.00E+00 | natural gas, unprocessed, at extraction, RNA |
| ne, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 2.15E-13 | kg/m3 | 2.62E-09 | natural gas, unprocessed, at extraction, RNA |
| ne, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 6.44E-11 | kg/m3 | 7.86E-07 | natural gas, unprocessed, at extraction, RNA |
| ane, biogenic | air | high population density | kg | 25 25 | kg CO2-Eq | 1.62E-09 2.21E-07 | kg/m3 | 4.06E-08 5.52E-06 | natural gas, unprocessed, at extraction, RNA |
| ane, biogenic ane, biogenic | air | low population density unspecified | kg ka | 25 25 | kg CO2-Eq kg CO2-Eq | 2.21E-07 1.07E-07 | kg/m3 kg/m3 | 2.68E-06 | natural gas, unprocessed, at extraction, RNA natural gas, unprocessed, at extraction, RNA |
| nane | air | unspecified | kg | 25 | kg CO2-Eq | 8.50E-03 | kg/m3 | 2.12E-01 | See calculations above for producing, processing and distributing natural gas |
| hane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 8.35E-16 | kg/m3 | 4.18E-15 | natural gas, unprocessed, at extraction, RNA |
| nane, bromochlorodifluoro-, Halon 1211 | air | low population density | | 1890 | kg CO2-Eq | 2.08E-12 | kg/m3 | 3.93E-09 | natural gas, unprocessed, at extraction, RNA |
| hane, bromotrifluoro-, Halon 1301 | air | high population density | kg kg | 7140 | kg CO2-Eq | 2.40E-17 | kg/m3 | 1.71E-13 | natural gas, unprocessed, at extraction, RNA |
| nane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.42E-11 | kg/m3 | 1.01E-07 | natural gas, unprocessed, at extraction, RNA |
| nane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 3.61E-13 | kg/m3 | 6.53E-10 | natural gas, unprocessed, at extraction, RNA |
| nane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.82E-11 | kg/m3 | 3.29E-08 | natural gas, unprocessed, at extraction, RNA |
| nane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/m3 | 0.00E+00 | natural gas, unprocessed, at extraction, RNA |
| nane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.08E-13 | kg/m3 | 1.81E-12 | natural gas, unprocessed, at extraction, RNA |
| ane, dichloro-, HCC-30 | air | low population density | kg | 8.7 10900 | kg CO2-Eq | 9.69E-10 | kg/m3 | 8.43E-09 | natural gas, unprocessed, at extraction, RNA |
| ane, dichlorodifluoro-, CFC-12 ane, dichlorodifluoro-, CFC-12 | air air | high population density low population density | kg kg | 10900 | kg CO2-Eq kg CO2-Eq | 4.13E-14 7.80E-15 | kg/m3 kg/m3 | 4.50E-10 8.50E-11 | natural gas, unprocessed, at extraction, RNA natural gas, unprocessed, at extraction, RNA |
| ane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 5.55E-16 | kg/m3 | 6.05E-12 | natural gas, unprocessed, at extraction, RNA |
| ane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 6.68E-17 | kg/m3 | 1.40E-14 | natural gas, unprocessed, at extraction, RNA |
| ane, fossil | air | high population density | ka | 25 | kg CO2-Eq | 1.05E-07 | kg/m3 | 2.63E-06 | natural gas, unprocessed, at extraction, RNA |
| ane, fossil | air | low population density | ka | 25 | kg CO2-Eg | 2.24E-05 | kg/m3 | 5.59E-04 | natural gas, unprocessed, at extraction, RNA |
| ane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 7.76E-16 | kg/m3 | 1.94E-14 | natural gas, unprocessed, at extraction, RNA |
| ane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 9.10E-03 | kg/m3 | 2.28E-01 | natural gas, unprocessed, at extraction, RNA |
| ane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 5.33E-12 | kg/m3 | 7.46E-09 | natural gas, unprocessed, at extraction, RNA |
| ane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 2.48E-13 | kg/m3 | 3.48E-10 | natural gas, unprocessed, at extraction, RNA |
| ane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 2.07E-13 | kg/m3 | 1.53E-09 | natural gas, unprocessed, at extraction, RNA |
| ane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 5.80E-10 | kg/m3 | 4.29E-06 | natural gas, unprocessed, at extraction, RNA |
| ane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 14800 | kg CO2-Eq | 1.09E-16 | kg/m3 | 5.16E-13 3.15E-10 | natural gas, unprocessed, at extraction, RNA |
| ane, trifluoro-, HFC-23 r hexafluoride | air air | high population density high population density | kg kg | 22800 | kg CO2-Eq kg CO2-Eq | 2.13E-14 | kg/m3 kg/m3 | 0.00E+00 | natural gas, unprocessed, at extraction, RNA natural gas, unprocessed, at extraction, RNA |
| hexafluoride | air | low population density | kg kg | 22800 | kg CO2-Eq | 3.88E-09 | kg/m3 | 8.85E-05 | natural gas, unprocessed, at extraction, RNA |
| hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.39E-10 | kg/m3 | 3.17E-06 | natural gas, unprocessed, at extraction, RNA |
| ane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 2.72E-15 | kg/m3 | 3.54E-14 | natural gas, unprocessed, at extraction, RNA |
| ane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 1.77E-09 | kg/m3 | 2.30E-08 | natural gas, unprocessed, at extraction, RNA |
| on dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.65E-06 | kg/m3 | 1.65E-06 | natural gas, unprocessed, at extraction, RNA |
| ogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/m3 | 0.00E+00 4.19E-01 | natural gas, unprocessed, at extraction, RNA |
| nonia | air | high population density | kg | 1.88 | kg SO2-Eq | 2.13E-08 | kg/m3 | 4.19E-01 4.00E-08 | natural gas, unprocessed, at extraction, RNA |
| nonia | air | low population density | kg | 1.88 | kg SO2-Eq | 6.05E-08 | kg/m3 | 1.14E-07 | natural gas, unprocessed, at extraction, RNA |
| monia | air | unspecified | kg | 1.88 | kg SO2-Eq | 7.78E-07 | kg/m3 | 1.46E-06 | natural gas, unprocessed, at extraction, RNA |
| rogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 2.08E-08 | kg/m3 | 1.83E-08 | natural gas, unprocessed, at extraction, RNA |
| rogen chionae | | | | | | | | | |
| rogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 4.10E-06 | kg/m3 | 3.61E-06 | natural gas, unprocessed, at extraction, RNA |
| drogen chloride drogen chloride drogen fluoride | air air | low population density unspecified high population density | kg kg ka | 0.88 0.88 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 4.10E-06 1.59E-08 1.03E-09 | kg/m3 kg/m3 kg/m3 | 3.61E-06 1.40E-08 1.65E-09 | natural gas, unprocessed, at extraction, RNA natural gas, unprocessed, at extraction, RNA natural gas, unprocessed, at extraction, RNA |

| lydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 5.18E-07 | kg/m3 | 8.28E-07 | natural gas, unprocessed, at extraction, RNA |
|--|----------|---------------------------------------|-----|--------|-----------|----------|--------|----------|---|
| drogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 3.40E-09 | kg/m3 | 5.44E-09 | natural gas, unprocessed, at extraction, RNA |
| rogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 1.36E-11 | kg/m3 | 2.56E-11 | natural gas, unprocessed, at extraction, RNA |
| rogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 1.82E-09 | kg/m3 | 3.42E-09 | natural gas, unprocessed, at extraction, RNA |
| drogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.77E-09 | kg/m3 | 3.33E-09 | natural gas, unprocessed, at extraction, RNA |
| ogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 3.10E-06 | kg/m3 | 2.17E-06 | natural gas, unprocessed, at extraction, RNA |
| rogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 2.93E-05 | kg/m3 | 2.05E-05 | natural gas, unprocessed, at extraction, RNA |
| ogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 1.12E-05 | kg/m3 | 7.84E-06 | natural gas, unprocessed, at extraction, RNA |
| rogen oxides | air | | kg | 0.7 | kg SO2-Eq | 9.79E-06 | kg/m3 | 6.85E-06 | See calculations above for producing, processing and distributing natural gas |
| fur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 6.74E-06 | kg/m3 | 6.74E-06 | natural gas, unprocessed, at extraction, RNA |
| fur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 8.24E-05 | kg/m3 | 8.24E-05 | natural gas, unprocessed, at extraction, RNA |
| fur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 4.86E-04 | kg/m3 | 4.86E-04 | natural gas, unprocessed, at extraction, RNA |
| drogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 6.03E-11 | kg/m3 | 1.13E-10 | natural gas, unprocessed, at extraction, RNA |
| furic acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 4.58E-17 | kg/m3 | 2.98E-17 | natural gas, unprocessed, at extraction, RNA |
| osphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/m3 | 0.00E+00 | natural gas, unprocessed, at extraction, RNA |
| furic acid | air | low population density | kg | 0.65 | kg SO2-Eq | 3.90E-15 | kg/m3 | 2.54E-15 | natural gas, unprocessed, at extraction, RNA |
| | | | | | | | | 5.88E-04 | |
| sphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 9.97E-10 | kg/m3 | 3.05E-09 | natural gas, unprocessed, at extraction, RNA |
| sphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 1.61E-11 | kg/m3 | 4.92E-11 | natural gas, unprocessed, at extraction, RNA |
| sphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 2.48E-10 | kg/m3 | 7.59E-10 | natural gas, unprocessed, at extraction, RNA |
| sphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 1.82E-13 | kg/m3 | 5.56E-13 | natural gas, unprocessed, at extraction, RNA |
| osphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 4.16E-09 | kg/m3 | 1.27E-08 | natural gas, unprocessed, at extraction, RNA |
| osphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 6.02E-10 | kg/m3 | 1.84E-09 | natural gas, unprocessed, at extraction, RNA |
| D5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 4.66E-06 | kg/m3 | 1.03E-07 | natural gas, unprocessed, at extraction, RNA |
| D5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 5.67E-04 | kg/m3 | 1.25E-05 | natural gas, unprocessed, at extraction, RNA |
| D, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 4.75E-06 | kg/m3 | 1.05E-07 | natural gas, unprocessed, at extraction, RNA |
| D, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 9.38E-04 | kg/m3 | 2.06E-05 | natural gas, unprocessed, at extraction, RNA |
| osphate | water | river | kg | 1 | kg PO4-Eq | 1.52E-09 | kg/m3 | 1.52E-09 | natural gas, unprocessed, at extraction, RNA |
| osphorus | water | river | kg | 3.06 | kg PO4-Eq | 3.56E-10 | kg/m3 | 1.09E-09 | natural gas, unprocessed, at extraction, RNA |
| osphorus | water | unspecified | kg | 3.06 | kg PO4-Eg | 1.41E-12 | kg/m3 | 4.33E-12 | natural gas, unprocessed, at extraction, RNA |
| osphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/m3 | 0.00E+00 | natural gas, unprocessed, at extraction, RNA |
| • | | · · · · · · · · · · · · · · · · · · · | 3 | | | | · · | 3.33E-05 | |
| al, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 1.05E-03 | kg/m3 | 1.04E-02 | natural gas, unprocessed, at extraction, RNA |
| al, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 9.13E-03 | kg/m3 | 1.74E-01 | natural gas, unprocessed, at extraction, RNA |
| s, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 5.99E-05 | Nm3/m3 | 2.38E-03 | natural gas, unprocessed, at extraction, RNA |
| s, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 1.03E+00 | Nm3/m3 | 3.93E+01 | natural gas, unprocessed, at extraction, RNA |
| crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 4.08E-04 | kg/m3 | 1.87E-02 | natural gas, unprocessed, at extraction, RNA |
| it, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 7.79E-09 | kg/m3 | 7.71E-08 | natural gas, unprocessed, at extraction, RNA |
| | | | • | | • | | - | 3.96E+01 | |

| E5 | Transport natural | | | | | | | | transport, natural gas, pipeline, long distance, RER |
|---|-------------------|---|----|----------|-----------|----------------------|--------|----------------------|--|
| ack to top | | This dataset describes the energy consumption and the emissions linked to the | | | | | | | |
| | | transport of 1 tkm average natural gas in Europe. | | | | | | | |
| bon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 4.83E-02 | kg/tkm | 4.83E-02 | transport, natural gas, pipeline, long distance, RER |
| oon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 2.18E-03 | kg/tkm | 2.18E-03 | transport, natural gas, pipeline, long distance, RER |
| oon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 5.77E-11 | kg/tkm | 5.77E-11 | transport, natural gas, pipeline, long distance, RER |
| oon dioxide, fossil | air | unspecified | ka | 1 | ka CO2-Eq | 1.75E-03 | kg/tkm | 1.75E-03 | transport, natural gas, pipeline, long distance, RER |
| oon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 3.44E-05 | kg/tkm | 5.40E-05 | transport, natural gas, pipeline, long distance, RER |
| pon monoxide, fossil | air | low population density | ka | 1.5714 | kg CO2-Eq | 4.78E-06 | kg/tkm | 7.51E-06 | transport, natural gas, pipeline, long distance, RER |
| bon monoxide, fossil | air | | ka | 1.5714 | kg CO2-Eq | 6.78E-14 | kg/tkm | 1.07E-13 | |
| bon monoxide, fossil | air | lower stratosphere + upper troposphere | 9 | 1.5714 | | 2.82E-05 | kg/tkm | 4.43E-05 | transport, natural gas, pipeline, long distance, RER |
| | air air | unspecified | kg | | kg CO2-Eq | | kg/tkm | 4.43E-05 7.91E-12 | transport, natural gas, pipeline, long distance, RER |
| proform | | high population density | kg | 30 | kg CO2-Eq | 2.64E-13 | 3 | | transport, natural gas, pipeline, long distance, RER |
| oroform | air | low population density | kg | 30 | kg CO2-Eq | 8.39E-15 | kg/tkm | 2.52E-13 | transport, natural gas, pipeline, long distance, RER |
| oroform | air | unspecified | kg | 30 | kg CO2-Eq | 7.64E-21 | kg/tkm | 2.29E-19 | transport, natural gas, pipeline, long distance, RER |
| trogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 8.57E-07 | kg/tkm | 2.55E-04 | transport, natural gas, pipeline, long distance, RER |
| trogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 2.39E-08 | kg/tkm | 7.14E-06 | transport, natural gas, pipeline, long distance, RER |
| trogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 5.50E-16 | kg/tkm | 1.64E-13 | transport, natural gas, pipeline, long distance, RER |
| trogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 3.98E-08 | kg/tkm | 1.18E-05 | transport, natural gas, pipeline, long distance, RER |
| ane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 1.24E-14 | kg/tkm | 1.78E-11 | transport, natural gas, pipeline, long distance, RER |
| ane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 3.91E-13 | kg/tkm | 5.59E-10 | transport, natural gas, pipeline, long distance, RER |
| ane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 2.16E-10 | kg/tkm | 3.08E-07 | transport, natural gas, pipeline, long distance, RER |
| ane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 4.43E-15 | kg/tkm | 2.71E-11 | transport, natural gas, pipeline, long distance, RER |
| ane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/tkm | 0.00E+00 | transport, natural gas, pipeline, long distance, RER |
| ane, 1,1-difluoro-, HFC-152a | air | high population density | ka | 124 | kg CO2-Eg | 4.63E-13 | kg/tkm | 5.75E-11 | transport, natural gas, pipeline, long distance, RER |
| ane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eg | | kg/tkm | 0.00E+00 | transport, natural gas, pipeline, long distance, RER |
| ane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | ka | 10000 | kg CO2-Eq | 6.76E-12 | kg/tkm | 6.76E-08 | transport, natural gas, pipeline, long distance, RER |
| ane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | 0.702 12 | kg/tkm | 0.00E+00 | transport, natural gas, pipeline, long distance, RER |
| ane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 3.17E-13 | kg/tkm | 3.86E-09 | transport, natural gas, pipeline, long distance, RER |
| ane, hexafluoro-, HFC-116 | air | unspecified | ka | 12200 | kg CO2-Eq | 2.43E-11 | kg/tkm | 2.97E-07 | transport, natural gas, pipeline, long distance, RER |
| thane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 2.43E-11 2.01E-09 | kg/tkm | 5.03E-08 | transport, natural gas, pipeline, long distance, RER |
| | air | | kg | 25 | kg CO2-Eq | 2.71E-08 | kg/tkm | 6.78E-07 | |
| hane, biogenic | air | low population density | | 25 25 | | 7.13E-09 | | 1.78E-07 | transport, natural gas, pipeline, long distance, RER |
| hane, biogenic | air air | unspecified | kg | 25 | kg CO2-Eq | | kg/tkm | | transport, natural gas, pipeline, long distance, RER |
| thane, bromo-, Halon 1001 | Q.II | unspecified | kg | 5 | kg CO2-Eq | 2.07E-20 | kg/tkm | 1.04E-19 | transport, natural gas, pipeline, long distance, RER |
| thane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 2.35E-08 | kg/tkm | 4.44E-05 | transport, natural gas, pipeline, long distance, RER |
| thane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 4.27E-18 | kg/tkm | 3.05E-14 | transport, natural gas, pipeline, long distance, RER |
| hane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.64E-11 | kg/tkm | 1.17E-07 | transport, natural gas, pipeline, long distance, RER |
| hane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 2.86E-13 | kg/tkm | 5.18E-10 | transport, natural gas, pipeline, long distance, RER |
| hane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 7.31E-08 | kg/tkm | 1.32E-04 | transport, natural gas, pipeline, long distance, RER |
| hane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/tkm | 0.00E+00 | transport, natural gas, pipeline, long distance, RER |
| hane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 1.70E-14 | kg/tkm | 1.48E-13 | transport, natural gas, pipeline, long distance, RER |
| thane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 2.48E-14 | kg/tkm | 2.16E-13 | transport, natural gas, pipeline, long distance, RER |
| hane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.83E-14 | kg/tkm | 2.00E-10 | transport, natural gas, pipeline, long distance, RER |
| hane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 4.31E-12 | kg/tkm | 4.70E-08 | transport, natural gas, pipeline, long distance, RER |
| hane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 1.38E-20 | kg/tkm | 1.50E-16 | transport, natural gas, pipeline, long distance, RER |
| nane, dichlorofluoro-, HCFC-21 | air | high population density | ka | 210 | kg CO2-Eq | 3.54E-17 | kg/tkm | 7.43E-15 | transport, natural gas, pipeline, long distance, RER |
| nane, fossil | air | high population density | ka | 25 | kg CO2-Eq | 4.24E-06 | kg/tkm | 1.06E-04 | transport, natural gas, pipeline, long distance, RER |
| nane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 3.33E-04 | kg/tkm | 8.33E-03 | transport, natural gas, pipeline, long distance, RER |
| ane, fossil | air | lower stratosphere + upper troposphere | ka | 25 | kg CO2-Eq | 9.17E-16 | kg/tkm | 2.29E-14 | transport, natural gas, pipeline, long distance, RER |
| nane, fossil | air | unspecified | ka | 25 | kg CO2-Eq | 4.85E-08 | kg/tkm | 1.21E-06 | transport, natural gas, pipeline, long distance, RER |
| nane, tetrachloro-, R-10 | air | | kg | 1400 | kg CO2-Eq | 2.76E-11 | kg/tkm | 3.86E-08 | transport, natural gas, pipeline, long distance, RER |
| | air | high population density | | 1400 | | 6.16E-18 | kg/tkm | 8.62E-15 | |
| hane, tetrachloro-, R-10 | | unspecified | kg | | kg CO2-Eq | | | | transport, natural gas, pipeline, long distance, RER |
| thane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 2.38E-14 | kg/tkm | 1.76E-10 | transport, natural gas, pipeline, long distance, RER |
| thane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 2.19E-10 | kg/tkm | 1.62E-06 | transport, natural gas, pipeline, long distance, RER |
| thane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 5.74E-17 | kg/tkm | 2.73E-13 | transport, natural gas, pipeline, long distance, RER |
| thane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 1.13E-14 | kg/tkm | 1.67E-10 | transport, natural gas, pipeline, long distance, RER |

| Soft responsible of the projection configuration of the projec | | | | | | | | | | |
|--|--|-------------|---------------------------------------|---------|-------|-----------|-----------|-----------|----------|---|
| Submit Communication | Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/tkm | 0.00E+00 | transport, natural gas, pipeline, long distance, RER |
| Moreau morealmen. Rod 4 19 13 4 15 4 | Sulfur hexafluoride | air | low population density | kg | | | 3.99E-14 | kg/tkm | | transport, natural gas, pipeline, long distance, RER |
| Section Control Contro | Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eg | 8.93E-11 | kg/tkm | 2.04E-06 | transport, natural gas, pipeline, long distance, RER |
| Notices monotonys, Self, 97 (Proposed Self Control of C | Methane, monochloro-, R-40 | air | high population density | ka | 13 | ka CO2-Ea | 4.48E-16 | ka/tkm | 5.83E-15 | transport, natural gas, pipeline, long distance, RER |
| Count of Enthropy 1 | Methane, monochloro-, R-40 | air | low population density | kg | 13 | ka CO2-Ea | 4.53E-14 | ka/tkm | 5.89E-13 | |
| Namenia de | | air | · · · · · · · · · · · · · · · · · · · | 3 | 1 | | | | | |
| Page | | | · · · · · · · · · · · · · · · · · · · | 9 | 17200 | | 1.07 2 00 | | | |
| Amenta si Pipopopolitani dendry la 180 kg 500-50 la 191 k | Millogen naonae | all | riigit population density | kg | 17200 | kg CO2-Lq | | Kg/tkiii | | transport, natural gas, pipeline, forty distance, INEIX |
| America g. 2 | A :- | _:_ | biologopa desette | 1 | 4.00 | I 000 F | 0.045.00 | 1 /41 | | terreset estual are similar large distance DED |
| Amonta of all proposition of the population design of the population de | | | 0 1 1 | kg | | | | | | |
| Mystopen childride 1 | | aır | | kg | | | | | | |
| Hymogen protoches | | air | | kg | | | | | | |
| Margare findings | Hydrogen chloride | air | high population density | kg | | kg SO2-Eq | 1.42E-08 | kg/tkm | | transport, natural gas, pipeline, long distance, RER |
| Margane Gardine France Gardine Gardi | Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 3.40E-08 | kg/tkm | 2.99E-08 | transport, natural gas, pipeline, long distance, RER |
| Windows Marcel September | Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eg | 4.70E-08 | kg/tkm | 4.14E-08 | |
| Full State | | air | high population density | kg | 1.6 | ka SO2-Ea | 5.31E-10 | ka/tkm | 8.50E-10 | |
| Hydrogen Hundred ar | | air | | ka | | | | | | |
| Hydrogen auffild err hyp population density big 1.86 big 30.50-61 3.016-12 signific significant significan | | air | | ka | | | | | | |
| Horogram Juride | | air | | ka | | | | | | |
| Mingran sulfde ar | | all oir | | kg | | | | | | |
| Nirogan condos air low population demisty log 0.7 log 502-Eq 1, 565-04 log/tem 1, 195-04 transport, natural gas, pepilane, floor gloridate, fl | | all | | ky | | | | | | |
| Negon coides | | air | | kg | | | | | | |
| Nergian coades air "unspended" kg 0,7 kg 50/2-Fig 1,281-G6 kg/bm 1,975-G6 transport, natural gas, pipeline, long distance, RER SUbtr doxide air high population dentaly kg 1 kg 50/2-Fig 1,575-G6 kg/bm 1,975-G6 transport, natural gas, pipeline, long distance, RER SUbtr doxide air low population dentaly kg 1 kg 50/2-Fig 1,575-G6 kg/bm 2,201-G6 kg/bm 2, | | air | | kg | | | | | | |
| Sulfur doucks ar high population density kg 1 1 kg SQ2-Eq 2.02.6-6 kg/mm 2.076-C5 transport, natural gas, prelime, long distance, REF Sulfur doucks ar long population density kg 1 1 kg SQ2-Eq 2.02.6-6 kg/mm 2.076-C5 transport, natural gas, prelime, long distance, REF Sulfur douck are unspecified log 1 kg 1 kg SQ2-Eq 1.21E-16 kg/mm 1.00E-00 transport, natural gas, prelime, long distance, REF Sulfur douck are unspecified log 1 kg SQ2-Eq 1.21E-16 kg/mm 1.00E-00 transport, natural gas, prelime, long distance, REF SQ1-Eq 2.02.6-6 kg/mm 2.02.6-1 | | air | | kg | | | | | | |
| Sulfur dioxidos air low population density kg 1 kg 50.2Eq 2.05E-05 kg/mm 2.03E-05 transport, natural gas, pipeline, lorg distance, RER silfur dioxidos air unspecified kg 1 kg 50.2Eq 1.6E-06 kg/mm 1.5SE-07 kg/mm 1.5SE | | air | | kg | 0.7 | | | | | |
| Sulfur doxionie water preser by g 1.8 kg SOZ-Eq 8.15E-10 kg/km 1.5E-00 transport, natural gas, pipeline, long datamon, RER Hydrogen sulfide water preser kg 9 1.88 kg SOZ-Eq 8.15E-10 kg/km 7.8EE-7 transport, natural gas, pipeline, long datamon, RER Hydrogen sulfide s | Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 1.57E-06 | kg/tkm | 1.57E-06 | transport, natural gas, pipeline, long distance, RER |
| Hydroge sulfide Water Fiver Fig 1,88 Fig 50,25Eq 5,15E-10 kg/thm 1,35E-01 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-11 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-14 kg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transport, natural gas, ppleine, long distance, RER Mg/thm 2,06E-16 transp | Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 2.03E-05 | kg/tkm | 2.03E-05 | transport, natural gas, pipeline, long distance, RER |
| Hydrogen sulfide Water river Ng 1,88 | Sulfur dioxide | air | unspecified | ka | 1 | ka SO2-Ea | 1.40E-06 | kg/tkm | 1.40E-06 | transport, natural gas, pipeline, long distance, RER |
| Sollutic acid soil agricultural kg 0.85 kg 502-Eq 1.16 kg/mm 0.78E-17 transport, natural gas. pipeline, long distance, RER high propulsion density kg 0.98 kg 502-Eq 4.00E-10 kg/mm 0.0E-00 transport, natural gas. pipeline, long distance, RER sulfure acid care in year population density kg 0.98 kg 502-Eq 4.00E-10 kg/mm 1.28E-10 transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas. pipeline, long distance, RER vision of transport, natural gas, pipeline, long distance, RER vision of transport, natural gas, pipeline, long distance, RER vision of transport, natural gas, pipeline, long distance, RER vision of transport, natural gas, pipeline, long distance, RER vision of transport, natural gas, pipeline, long distance, RER vision of transport, natural gas, pipeline, long distance, RER vision of transport, natural gas, pipeline, long distance, RER vision of transport, natural gas, pipeline, long distance, RER vision of transport, natura | Hydrogen sulfide | water | river | kg | 1.88 | ka SO2-Ea | 8.15E-10 | ka/tkm | 1.53E-09 | |
| Phosphorus air high population density kg 0.68 kg SOX-Eq 4.061-6 kg SOX-Eq | | | | ka | | | | | | |
| Salturia cacid air low population density kg 0,65 kg 502-Eq 4.06E-16 kg/tok 2,98E-16 transport, natural gas, pipeline, long distance, RER 1.5E-10 kg/tok 4.6E-10 kg/tok 4.6E-10 transport, natural gas, pipeline, long distance, RER 1.5E-10 kg/tok 4.6E-10 transport, natural gas, pipeline, long distance, RER 1.5E-10 kg/tok 4.6E-10 transport, natural gas, pipeline, long distance, RER 1.5E-10 kg/tok 4.6E-10 transport, natural gas, pipeline, long distance, RER 1.5E-10 kg/tok 4.6E-10 kg/tok 4.6E-10 transport, natural gas, pipeline, long distance, RER 1.5E-10 kg/tok 4.6E-10 kg/tok 4.6E-10 transport, natural gas, pipeline, long distance, RER 1.5E-10 kg/tok 4.6E-10 kg/t | | | | ka | | | | | | |
| Phosphorus air | | | | ka | | | 4 60E-16 | | | |
| Phosphorus air high population density kg 3.06 kg PO-Eq 1.51E-10 kg/km 4.61E-10 transport, natural gas, pipeline, ReR phosphorus air low population density, long-term kg 3.06 kg PO-Eq 1.23E-11 kg/km 3.76E-11 transport, natural gas, pipeline, long distance, RER Phosphorus air unspecified kg 3.06 kg PO-Eq 3.81E-13 kg/km 3.76E-11 transport, natural gas, pipeline, long distance, RER Phosphorus soil agricultural kg 3.06 kg PO-Eq 3.81E-13 kg/km 1.77E-12 transport, natural gas, pipeline, long distance, RER Phosphorus soil agricultural kg 3.06 kg PO-Eq 2.78E-10 kg/km 8.50E-10 transport, natural gas, pipeline, long distance, RER Phosphorus soil industrial kg 3.06 kg PO-Eq 2.78E-10 kg/km 8.50E-10 transport, natural gas, pipeline, long distance, RER Phosphorus soil industrial kg 3.06 kg PO-Eq 2.78E-10 kg/km 8.50E-10 transport, natural gas, pipeline, long distance, RER Phosphorus soil industrial kg 3.06 kg PO-Eq 2.78E-10 kg/km 1.07E-07 transport, natural gas, pipeline, long distance, RER Phosphorus soil | Sulfulic acid | all | low population density | kg | 0.03 | kg 502-Lq | 4.00L-10 | Kg/tkiii | | transport, natural gas, pipeline, long distance, NEIX |
| Phosphorus air Dwopoulation density Ng 3.06 Ng PO4-Eq 3.41E-11 Ng/thm 1.04E-10 transport, natural gas, pipeline, long distance, RER | Dhoonhorus | oir | high population density | l.a | 2.06 | ka DO4 Fa | 4 F4F 40 | lea /tlem | | transport natural and pineling long distance DED |
| Phosphorus air outpopulation density, long-term kg 3 3.6 kg PO4-Eq 1.28-11 kg/tkm 3.76E-11 transport, natural gas, piepine, long distance, RER phosphorus air outpopulation density, long-term kg 3 3.6 kg PO4-Eq 2.78E-10 kg/tkm 1.7E-12 transport, natural gas, piepine, long distance, RER phosphorus soil agricultural kg 3.06 kg PO4-Eq 2.78E-10 kg/tkm 8.50E-10 transport, natural gas, piepine, long distance, RER phosphorus soil industrial kg 3.06 kg PO4-Eq 2.78E-10 kg/tkm 1.92E-08 transport, natural gas, piepine, long distance, RER phosphorus water river kg 0.022 kg PO4-Eq 4.88E-06 kg/tkm 1.07E-07 transport, natural gas, piepine, long distance, RER phosphorus phosphoru | | | | kg L | | | | | | |
| Phosphorus si | | u.i. | | kg | | | | | | |
| Phosphorus Soil agricultural Kg 3.06 kg PO4-Eq 2.78E-10 kg/lkm 1.92E-0.8 transport, natural agas, pipeline, long distance, RER Phosphorus Soil industrial Kg 3.06 kg PO4-Eq 4.88E-0.6 kg/lkm 1.07E-0.7 transport, natural agas, pipeline, long distance, RER BDDS, Biological Oxygen Demand water river Kg 0.022 kg PO4-Eq 4.88E-0.6 kg/lkm 4.38E-0.9 transport, natural agas, pipeline, long distance, RER Po5-Embals Regular R | | | | kg | | | | | | |
| Phosphorus Soil Industrial Kg 3.06 Kg PO4-Eq 6.27E-09 Kg/tkm 1.92E-08 transport, natural gas, pipeline, long distance, RER | | | | kg | | | | | | |
| BODS, Biological Oxygen Demand water river kg 0.022 kg PO4-Eq 4.86E-06 kg/lkm 1.07E-07 transport, natural gas, pipeline, long distance, RER DDS, Biological Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.99E-07 kg/lkm 4.38E-09 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand water river kg 0.022 kg PO4-Eq 1.99E-07 kg/lkm 4.38E-09 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.99E-07 kg/lkm 4.38E-09 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.99E-07 kg/lkm 4.38E-09 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 5.49E-09 kg/lkm 5.49E-09 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand water unspecified kg 0.02 kg PO4-Eq 1.16E-09 kg/lkm 3.56E-09 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand kg 0.09 kg/lkm 3.56E-09 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand Vg 0.00 kg/lkm 2.31E-11 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand Vg 0.00 kg/lkm 2.31E-11 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand Vg 0.00 kg/lkm 2.00E-00 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand Vg 0.00E-00 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand Vg 0.00E-00 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand Vg 0.00E-00 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand Vg 0.00E-00 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand Vg 0.00E-00 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand Vg 0.00E-00 transport, natural gas, pipeline, long distance, RER COD. Chemical Oxygen Demand Vg 0.00E-00 transport, natural gas, pipeline, l | | | | kg | | | | | | |
| BODS, Biological Oxygen Demand water river kg 0.022 kg PO4-Eq 4.98E-06 kg/lkm 1.07E-07 transport, natural gas, pipeline, long distance, RER MgBODS, Biological Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.99E-07 kg/lkm 4.38E-09 transport, natural gas, pipeline, long distance, RER MgBODS, Biological Oxygen Demand water river kg 0.022 kg PO4-Eq 1.99E-07 kg/lkm 4.38E-09 transport, natural gas, pipeline, long distance, RER MgBoDS, Biological Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.99E-07 kg/lkm 4.38E-09 transport, natural gas, pipeline, long distance, RER MgBoDS, Biological Oxygen Demand river kg 1 kg PO4-Eq 1.99E-07 kg/lkm 3.58E-09 transport, natural gas, pipeline, long distance, RER MgBoDS, Biological Oxygen Demand river kg 3.06 kg PO4-Eq 1.98E-09 kg/lkm 3.58E-09 transport, natural gas, pipeline, long distance, RER MgBoDS, Biological Oxygen Demand river kg 3.06 kg PO4-Eq 7.55E-12 kg/lkm 2.31E-11 transport, natural gas, pipeline, long distance, RER MgBoDS, Biological Oxygen Demand river kg 3.06 kg PO4-Eq 7.55E-12 kg/lkm 2.31E-11 transport, natural gas, pipeline, long distance, RER MgBoDS, Biological Oxygen Demand river kg 3.06 kg PO4-Eq 7.55E-12 kg/lkm 2.01E-07 kg/lk | Phosphorus | soil | industrial | kg | | kg PO4-Eq | | | | transport, natural gas, pipeline, long distance, RER |
| BODS, Biological Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.99E-07 kg/tkm 4.38E-09 transport, natural gas, pipeline, long distance, RER | BOD5, Biological Oxygen Demand | water | river | kg | | kg PO4-Eq | 4.86E-06 | kg/tkm | 1.07E-07 | |
| COD, Chemical Oxygen Demand water river kg 0.022 kg PO4-Eq 5.19E-06 kg/tkm 1.14E-07 transport, natural gas, pipeline, long distance, RER PLOSE (CDD, Chemical Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.99E-07 kg/tkm 4.38E-09 transport, natural gas, pipeline, long distance, RER PLOSE (Phosphorus river kg 1.16E-09 kg/tkm 5.49E-09 kg/tkm 5.49E-09 kg/tkm 3.56E-09 transport, natural gas, pipeline, long distance, RER PLOSE (Phosphorus water unspecified kg 3.06 kg PO4-Eq 1.16E-09 kg/tkm 3.56E-09 transport, natural gas, pipeline, long distance, RER PLOSE (Phosphorus water unspecified kg 0.97 kg PO4-Eq 7.55E-12 kg/tkm 2.31E-10 transport, natural gas, pipeline, long distance, RER PLOSE (Phosphorus water unspecified kg 0.97 kg PO4-Eq 7.55E-12 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER PLOSE (Phosphorus air high population density kg 0.97 kg PO4-Eq kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER PLOSE (Phosphorus density kg 0.99 MJ-Eq 2.03E-04 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER PLOSE (Po4-Eq 1.16E-09 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER PLOSE (Po4-Eq 1.16E-09 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER PLOSE (Po4-Eq 1.16E-09 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER PLOSE (Po4-Eq 1.16E-09 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER PLOSE (Po4-Eq 1.16E-09 kg/tkm 0.15E-02 transport, natural gas, pipeline, long distance, RER PLOSE (Po4-Eq 1.16E-09 kg/tkm 0.15E-02 kg/tkm 0.15E-02 transport, natural gas, pipeline, long distance, RER PLOSE (Po4-Eq 1.16E-09 kg/tkm 0.15E-02 | BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 1.99E-07 | kg/tkm | 4.38E-09 | |
| COD, Chemical Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.98E-07 kg/lkm 4.38E-09 transport, natural gas, pipeline, long distance, RER Phosphate water fiver kg 1 kg PO4-Eq 5.49E-09 kg/lkm 3.56E-09 transport, natural gas, pipeline, long distance, RER Phosphorus water river kg 3.06 kg PO4-Eq 1.16E-09 kg/lkm 3.56E-09 transport, natural gas, pipeline, long distance, RER Phosphorus water unspecified kg 0.07 kg PO4-Eq 7.55E-12 kg/lkm 2.31E-11 transport, natural gas, pipeline, long distance, RER Phosphorus water high population density kg 0.97 kg PO4-Eq 7.55E-12 kg/lkm 2.00E-00 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.00E-00 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.00E-00 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.00E-00 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.00E-00 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.00E-00 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.00E-00 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.00E-00 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.0E-03 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.0E-03 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.0E-03 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.0E-03 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.0E-03 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.0E-03 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.1E-02 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.1E-02 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.1E-02 transport, natural gas, pipeline, long distance, RER PO4-Eq 7.55E-12 kg/lkm 2.1E-02 transport, natural gas, p | | water | | kg | | | | | 1.14E-07 | |
| Phosphate water river kg 1 kg 904-Eq 5.49E-09 kg/tkm 5.59E-09 | | | | ka | | | | | | |
| Phosphorus water river kg 3 3.06 kg PO4-Eq 1.16E-09 kg/km 3.56E-09 transport, natural gas, pipeline, long distance, RER Phosphorus water unspecified kg 3.06 kg PO4-Eq 7.55E-12 kg/km 2.30E+10 transport, natural gas, pipeline, long distance, RER Phosphoric acid air high population density kg 0.97 kg PO4-Eq 5.55E-12 kg/km 2.30E+10 transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phosphoric acid transport, natural gas, pipeline, long distance, RER Phospho | | | | 9 | 1 | | | | | |
| Phosphorus water unspecified kg 3.06 kg PO4-Eq 7.55E-12 kg/tkm 2.31E-11 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, pipeline, long distance, RER Phosphoric acid 2.05E-00 transport, natural gas, | | | | 9 | 3.06 | | | | | |
| Phosphoric acid air high population density kg 0.97 kg PO4-Eq kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER 0.00E+00 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER 0.00E+00 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER 0.00E+00 kg/tkm 0.00E+00 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER 0.00E+00 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER 0.00E+00 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER 0.00E+00 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER 0.00E+00 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER 0.00E+00 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER 0.00E+00 kg/tkm 0.00E+00 transport, natural gas, pipeline, long distance, RER 0.00E+00 kg/tkm 0.00E+00 kg/t | | | | 3 | | | | | | |
| 2.60E-07 Coal, brown, in ground resource in ground kg 9.9 MJ-Eq 2.03E-04 kg/tkm 2.00E-03 transport, natural gas, pipeline, long distance, RER Coal, hard, unspecified, in ground resource in ground kg 19.1 MJ-Eq 8.27E-04 kg/tkm 1.58E-02 transport, natural gas, pipeline, long distance, RER Gas, mine, off-gas, process, coal mining resource in ground Nm3 39.8 MJ-Eq 8.00E-06 Nm3/tkm 3.18E-04 transport, natural gas, pipeline, long distance, RER Gas, attural, in ground resource in ground Nm3 38.293 MJ-Eq 2.46E-02 Nm3/tkm 9.40E-01 transport, natural gas, pipeline, long distance, RER Oil, crude, in ground resource in ground kg 45.8 MJ-Eq 4.60E-04 kg/tkm 2.11E-02 transport, natural gas, pipeline, long distance, RER Peat, in ground resource biotic kg 9.9 MJ-Eq 2.21E-07 kg/tkm 2.19E-06 transport, natural gas, pipeline, long distance, RER | | | | 3 | | | 7.00E-12 | | | |
| Coal, brown, in ground resource in ground kg 9.9 MJ-Eq 2.03E-04 kg/tkm 2.00E-03 transport, natural gas, pipeline, long distance, RER Coal, hard, unspecified, in ground resource in ground kg 19.1 MJ-Eq 8.27E-04 kg/tkm 1.58E-02 transport, natural gas, pipeline, long distance, RER Gas, natural, in ground resource in ground Nm3 39.8 MJ-Eq 8.00E-06 Nm3/tkm 3.18E-04 transport, natural gas, pipeline, long distance, RER Gas, natural, in ground resource in ground Nm3 38.293 MJ-Eq 2.46E-02 Nm3/tkm 9.40E-01 transport, natural gas, pipeline, long distance, RER Oil, crude, in ground resource in ground resource biotic kg 9.9 MJ-Eq 2.21E-07 kg/tkm 2.11E-02 transport, natural gas, pipeline, long distance, RER | Phospholic acid | all | riigh population density | кд | 0.97 | kg PO4-Eq | | кд/ткт | | transport, natural gas, pipeline, long distance, RER |
| Coal, hard, unspecified, in ground resource in ground kg 19.1 MJ-Eq 8.27E-04 kg/tkm 1.58E-02 transport, natural gas, pipeline, long distance, RER Gas, mine, off-gas, process, coal mining resource in ground Nm3 39.8 MJ-Eq 8.00E-06 Nm3/tkm 3.18E-04 transport, natural gas, pipeline, long distance, RER Gas, natural, in ground resource in ground Nm3 38.293 MJ-Eq 2.46E-02 Nm3/tkm 9.40E-01 transport, natural gas, pipeline, long distance, RER Gas, natural, in ground resource in ground kg 45.8 MJ-Eq 4.60E-04 kg/tkm 2.11E-02 transport, natural gas, pipeline, long distance, RER Peat, une, ground resource biotic kg 9.9 MJ-Eq 2.21E-07 kg/tkm 2.19E-06 transport, natural gas, pipeline, long distance, RER | 0.11 | | | | 0.0 | | 0.005.04 | 1 (1) | | |
| Gas, mine, off-gas, process, coal mining resource in ground Nm3 39.8 MJ-Eq 8.00E-06 Nm3/tkm 3.18E-04 transport, natural gas, pipeline, long distance, RER Gas, natural, in ground resource in ground Nm3 38.293 MJ-Eq 2.46E-02 Nm3/tkm 9.40E-01 transport, natural gas, pipeline, long distance, RER Oil, crude, in ground resource in ground kg 45.8 MJ-Eq 4.60E-04 kg/tkm 2.11E-02 transport, natural gas, pipeline, long distance, RER Oil crude, in ground resource biotic kg 9.9 MJ-Eq 2.21E-07 kg/tkm 2.19E-06 transport, natural gas, pipeline, long distance, RER | | | | | | | | | | |
| Gas, natural, in ground resource in ground Nm3 38.293 MJ-Eq 2.46E-02 Nm3/tkm 9.40E-01 transport, natural gas, pipeline, long distance, RER Oil, crude, in ground resource in ground kg 45.8 MJ-Eq 4.60E-04 kg/tkm 2.11E-02 transport, natural gas, pipeline, long distance, RER Peat, in ground resource biotic kg 9.9 MJ-Eq 2.21E-07 kg/tkm 2.19E-06 transport, natural gas, pipeline, long distance, RER | | | | | | | | | | |
| Oil, crude, in ground resource in ground kg 45.8 MJ-Eq 4.60E-04 kg/tkm 2.11E-02 transport, natural gas, pipeline, long distance, RER Peat, in ground resource biotic kg 9.9 MJ-Eq 2.21E-07 kg/tkm 2.19E-06 transport, natural gas, pipeline, long distance, RER | Gas, mine, off-gas, process, coal mining | resource | in ground | | | = -1 | | | | transport, natural gas, pipeline, long distance, RER |
| Peat, in ground resource biotic kg 9.9 MJ-Eq 2.21E-07 kg/tkm 2.19E-06 transport, natural gas, pipeline, long distance, RER | Gas, natural, in ground | resource | in ground | Nm3 | | | | Nm3/tkm | | transport, natural gas, pipeline, long distance, RER |
| Peat, in ground resource biotic kg 9.9 MJ-Eq 2.21E-07 kg/tkm 2.19E-06 transport, natural gas, pipeline, long distance, RER | Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 4.60E-04 | kg/tkm | 2.11E-02 | transport, natural gas, pipeline, long distance, RER |
| | | | | kg | | MJ-Eq | 2.21E-07 | kg/tkm | 2.19E-06 | |
| 9./3E-U1 | | | | | | | | | 9.79E-01 | |
| | | | | | | | | | | |

| E8 | Process natural gas | | | | | | | | |
|--|---------------------|---|----|--------|-----------|----------|--------|----------|---|
| | | | | | | | | | |
| back to top | 1 | The dataset describes the processing of natural gas including sweetening. | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 1.72E-03 | kg/Nm3 | 1.72E-03 | Ecoinvent V2, natural gas, at production, RNA |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 2.72E-02 | kg/Nm3 | 2.72E-02 | Ecoinvent V2, natural gas, at production, RNA |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 7.76E-11 | kg/Nm3 | 7.76E-11 | Ecoinvent V2, natural gas, at production, RNA |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 5.61E-03 | kg/Nm3 | 5.61E-03 | Ecoinvent V2, natural gas, at production, RNA |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 3.76E-07 | kg/Nm3 | 5.91E-07 | Ecoinvent V2, natural gas, at production, RNA |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 3.60E-06 | kg/Nm3 | 5.66E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 9.11E-14 | kg/Nm3 | 1.43E-13 | Ecoinvent V2, natural gas, at production, RNA |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.02E-05 | kg/Nm3 | 1.61E-05 | Ecoinvent V2, natural gas, at production, RNA |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 1.02E-11 | kg/Nm3 | 3.07E-10 | Ecoinvent V2, natural gas, at production, RNA |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 5.20E-10 | kg/Nm3 | 1.56E-08 | Ecoinvent V2, natural gas, at production, RNA |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 4.89E-16 | kg/Nm3 | 1.47E-14 | Ecoinvent V2, natural gas, at production, RNA |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 1.51E-07 | kg/Nm3 | 4.50E-05 | Ecoinvent V2, natural gas, at production, RNA |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 8.60E-07 | kg/Nm3 | 2.56E-04 | Ecoinvent V2, natural gas, at production, RNA |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 7.39E-16 | kg/Nm3 | 2.20E-13 | Ecoinvent V2, natural gas, at production, RNA |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 1.18E-07 | kg/Nm3 | 3.52E-05 | Ecoinvent V2, natural gas, at production, RNA |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 3.73E-14 | kg/Nm3 | 5.33E-11 | Ecoinvent V2, natural gas, at production, RNA |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 4.93E-11 | kg/Nm3 | 7.05E-08 | Ecoinvent V2, natural gas, at production, RNA |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 8.34E-11 | kg/Nm3 | 1.19E-07 | Ecoinvent V2, natural gas, at production, RNA |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 2.66E-15 | kg/Nm3 | 1.63E-11 | Ecoinvent V2, natural gas, at production, RNA |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | | 0.00E+00 | Ecoinvent V2, natural gas, at production, RNA |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 6.36E-12 | kg/Nm3 | 7.89E-10 | Ecoinvent V2, natural gas, at production, RNA |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | | 0.00E+00 | Ecoinvent V2, natural gas, at production, RNA |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 6.99E-10 | kg/Nm3 | 6.99E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | | 0.00E+00 | Ecoinvent V2, natural gas, at production, RNA |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 3.41E-13 | kg/Nm3 | 4.16E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 1.02E-10 | kg/Nm3 | 1.25E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 2.58E-09 | kg/Nm3 | 6.45E-08 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 3.50E-07 | kg/Nm3 | 8.76E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 1.70E-07 | kg/Nm3 | 4.25E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 1.33E-15 | kg/Nm3 | 6.63E-15 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 3.30E-12 | kg/Nm3 | 6.23E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 3.81E-17 | kg/Nm3 | 2.72E-13 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 2.25E-11 | kg/Nm3 | 1.61E-07 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 5.73E-13 | kg/Nm3 | 1.04E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 2.88E-11 | kg/Nm3 | 5.22E-08 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | | 0.00E+00 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 3.31E-13 | kg/Nm3 | 2.88E-12 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 1.54E-09 | kg/Nm3 | 1.34E-08 | Ecoinvent V2, natural gas, at production, RNA |

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|--|--|--|--|---|--|---|---|---|--|
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 6.56E-14 | kg/Nm3 | 7.15E-10 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 1.24E-14 8.82E-16 | kg/Nm3 kg/Nm3 | 1.35E-10 9.61E-12 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorofluoro-, HCFC-21 | air air | unspecified high population density | kg kg | 10900 210 | kg CO2-Eq kg CO2-Eq | 1.06E-16 | kg/Nm3 | 2.23E-14 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at production, RNA |
| Methane, fossil | air | high population density | ka | 25 | kg CO2-Eq | 1.67E-07 | kg/Nm3 | 4.18E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, fossil | air | low population density | ka | 25 | kg CO2-Eq | 3.55E-05 | kg/Nm3 | 8.88E-04 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, fossil | air | lower stratosphere + upper troposphere | ka | 25 | kg CO2-Eq | 1.23E-15 | kg/Nm3 | 3.08E-14 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eg | 1.10E-02 | kg/Nm3 | 2.75E-01 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 8.46E-12 | kg/Nm3 | 1.18E-08 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 3.94E-13 | kg/Nm3 | 5.52E-10 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 3.28E-13 | kg/Nm3 | 2.42E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 9.21E-10 | kg/Nm3 | 6.81E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.72E-16 | kg/Nm3 | 8.18E-13 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 3.38E-14 | kg/Nm3 | 5.00E-10 | Ecoinvent V2, natural gas, at production, RNA |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | | 0.00E+00 | Ecoinvent V2, natural gas, at production, RNA |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 6.16E-09 | kg/Nm3 | 1.40E-04 | Ecoinvent V2, natural gas, at production, RNA |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 2.21E-10 | kg/Nm3 | 5.03E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 4.32E-15 | kg/Nm3 | 5.62E-14 | Ecoinvent V2, natural gas, at production, RNA |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 2.81E-09 | kg/Nm3 | 3.65E-08 | Ecoinvent V2, natural gas, at production, RNA |
| Carbon dioxide, land transformation | air air | low population density | kg | 1 17200 | kg CO2-Eq | 2.62E-06 | kg/Nm3 | 2.62E-06 0.00E+00 | Ecoinvent V2, natural gas, at production, RNA |
| Nitrogen fluoride | all | high population density | kg | 17200 | kg CO2-Eq | | | 5.22E-04 | Ecoinvent V2, natural gas, at production, RNA |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 3.38E-08 | kg/Nm3 | 6.35E-08 | Ecoinvent V2, natural gas, at production, RNA |
| Ammonia | air | low population density | ka | 1.88 | kg SO2-Eq | 9.61E-08 | kg/Nm3 | 1.81E-07 | Ecoinvent V2, natural gas, at production, RNA |
| Ammonia | air | unspecified | ka | 1.88 | kg SO2-Eq | 1.24E-06 | kg/Nm3 | 2.32E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Hydrogen chloride | air | high population density | ka | 0.88 | kg SO2-Eq | 3.31E-08 | kg/Nm3 | 2.91E-08 | Ecoinvent V2, natural gas, at production, RNA |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 6.51E-06 | kg/Nm3 | 5.73E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 2.53E-08 | kg/Nm3 | 2.22E-08 | Ecoinvent V2, natural gas, at production, RNA |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.63E-09 | kg/Nm3 | 2.61E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 8.22E-07 | kg/Nm3 | 1.32E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 5.39E-09 | kg/Nm3 | 8.63E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 2.16E-11 | kg/Nm3 | 4.07E-11 | Ecoinvent V2, natural gas, at production, RNA |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 2.89E-09 | kg/Nm3 | 5.44E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.81E-09 | kg/Nm3 | 5.29E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 4.93E-06 | kg/Nm3 | 3.45E-06 | Ecoinvent V2, natural gas, at production, RNA |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 4.66E-05 | kg/Nm3 | 3.26E-05 | Ecoinvent V2, natural gas, at production, RNA |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 1.78E-05 | kg/Nm3 | 1.24E-05 | Ecoinvent V2, natural gas, at production, RNA |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 1.07E-05 | kg/Nm3 | 1.07E-05 | Ecoinvent V2, natural gas, at production, RNA |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 1.31E-04 | kg/Nm3 | 1.31E-04 | Ecoinvent V2, natural gas, at production, RNA |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 1.89E-02 | kg/Nm3 | 1.89E-02 | Ecoinvent V2, natural gas, at production, RNA |
| Hydrogen sulfide Sulfuric acid | water soil | river | kg | 1.88 0.65 | kg SO2-Eq kg SO2-Eq | 9.57E-11 7.27E-17 | kg/Nm3 kg/Nm3 | 1.80E-10 4.73E-17 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphoric acid | air | agricultural high population density | kg | 0.98 | kg SO2-Eq | 1.216-11 | kg/NIII3 | 0.00E+00 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at production, RNA |
| Sulfuric acid | air | low population density | kg ka | 0.65 | kg SO2-Eq | 6.19E-15 | kg/Nm3 | 4.03E-15 | Econivent V2, natural gas, at production, RNA |
| Sullulic acid | all | low population density | kg | 0.03 | kg 502-Lq | 0.132-13 | KG/MIIIS | 1.91E-02 | Econivers v2, natural gas, at production, reve |
| Phosphorus | air | high population density | ka | 3.06 | kg PO4-Eq | 1.58E-09 | kg/Nm3 | 4.84E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus | air | low population density | ka | 3.06 | kg PO4-Eg | 2.55E-11 | kg/Nm3 | 7.82E-11 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 3.94E-10 | kg/Nm3 | 1.20E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eg | 2.88E-13 | kg/Nm3 | 8.83E-13 | Ecoinvent V2, natural gas, at production, RNA |
| | | | | | | | | | |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 6.61E-09 | kg/Nm3 | 2.02E-08 | Ecoinvent V2, natural gas, at production, RNA |
| | soil soil | agricultural industrial | kg kg | 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 6.61E-09 9.55E-10 | kg/Nm3 kg/Nm3 | 2.02E-08 2.92E-09 | Econvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus | | | · | | | | | | |
| Phosphorus Phosphorus | soil | industrial | kg | 3.06 0.022 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.55E-10 7.40E-06 5.96E-04 | kg/Nm3 kg/Nm3 kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | soil water water water | industrial river unspecified river | kg | 3.06 0.022 0.022 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 | kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | soil water water water water | industrial river unspecified river unspecified | kg kg kg | 3.06 0.022 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 | kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | soil water water water water water | industrial river unspecified river unspecified river | kg kg kg kg kg | 3.06 0.022 0.022 0.022 0.022 1 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 | kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | soil water water water water water water | industrial river unspecified river unspecified river unspecified river | kg kg kg kg kg kg | 3.06 0.022 0.022 0.022 0.022 1 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 | kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus | soil water water water water water water water | industrial river unspecified river unspecified river unspecified river river unspecified | kg kg kg kg kg kg kg | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 | kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | soil water water water water water water | industrial river unspecified river unspecified river unspecified river | kg kg kg kg kg kg | 3.06 0.022 0.022 0.022 0.022 1 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 | kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid | soil water water water water water water air | industrial river unspecified river unspecified river unspecified river river unspecified river unspecified high population density | kg kg kg kg kg kg kg | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 | kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground | soil water water water water water water water water air resource | industrial river unspecified river unspecified river unspecified river river unspecified high population density | kg kg kg kg kg kg kg | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 | kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground | soil water water water water water water water water air resource resource | industrial river unspecified river unspecified river unspecified river river unspecified fiver inder unspecified in ground in ground | kg kg kg kg kg kg kg | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 | kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | soil water water water water water water water water air resource resource | industrial river unspecified river unspecified river unspecified river unspecified river river unspecified high population density in ground in ground in ground | kg kg kg kg kg kg kg kg kg Nm3 | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | soil water water water water water water water water air resource resource | industrial river unspecified river unspecified river unspecified river river unspecified high population density in ground in ground in ground in ground in ground in ground | kg kg kg kg kg kg kg | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 | kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | soil water water water water water water water water air resource resource resource resource | industrial river unspecified river unspecified river unspecified river unspecified river river unspecified high population density in ground in ground in ground | kg kg kg kg kg kg kg kg Mm3 Nm3 | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 | kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 Nm3/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | soil water water water water water water water water air resource resource resource resource resource | industrial river unspecified river unspecified river unspecified river river unspecified high population density in ground in ground in ground in ground in ground in ground | kg kg kg kg kg kg kg kg Mm3 Nm3 | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground | soil water water water water water water water water air resource resource resource resource resource resource resource | industrial river unspecified river unspecified river unspecified river river unspecified high population density in ground in ground in ground in ground in ground in ground | kg kg kg kg kg kg kg kg Mm3 Nm3 | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | soil water water water water water water water water water air resource resource resource resource resource resource resource resource | industrial river unspecified river unspecified river unspecified river unspecified river river unspecified high population density in ground | kg kg kg kg kg kg kg kg Mm3 Nm3 | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground | soil water water water water water water water water water air resource | industrial river unspecified river unspecified river unspecified river river unspecified high population density in ground in ground in ground in ground in ground in ground | kg kg kg kg kg kg kg kg Mm3 Nm3 | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground | soil water water water water water water water water water air resource resource resource resource resource resource resource resource | industrial river unspecified river unspecified river unspecified river unspecified river river unspecified high population density in ground | kg kg kg kg kg kg kg kg Mm3 Nm3 | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground | soil water water water water water water water water water air resource | industrial river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground The dataset describes approximately the transport and distribution of natural gas. | kg kg kg kg kg kg kg kg Mm3 Nm3 | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground E10 back to top Carbon dioxide, fossil | soil water air resource | industrial river unspecified river unspecified river unspecified river unspecified high population density in ground hiotic | kg kg kg kg kg kg kg Nm3 Nm3 kg kg | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil | soil water air resource resource resource resource resource resource resource air Transport and distribution of natural gas air air | industrial river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground | kg Mm3 Nm3 kg kg | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.76E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground E10 back to top Carbon dioxide, fossil | soil water air resource | industrial river unspecified river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground biotic | kg kg kg kg kg kg kg Nm3 Nm3 kg kg | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground E10 back to top Carbon dioxide, fossil | soil water air resource resource resource resource resource resource resource air Transport and distribution of natural gas | industrial river unspecified river unspecified river unspecified river unspecified high population density in ground biotic | kg k | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq MJ-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil | soil water air resource resource resource resource resource resource resource air air air air air air water water water water water water water water air | industrial river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground | kg Nm3 Nm3 kg kg kg | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil | soil water air resource resource resource resource resource resource resource air Transport and distribution of natural gas | industrial river unspecified river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground in | kg kg kg kg kg kg kg kg kg Nm3 Nm3 kg kg kg | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA |
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| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil | soil water air resource resource resource resource resource resource Transport and distribution of natural gas air air air air air air air air | industrial river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground | kg | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.31E-07 4.45E-15 6.83E-06 | kg/Nm3 | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA |
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| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil | soil water air resource resource resource resource resource resource resource resource air | industrial river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground biotic | kg Nm3 Nm3 kg | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO2-Eq kg PO2-Eq kg CO2-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 | kg/Nm3 kg/MJ | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform | soil water air resource resource resource resource resource resource air | industrial river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground in ground in ground in ground in ground biotic The dataset describes approximately the transport and distribution of natural gas. high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density | kg k | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 | kg/Nm3 kg/MJ | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform | soil water air resource resource resource resource resource resource air | industrial river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground | kg kg kg kg kg kg kg kg kg Nm3 Nm3 kg kg kg kg kg kg kg kg | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.038-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 5.47E-15 4.34E-09 2.33E-08 | kg/Nm3 kg/MJ | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E-01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide | soil water air resource resource resource resource resource air | industrial river unspecified river unspecified river unspecified river unspecified high population density in ground in groun | kg kg kg kg kg kg Nm3 kg kg kg kg kg kg kg kg kg kg kg kg kg | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4 | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 5.47E-15 4.34E-09 2.33E-08 3.61E-17 | kg/Nm3 kg/MJ | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 6.72E-05 7.46E-04 3.79E-12 5.03E-03 2.41E-08 2.06E-07 6.99E-15 1.07E-05 8.44E-12 4.18E-10 1.64E-13 1.29E-06 6.95E-06 1.08E-14 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform Chloroform Chloroform Chirtogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide | soil water air resource resource resource resource resource resource air | industrial river unspecified river unspecified river unspecified river unspecified high population density in ground biotic The dataset describes approximately the transport and distribution of natural gas. | kg kg kg kg kg kg Nm3 Nm3 kg kg kg kg kg kg kg kg kg kg kg kg kg | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg CO2-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 5.47E-15 4.34E-09 2.33E-08 3.61E-17 1.03E-07 | kg/Nm3 kg/MJ | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | soil water esource resource resource resource resource resource resource Transport and distribution of natural gas air air air air air air air air air ai | industrial river unspecified river unspecified river unspecified river unspecified high population density in ground biotic The dataset describes approximately the transport and distribution of natural gas. | kg k | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4 | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 5.47E-15 4.34E-09 2.33E-08 3.61E-17 1.03E-07 1.36E-15 | kg/Nm3 Nm3/Nm3 Nm3/Nm3 kg/Nm3 kg/MJ | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | soil water air resource resource resource resource resource resource air | industrial river unspecified river unspecified river unspecified river unspecified high population density in ground in groun | kg kg kg kg kg kg kg kg kg kg kg kg kg k | 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4 | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 5.47E-15 4.34E-09 2.33E-08 3.61E-17 1.03E-07 1.36E-15 1.33E-12 | kg/Nm3 kg/Muj | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 6.72E-05 7.46E-04 3.79E-12 5.03E-03 2.41E-08 2.06E-07 6.99E-15 1.07E-05 8.44E-12 4.18E-10 1.64E-13 1.29E-06 6.95E-06 1.08E-14 3.06E-05 1.95E-09 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA Ecoinvent V2, natural gas, |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro, HFC-134a Ethane, 1,1,1,2-tetrafluoro, HFC-134a | soil water dir esource resource reso | industrial river unspecified river unspecified river unspecified river unspecified high population density in ground biotic The dataset describes approximately the transport and distribution of natural gas. high population density low population density unspecified high population density low population density | kg k | 3.06 0.022 0.022 0.022 1 3.06 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 5.47E-15 4.34E-09 2.33E-08 3.61E-17 1.03E-07 1.36E-15 1.33E-12 9.70E-12 | kg/Nm3 kg/MJ | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA Ecoinvent V2, natural ga |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, LFC-134a Ethane, 1,1,1,2-tetrafluoro-, LFC-134a Ethane, 1,1,1,2-tetrafluoro-, LFC-134a | soil water esource resource resource resource resource resource resource resource resource resource Transport and distribution of natural gas air air air air air air air air air ai | industrial river unspecified river unspecified river unspecified river unspecified high population density in ground biotic The dataset describes approximately the transport and distribution of natural gas. | kg k | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | kg PO4-Eq kg PO4 | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 5.47E-15 4.34E-09 2.33E-08 3.61E-17 1.03E-07 1.36E-15 1.33E-12 | kg/Nm3 kg/Muj | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA Ecoinvent V2, natural gas, at |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide Dinitrogen monoxide | soil water air resource resource resource resource resource resource air | industrial river unspecified river unspecified river unspecified river unspecified high population density in ground in groun | kg k | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4 | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 5.47E-15 4.34E-09 2.33E-08 3.61E-17 1.03E-07 1.36E-15 1.33E-12 9.70E-12 2.05E-16 | kg/Nm3 Nm3/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/MJ | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 6.72E-05 7.46E-04 3.79E-12 5.03E-03 2.41E-08 2.06E-07 6.99E-15 1.07E-05 8.44E-12 4.18E-10 1.64E-13 1.29E-06 6.95E-06 1.08E-14 3.06E-05 1.95E-12 1.90E-09 1.39E-08 1.26E-12 0.00E+00 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA Ecoinvent V2, natural gas, at |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon form Chloroform Chlorof | soil water resource resourc | industrial river unspecified river unspecified river unspecified liver unspecified high population density in ground biotic The dataset describes approximately the transport and distribution of natural gas. high population density low population density unspecified high population density low population density unspecified high population density | kg k | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1.5714 1.5715 1. | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 5.47E-15 4.34E-09 2.33E-08 3.61E-17 1.03E-07 1.36E-15 1.33E-12 9.70E-12 | kg/Nm3 kg/MJ | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 6.72E-05 7.46E-04 3.79E-12 5.03E-03 2.41E-08 2.06E-07 6.99E-15 1.07E-05 8.44E-12 4.18E-10 1.64E-13 1.29E-06 6.95E-06 1.08E-14 3.06E-05 1.95E-12 1.90E-09 1.39E-01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA Ecoinvent V2, natural gas, a |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbo | soil water esource resource | industrial river unspecified river unspecified river unspecified ligh population density in ground biotic The dataset describes approximately the transport and distribution of natural gas. high population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density | kg k | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | kg PO4-Eq kg PO4 | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 5.47E-15 4.34E-09 2.33E-08 3.61E-17 1.03E-07 1.36E-15 1.33E-12 9.70E-12 2.05E-16 1.82E-13 | kg/Nm3 Nm3/Nm3 Nm3/Nm3 kg/Nm3 kg/Nm3 kg/MJ | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 6.72E-05 7.46E-04 3.79E-12 5.03E-03 2.41E-08 2.06E-07 6.99E-15 1.07E-05 8.44E-12 4.18E-10 1.64E-13 1.29E-06 6.95E-06 1.08E-14 3.06E-05 1.95E-12 1.90E-09 1.39E-08 1.26E-12 0.00E+00 2.26E-11 0.00E+00 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA Ecoinvent V2, natural gas, a |
| Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground E10 back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon form Chloroform Chlorof | soil water resource resourc | industrial river unspecified river unspecified river unspecified liver unspecified high population density in ground biotic The dataset describes approximately the transport and distribution of natural gas. high population density low population density unspecified high population density low population density unspecified high population density | kg k | 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1.5714 1.5715 1. | kg PO4-Eq kg PO2-Eq kg CO2-Eq | 9.55E-10 7.40E-06 5.96E-04 7.54E-06 9.86E-04 2.41E-09 5.65E-10 2.24E-12 1.67E-03 1.45E-02 9.51E-05 1.08E+00 6.47E-04 1.24E-08 6.72E-05 7.46E-04 3.79E-12 5.03E-03 1.54E-08 1.31E-07 4.45E-15 6.83E-06 2.81E-13 1.39E-11 5.47E-15 4.34E-09 2.33E-08 3.61E-17 1.03E-07 1.36E-15 1.33E-12 9.70E-12 2.05E-16 | kg/Nm3 Nm3/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/Nm3 kg/MJ | 2.92E-09 1.63E-07 1.31E-05 1.66E-07 2.17E-05 2.41E-09 1.73E-09 6.87E-12 0.00E+00 3.52E-05 1.66E-02 2.77E-01 3.78E-03 4.14E+01 2.96E-02 1.22E-07 4.17E+01 6.72E-05 7.46E-04 3.79E-12 5.03E-03 2.41E-08 2.06E-07 6.99E-15 1.07E-05 8.44E-12 4.18E-10 1.64E-13 1.29E-06 6.95E-06 1.08E-14 3.06E-05 1.95E-12 1.90E-09 1.39E-01 | Ecoinvent V2, natural gas, at production, RNA Ecoinvent V2, natural gas, at consumer, RNA Ecoinvent V2, natural gas, a |

| Ethane, hexafluoro-, HFC-116 | | 10.1 | The second secon | 10000 | 1 000 F | 4.005.44 | 1 041 | 0.075.40 | |
|--|--|---|--|--|---|---|---|--|---|
| | air | high population density | kg | 12200 | kg CO2-Eq | 1.86E-14 | kg/MJ | 2.27E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 3.09E-12 1.30E-10 | kg/MJ | 3.77E-08 3.26E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | | kg/MJ | | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, biogenic | air | low population density | кg | 25 | kg CO2-Eq | 9.59E-09 | kg/MJ | 2.40E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 4.72E-09 | kg/MJ | 1.18E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 1.48E-14 | kg/MJ | 7.42E-14 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 3.10E-13 | kg/MJ | 5.85E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 1.16E-18 | kg/MJ | 8.27E-15 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.02E-12 | kg/MJ | 7.30E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 2.39E-14 | kg/MJ | 4.33E-11 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.63E-12 | kg/MJ | 2.94E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | | 0.00E+00 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 9.25E-15 | kg/MJ | 8.04E-14 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 4.12E-11 | kg/MJ | 3.59E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 2.25E-15 | kg/MJ | 2.45E-11 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 1.11E-15 | kg/MJ | 1.21E-11 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 9.86E-15 | kg/MJ | 1.08E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 3.88E-18 | kg/MJ | 8.14E-16 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 1.32E-08 | kg/MJ | 3.30E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 1.13E-06 | kg/MJ | 2.82E-05 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 6.02E-17 | kg/MJ | 1.50E-15 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 3.23E-04 | kg/MJ | 8.07E-03 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 1.10E-12 | kg/MJ | 1.54E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 4.41E-12 | kg/MJ | 6.17E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 9.38E-15 | kg/MJ | 6.93E-11 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 2.78E-11 | kg/MJ | 2.05E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 6.30E-18 | kg/MJ | 2.99E-14 | Econvent V2, natural gas, at consumer, RNA |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 1.23E-15 | kg/MJ | 1.83E-11 | Econivent V2, natural gas, at consumer, RNA Econivent V2, natural gas, at consumer, RNA |
| Sulfur hexafluoride | air | high population density | kg kg | 22800 | kg CO2-Eq | 1.20E-10 | Kg/IVIJ | 0.00E+00 | Ecoinvent V2, natural gas, at consumer, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.65E-10 | kg/MJ | 3.76E-06 | Econivent V2, natural gas, at consumer, RNA Econivent V2, natural gas, at consumer, RNA |
| | air air | | | 22800 | kg CO2-Eq | 7.76E-12 | kg/MJ | 3.76E-06 1.77E-07 | |
| Sulfur hexafluoride | | unspecified | kg | | | | kg/MJ | | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 1.28E-16 | | 1.66E-15 | Ecoinvent V2, natural gas, at consumer, RNA |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 7.53E-11 | kg/MJ | 9.79E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.25E-07 | kg/MJ | 1.25E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | | 0.00E+00 | Ecoinvent V2, natural gas, at consumer, RNA |
| | | | | | | | | 5.43E-05 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 1.04E-09 | kg/MJ | 1.95E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 3.03E-09 | kg/MJ | 5.70E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 3.75E-08 | kg/MJ | 7.04E-08 | Ecoinvent V2, natural gas, at consumer, RNA |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 1.29E-09 | kg/MJ | 1.14E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 1.75E-07 | kg/MJ | 1.54E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 2.16E-07 | kg/MJ | 1.90E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 5.86E-11 | kg/MJ | 9.38E-11 | Ecoinvent V2, natural gas, at consumer, RNA |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 2.22E-08 | kg/MJ | 3.55E-08 | Ecoinvent V2, natural gas, at consumer, RNA |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 2.63E-08 | kg/MJ | 4.21E-08 | Ecoinvent V2, natural gas, at consumer, RNA |
| Hydrogen sulfide | air | high population density | ka | 1.88 | kg SO2-Eq | 6.70E-13 | kg/MJ | 1.26E-12 | Ecoinvent V2, natural gas, at consumer, RNA |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 6.14E-10 | kg/MJ | 1.15E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Hydrogen sulfide | air | unspecified | ka | 1.88 | kg SO2-Eq | 3.13E-10 | kg/MJ | 5.88E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eq | 1.49E-07 | kg/MJ | 1.04E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Nitrogen oxides | air | | | | | | | | |
| Nitrogen oxides | | low population density | ka | 0.7 | | 1.31F-06 | ka/M I | 9 17F-07 | Econyent V2 natural das at consumer RNA |
| | oir | low population density | kg | 0.7 | kg SO2-Eq | 1.31E-06 | kg/MJ | 9.17E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| | air | unspecified | kg kg | 0.7 0.7 | kg SO2-Eq kg SO2-Eq | 7.69E-06 | kg/MJ | 5.38E-06 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide | air | unspecified high population density | kg kg | | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 7.69E-06 3.15E-07 | kg/MJ kg/MJ | 5.38E-06 3.15E-07 | Ecoinvent V2, natural gas, at consumer, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide | air air | unspecified high population density low population density | kg kg kg kg | | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 7.69E-06 3.15E-07 3.60E-06 | kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 | Ecoinvent V2, natural gas, at consumer, RNA Ecoinvent V2, natural gas, at consumer, RNA Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide | air air air | unspecified high population density low population density unspecified | kg kg kg kg kg | 0.7 1 1 1 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 | kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide | air air air water | unspecified high population density low population density unspecified river | kg kg kg kg kg | 0.7 1 1 1 1 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid | air air air water soil | unspecified high population density low population density unspecified river agricultural | kg | 0.7 1 1 1 1.88 0.65 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 | kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid | air air air water soil air | unspecified high population density low population density unspecified river agricultural high population density | kg kg | 0.7 1 1 1 1 1.88 0.65 0.98 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid | air air air water soil | unspecified high population density low population density unspecified river agricultural | kg | 0.7 1 1 1 1.88 0.65 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid | air air air water soil air air | unspecified high population density low population density unspecified river agricultural high population density low population density | kg kg kg | 0.7 1 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuria eaid Phosphoria eaid Sulfuric acid Phosphorus | air air air water soil air | unspecified high population density low population density unspecified river agricultural high population density low population density high population density | kg kg | 0.7 1 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus | air air water soil air air air | unspecified high population density low population density unspecified river agricultural high population density low population density low population density low population density | kg kg kg | 0.7 1 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus | air air air water soil air air air air | unspecified high population density low population density unspecified river agricultural high population density low population density high population density low population density | kg kg kg | 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air air air water soil air air air air air | unspecified high population density low population density unspecified river agricultural high population density low population density high population density low population density low population density low population density up population density low population density low population density low population density | kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air air water soil air air air air air | unspecified high population density low population density unspecified river agricultural high population density low population density high population density by population density low population density low population density low population density low population density unspecified agricultural | kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air air air water soil air air air air air | unspecified high population density low population density unspecified river agricultural high population density low population density high population density low population density low population density low population density up population density low population density low population density low population density | kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Silological Oxygen Demand | air air water soil air air air air air | unspecified high population density low population density unspecified river agricultural high population density low population density high population density by population density low population density low population density low population density low population density unspecified agricultural | kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 0.022 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air air air water soil air air air air air soil | unspecified high population density low population density unspecified river agricultural high population density low population density | kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Silological Oxygen Demand | air air air water soil air air air air air soil soil | unspecified high population density low population density unspecified river agricultural high population density low population density high population density low population density | kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand | air air air water soil air air air air soil soil | unspecified high population density low population density unspecified fiver agricultural high population density low population density in population density low population density low population density in population density low population density low population density in population density unspecified agricultural industrial fiver unspecified | kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | air air air water soil air air air air air air soil soil water water | unspecified high population density low population density unspecified river agricultural high population density low population density in density low population density low population density low population density in density unspecified agricultural industrial river unspecified river | kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuria acid Phosphoria acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Posphorus Posphorus DOD, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | air air air vater soil air air air air air air soil soil water water water water | unspecified high population density low population density unspecified river agricultural high population density low population density in density unspecified agricultural industrial river unspecified river unspecified | kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Posphorus COD, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | air air air water soil air air air air air air soil soil water water water water water | unspecified high population density low population density unspecified river agricultural high population density low population density in population density low population density low population density river unspecified river unspecified river unspecified river | kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 2.37E-10 4.49E-11 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 2.37E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Posphorus Posphorus Posphorus Posphorus COD, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphorus | air air air vater soil air air air air air air air soil soil water | Inspecified high population density low population density unspecified river agricultural high population density low population density iow population density low population density | kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 2.37E-10 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 2.37E-10 1.37E-10 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus | air air air vater soil air air air air air air air soil soil water water water water water water water water | unspecified high population density low population density unspecified river agricultural high population density low population density in density low population density unspecified agricultural industrial river unspecified river unspecified river river | kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 2.37E-10 4.49E-11 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 2.37E-10 1.37E-10 4.47E-13 0.00E+00 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphoric acid | air air air water soil air air air air air air air soil soil water air | unspecified high population density low population density unspecified river agricultural high population density low population density unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified niver river unspecified high population density | kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 2.37E-10 4.49E-11 1.46E-13 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 2.37E-10 1.37E-10 4.47E-13 0.00E+00 9.49E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Posphorus Pooption Sulfuric acid COD, Siological Oxygen Demand SOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground | air air air vater soil air air air air air air air air soil soil water air soil soil water water water water water water water | Inspecified high population density low population density unspecified river agricultural high population density low population density in unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified high population density in ground | kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 2.37E-10 4.49E-11 1.46E-13 | kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 2.37E-10 1.37E-10 4.47E-13 0.00E+00 9.49E-07 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfurie acid Phosphoric acid Sulfuric acid Phosphorus Phosphoric Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground | air air air vater soil air air air air air air air soil soil water air resource resource | Inspecified high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified river unspecified river iver unspecified river iver unspecified river river unspecified high population density in ground in ground | kg kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 2.37E-10 4.49E-11 1.46E-13 | kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 2.37E-10 4.47E-13 0.00E+00 9.49E-07 4.94E-04 7.89E-03 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | air air air air vater soil air air air air air air air soil soil water air resource resource resource | unspecified high population density low population density unspecified river agricultural high population density low population density unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified niver unspecified niver iver unspecified niver unspecified niver unspecified niver unspecified niver unspecified nipround in ground in ground | kg kg kg kg kg kg kg kg kg kg kg kg | 0.7 1 1 1.88 0.65 0.98 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.09 9.022 0.022 0.022 0.022 0.022 0.92 0.92 0.93 1. | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 2.37E-10 4.49E-11 1.46E-13 | kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 2.37E-10 1.37E-10 4.47E-13 0.00E+00 9.49E-07 4.94E-04 7.89E-03 1.11E-04 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus Phosphorical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | air air air air vater soil air air air air air air air air soil soil water soil resource resource resource resource | Inspecified high population density low population density unspecified river agricultural high population density low population density in unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified fiver iver unspecified fiver iver unspecified fiver in ground in ground in ground in ground in ground | kg k | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 2.37E-10 4.49E-11 1.46E-13 | kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 2.37E-10 1.37E-10 1.37E-10 4.47E-13 0.00E+00 9.49E-07 4.94E-04 7.89E-03 1.11E-04 1.11E+00 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorial Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | air air air air vater soil air air air air air air air soil soil water water water water water water water water soil resource resource resource resource | Inspecified high population density low population density unspecified river agricultural high population density low population density unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified river iver river unspecified river iver river unspecified high population density in ground | kg k | 0.7 1 1 1.88 0.65 0.98 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.09 9.022 0.022 0.022 0.022 1 3.06 3.08 4.09 | kg SO2-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 2.37E-10 4.49E-11 1.46E-13 | kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 2.37E-10 4.47E-13 0.00E+00 9.49E-07 4.94E-04 7.89E-03 1.11E-04 1.11E-00 1.34E-03 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus Phosphorical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | air air air air vater soil air air air air air air air air soil soil water soil resource resource resource resource | Inspecified high population density low population density unspecified river agricultural high population density low population density in unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified fiver iver unspecified fiver iver unspecified fiver in ground in ground in ground in ground in ground | kg k | 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg PO4-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 2.37E-10 4.49E-11 1.46E-13 | kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 2.37E-10 1.37E-10 4.47E-13 0.00E+00 9.49E-07 4.94E-04 7.89E-03 1.11E-04 1.11E+00 1.34E-03 1.43E-03 | Ecoinvent V2, natural gas, at consumer, RNA |
| Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorial Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | air air air air vater soil air air air air air air air soil soil water water water water water water water water soil resource resource resource resource | Inspecified high population density low population density unspecified river agricultural high population density low population density unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified river iver river unspecified river iver river unspecified high population density in ground | kg k | 0.7 1 1 1.88 0.65 0.98 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.09 9.022 0.022 0.022 0.022 1 3.06 3.08 4.09 | kg SO2-Eq kg PO4-Eq | 7.69E-06 3.15E-07 3.60E-06 5.47E-04 2.76E-11 5.61E-18 1.77E-16 4.63E-11 1.73E-12 1.09E-11 8.72E-15 1.82E-10 4.26E-11 3.21E-07 1.60E-05 3.31E-07 2.64E-05 2.37E-10 4.49E-11 1.46E-13 | kg/MJ | 5.38E-06 3.15E-07 3.60E-06 5.47E-04 5.18E-11 3.65E-18 0.00E+00 1.15E-16 5.51E-04 1.42E-10 5.28E-12 3.32E-11 2.67E-14 5.58E-10 1.30E-10 7.07E-09 3.52E-07 7.28E-09 5.81E-07 2.37E-10 4.47E-13 0.00E+00 9.49E-07 4.94E-04 7.89E-03 1.11E-04 1.11E-00 1.34E-03 | Ecoinvent V2, natural gas, at consumer, RNA |

E11 Combust natural

Combust natural gas

The module includes fuel input from high pressure (RER) network, infrastructure (boiler), emissions to air, and electricity needed for operation.

| back to top | | | | | | | | | |
|--|--------------------------|--|----------------|---------|-----------|----------|-------------------------|----------|--|
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 6.13E-02 | kg/MJ | 6.13E-02 | natural gas, burned in industrial furnace >100kW, RER |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 2.60E-03 | kg/MJ | 2.60E-03 | natural gas, burned in industrial furnace >100kW, RER |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 1.80E-11 | kg/MJ | 1.80E-11 | natural gas, burned in industrial furnace >100kW, RER |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 2.62E-04 | kg/MJ | 2.62E-04 | natural gas, burned in industrial furnace >100kW, RER |
| Carbon dioxide | air | total | kg | 1 | kg CO2-Eq | 5.10E-02 | kg/MJ | 5.10E-02 | See calculations above |
| Carbon monoxide, fossil | air | high population density | ka | 1.5714 | kg CO2-Eg | 5.89E-06 | ka/M I | 9.26E-06 | natural gas, burned in industrial furnace >100kW, RER |
| | | | ing ing | 1.07 17 | Ng OOZ Eq | 0.00E 00 | RG/1010 | 3.202 00 | Hatarar gas, barries in massinar farmace > rooky, reek |
| | air | low population density | kg | 1.5714 | kg CO2-Eq | 4.87E-06 | kg/MJ | 7.65E-06 | natural gas, burned in industrial furnace >100kW, RER |
| Carbon monoxide, fossil Carbon monoxide, fossil | air air | | kg kg | | | | kg/MJ kg/MJ | | 344, 444, 444, 444, 444, 444, 444, 444, |
| Carbon monoxide, fossil | air air air air | low population density | kg kg kg | 1.5714 | kg CO2-Eq | 4.87E-06 | kg/MJ kg/MJ kg/MJ | 7.65E-06 | natural gas, burned in industrial furnace >100kW, RER |

| Carbon monoxide | air | total | kg | 1.5714 | kg CO2-Eq | 1.70E-05 | kg/MJ | 2.67E-05 | See calculations above |
|--|----------------|---|----------|----------------|------------------------|----------------------|----------------|----------------------|---|
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 2.84E-13 | kg/MJ | 8.52E-12 | natural gas, burned in industrial furnace >100kW, RER |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 1.09E-14 | kg/MJ | 3.28E-13 | natural gas, burned in industrial furnace >100kW, RER |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 1.08E-21 | kg/MJ | 3.25E-20 | natural gas, burned in industrial furnace >100kW, RER |
| Dinitrogen monoxide | air | high population density | kg | 298 298 | kg CO2-Eq kg CO2-Eq | 1.90E-07 2.73E-08 | kg/MJ kg/MJ | 5.65E-05 8.15E-06 | natural gas, burned in industrial furnace >100kW, RER natural gas, burned in industrial furnace >100kW, RER |
| Dinitrogen monoxide Dinitrogen monoxide | air | low population density lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 2.73E-08 1.72E-16 | kg/MJ | 5.12E-14 | natural gas, burned in industrial furnace > 100kW, RER natural gas, burned in industrial furnace > 100kW, RER |
| Dinitrogen monoxide | air | unspecified | ka | 298 | kg CO2-Eq | 1.43E-08 | kg/MJ | 4.26E-06 | natural gas, burned in industrial furnace >100kW, RER |
| Dinitrogen monoxide | air | total | kg | 298 | kg CO2-Eg | 9.35E-07 | kg/MJ | 2.79E-04 | See calculations above |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 5.95E-15 | kg/MJ | 8.51E-12 | natural gas, burned in industrial furnace >100kW, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 5.79E-13 | kg/MJ | 8.28E-10 | natural gas, burned in industrial furnace >100kW, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 3.60E-11 | kg/MJ | 5.15E-08 | natural gas, burned in industrial furnace >100kW, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 1.08E-15 | kg/MJ | 6.62E-12 | natural gas, burned in industrial furnace >100kW, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | | 0.00E+00 | natural gas, burned in industrial furnace >100kW, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 7.19E-13 | kg/MJ | 8.92E-11 | natural gas, burned in industrial furnace >100kW, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | | 0.00E+00 | natural gas, burned in industrial furnace >100kW, RER |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 9.96E-12 | kg/MJ | 9.96E-08 | natural gas, burned in industrial furnace >100kW, RER |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 12200 | kg CO2-Eq | 0.045.44 | kg/MJ | 0.00E+00 | natural gas, burned in industrial furnace >100kW, RER |
| Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 | air air | high population density | kg kg | 12200 | kg CO2-Eq | 9.21E-14 8.95E-12 | kg/MJ | 1.12E-09 1.09E-07 | natural gas, burned in industrial furnace > 100kW, RER |
| Methane, biogenic | all | unspecified high population density | ka | 25 | kg CO2-Eq kg CO2-Eq | 6.07E-10 | kg/MJ | 1.52E-08 | natural gas, burned in industrial furnace >100kW, RER natural gas, burned in industrial furnace >100kW, RER |
| Methane, biogenic | air | low population density | ka | 25 | kg CO2-Eq | 3.53E-08 | kg/MJ | 8.82E-07 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, biogenic | air | unspecified | ka | 25 | kg CO2-Eq | 1.12E-08 | kg/MJ | 2.79E-07 | natural gas, burned in industrial furnace >100kW, RER |
| Methane | air | total | kg | 25 | kg CO2-Eq | 9.78E-07 | kg/MJ | 2.44E-05 | See calculations above |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 2.93E-21 | kg/MJ | 1.47E-20 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 1.58E-09 | kg/MJ | 2.98E-06 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 1.96E-18 | kg/MJ | 1.40E-14 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 5.13E-12 | kg/MJ | 3.66E-08 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 1.09E-13 | kg/MJ | 1.97E-10 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 5.41E-09 | kg/MJ | 9.78E-06 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | | 0.00E+00 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.89E-14 | kg/MJ | 2.52E-13 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 3.24E-14 | kg/MJ | 2.82E-13 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.32E-14 | kg/MJ | 1.44E-10 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorodifluoro-, CFC-12 | air air | low population density | kg kg | 10900 10900 | kg CO2-Eq | 5.36E-12 1.95E-21 | kg/MJ kg/MJ | 5.85E-08 2.13E-17 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, dichlorofluoro-, HCFC-21 | aır air | unspecified high population density | кд kg | 10900 210 | kg CO2-Eq kg CO2-Eq | 1.95E-21 1.69E-17 | kg/MJ kg/MJ | 2.13E-17 3.56E-15 | natural gas, burned in industrial furnace >100kW, RER natural gas, burned in industrial furnace >100kW, RER |
| Methane, fossil | all | high population density | ka | 25 | kg CO2-Eq | 2.64E-06 | kg/MJ | 6.60E-05 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, fossil | air | low population density | ka | 25 | kg CO2-Eq | 1.58E-04 | kg/MJ | 3.96E-03 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, fossil | air | lower stratosphere + upper troposphere | ka | 25 | kg CO2-Eq | 2.86E-16 | kg/MJ | 7.16E-15 | natural gas, burned in industrial furnace >106kW, RER |
| Methane, fossil | air | unspecified | ka | 25 | kg CO2-Eq | 5.94E-09 | kg/MJ | 1.49E-07 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 3.96E-12 | kg/MJ | 5.54E-09 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 8.72E-19 | kg/MJ | 1.22E-15 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 3.70E-14 | kg/MJ | 2.73E-10 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 8.05E-11 | kg/MJ | 5.95E-07 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 2.75E-17 | kg/MJ | 1.31E-13 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 5.39E-15 | kg/MJ | 7.98E-11 | natural gas, burned in industrial furnace >100kW, RER |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | | 0.00E+00 | natural gas, burned in industrial furnace >100kW, RER |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 4.70E-14 | kg/MJ | 1.07E-09 | natural gas, burned in industrial furnace >100kW, RER |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.46E-10 | kg/MJ | 3.32E-06 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 5.27E-16 | kg/MJ | 6.85E-15 | natural gas, burned in industrial furnace >100kW, RER |
| Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air | low population density | kg | 13 1 | kg CO2-Eq | 5.91E-14 2.08E-07 | kg/MJ kg/MJ | 7.69E-13 2.08E-07 | natural gas, burned in industrial furnace >100kW, RER |
| Nitrogen fluoride | air | low population density high population density | kg ka | 17200 | kg CO2-Eq kg CO2-Eq | 2.000-07 | Kg/IVIJ | 0.00E+00 | natural gas, burned in industrial furnace >100kW, RER natural gas, burned in industrial furnace >100kW, RER |
| Training of Traini | an an | riigii population density | Ng - | 17200 | ng OOZ Lq | | | 5.14E-02 | natural gas, burned in madethal furnace > 100kW, NEIX |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 4.48E-09 | kg/MJ | 8.42E-09 | natural gas, burned in industrial furnace >100kW, RER |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 5.07E-09 | kg/MJ | 9.52E-09 | natural gas, burned in industrial furnace >100kW, RER |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.62E-08 | kg/MJ | 4.93E-08 | natural gas, burned in industrial furnace >100kW, RER |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 4.07E-09 | kg/MJ | 3.58E-09 | natural gas, burned in industrial furnace >100kW, RER |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 5.30E-08 | kg/MJ | 4.66E-08 | natural gas, burned in industrial furnace >100kW, RER |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 8.43E-09 | kg/MJ | 7.42E-09 | natural gas, burned in industrial furnace >100kW, RER |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.71E-10 | kg/MJ | 2.73E-10 | natural gas, burned in industrial furnace >100kW, RER |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 1.18E-08 | kg/MJ | 1.89E-08 | natural gas, burned in industrial furnace >100kW, RER |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 1.82E-09 | kg/MJ | 2.91E-09 | natural gas, burned in industrial furnace >100kW, RER |
| Hydrogen sulfide | air | high population density | Kg L- | 1.88 | kg SO2-Eq | 9.60E-13 | kg/MJ | 1.81E-12 | natural gas, burned in industrial furnace >100kW, RER |
| Hydrogen sulfide Hydrogen sulfide | aır air | low population density unspecified | kg ka | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 7.53E-07 1.53E-09 | kg/MJ kg/MJ | 1.42E-06 2.87E-09 | natural gas, burned in industrial furnace >100kW, RER natural gas, burned in industrial furnace >100kW, RER |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eq | 3.31E-05 | kg/MJ | 2.32E-05 | natural gas, burned in industrial furnace >100kW, RER |
| Nitrogen oxides | air | low population density | ka | 0.7 | kg SO2-Eq | 7.69E-06 | kg/MJ | 5.38E-06 | natural gas, burned in industrial furnace >100kW, RER |
| Nitrogen oxides | air | unspecified | ka | 0.7 | kg SO2-Eq | 1.43E-06 | kg/MJ | 1.00E-06 | natural gas, burned in industrial furnace >100kW, RER |
| Nitrogen oxides | air | total | kg | 0.7 | kg SO2-Eq | 4.00E-05 | kg/MJ | 2.80E-05 | See calculations above |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 1.23E-06 | kg/MJ | 1.23E-06 | natural gas, burned in industrial furnace >100kW, RER |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 2.38E-05 | kg/MJ | 2.38E-05 | natural gas, burned in industrial furnace >100kW, RER |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 2.41E-07 | kg/MJ | 2.41E-07 | natural gas, burned in industrial furnace >100kW, RER |
| Sulfur dioxide | air | total | kg | 1 | kg SO2-Eq | 2.55E-07 | kg/MJ | 2.55E-07 | See calculations above |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 1.53E-10 | kg/MJ | 2.87E-10 | natural gas, burned in industrial furnace >100kW, RER |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 2.95E-17 | kg/MJ | 1.92E-17 | natural gas, burned in industrial furnace >100kW, RER |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | 7.47 | , | 0.00E+00 | natural gas, burned in industrial furnace >100kW, RER |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 7.14E-16 | kg/MJ | 4.64E-16 2.98E-05 | natural gas, burned in industrial furnace >100kW, RER |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 9.67E-11 | kg/MJ | 2.98E-05 2.96E-10 | natural gas, burned in industrial furnace >100kW, RER |
| Phosphorus | air air | low population density | kg | 3.06 | kg PO4-Eq kg PO4-Eq | 9.67E-11 7.17E-12 | kg/MJ | 2.96E-10 2.20E-11 | natural gas, burned in industrial furnace >100kW, RER natural gas, burned in industrial furnace >100kW, RER |
| Phosphorus | air | low population density, long-term | kg ka | 3.06 | kg PO4-Eq | 1.85E-11 | kg/MJ | 5.66E-11 | natural gas, burned in industrial furnace >100kW, RER |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 4.62E-14 | kg/MJ | 1.41E-13 | natural gas, burned in industrial furnace >100kW, RER |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 3.64E-10 | kg/MJ | 1.11E-09 | natural gas, burned in industrial furnace >100kW, RER |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 7.23E-09 | kg/MJ | 2.21E-08 | natural gas, burned in industrial furnace >100kW, RER |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.52E-06 | kg/MJ | 3.35E-08 | natural gas, burned in industrial furnace >100kW, RER |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 3.07E-08 | kg/MJ | 6.75E-10 | natural gas, burned in industrial furnace >100kW, RER |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.73E-06 | kg/MJ | 3.80E-08 | natural gas, burned in industrial furnace >100kW, RER |
| | water | unspecified | kg | 0.022 | kg PO4-Eq | 3.09E-08 | kg/MJ | 6.79E-10 | natural gas, burned in industrial furnace >100kW, RER |
| | | river | kg | 1 | kg PO4-Eq | 7.21E-10 | kg/MJ | 7.21E-10 | natural gas, burned in industrial furnace >100kW, RER |
| COD, Chemical Oxygen Demand Phosphate | water | | | | | | | | |
| COD, Chemical Oxygen Demand Phosphate Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 4.31E-10 | kg/MJ | 1.32E-09 | natural gas, burned in industrial furnace >100kW, RER |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus | water water | river unspecified | kg | 3.06 | kg PO4-Eq | 4.31E-10 6.61E-12 | kg/MJ kg/MJ | 2.02E-11 | natural gas, burned in industrial furnace >100kW, RER |
| COD, Chemical Oxygen Demand Phosphate Phosphorus | water | river | . • | | | | | 2.02E-11 0.00E+00 | |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus | water water | river unspecified | kg | 3.06 | kg PO4-Eq | | | 2.02E-11 | natural gas, burned in industrial furnace >100kW, RER |

| oal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 3.18E-04 | kg/MJ | 6.07E-03 | natural gas, burned in industrial furnace >100kW, RER |
|--|----------------------|--|--|-------------|------------------------|----------------------|-----------------------------|----------------------|--|
| as, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 3.07E-06 | Nm3/MJ | 1.22E-04 | natural gas, burned in industrial furnace > 100kW, RER |
| s, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 3.06E-02 | Nm3/MJ | 1.17E+00 | natural gas, burned in industrial furnace >100kW, RER |
| rude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.40E-04 | kg/MJ | 6.42E-03 | natural gas, burned in industrial furnace >100kW, RER |
| in ground | resource | biotic | ka | 9.9 | MJ-Eq | 2.42E-07 | kg/MJ | 2.39E-06 | natural gas, burned in industrial furnace >100kW, RER |
| | | | <u> </u> | | | | • | 1.19E+00 | • |
| | | | | | | | | | |
| | Generate electricity | | | | | | | | |
| k to top | | These emissions replace Ecoinvent emissions below | Ammonia Carbon Dioxide Equivalents | | 4.85E-03 9.30E+02 | air air | | g / kWh g / kWh | Alberta Environment Summary Report on 2004 NPRI Air Emissions, http://environment.gov.ab.ca/info/library/7758.pdf Environment Canada. 2006. NATIONAL INVENTORY REPORT: GREENHOUSE GAS SOURCES AND SINKS IN CANADA, 1990 |
| | | | Carson Bioxido Equivalente | | 0.002.02 | u., | | g/iiiii | 2006,http://www.ec.gc.ca/pdb/ghg/inventory_report/2006_report/tdm-toc_eng.cfm. |
| | | | Nitrogen Oxides | | 1.60E+00 | air | | g / kWh | Alberta Environment Summary Report on 2004 NPRI Air Emissions, http://environment.gov.ab.ca/info/library/7758.pdf |
| | | | Sulphur Dioxide | | 2.43E+00 | air | | g / kWh | Alberta Environment Summary Report on 2004 NPRI Air Emissions, http://environment.gov.ab.ca/info/library/7758.pdf |
| | | | Ammonia - 2004 Power | | 2.63E+02 | air | | tonnes NH3 | Alberta Environment Summary Report on 2004 NPRI Air Emissions, http://environment.gov.ab.ca/info/library/7758.pdf |
| | | | Generation Emissions | | 4.075.04 | | | 4 00 | Alberta Ferriannest Comment Constant of Co |
| | | | Carbon Monoxide - 2004 Power Generation | | 1.07E+04 | air | | tonnes CO | Alberta Environment Summary Report on 2004 NPRI Air Emissions, http://environment.gov.ab.ca/info/library/7758.pdf |
| | | | Nitrogen Oxides - 2004 | | 8.67E+04 | air | | tonnes Nox | Alberta Environment Summary Report on 2004 NPRI Air Emissions, http://environment.gov.ab.ca/info/library/7758.pdf |
| | | | Power Generation Sulphur Dioxide - 2004 | | 1.32E+05 | air | | tonnes SO2 | Alberta Environment Summary Report on 2004 NPRI Air Emissions, http://environment.gov.ab.ca/info/library/7758.pdf |
| | | | Power Generation | | 1.322+03 | all | | torines 502 | Alberta Elivironinent Guniniary Report of 2004 N. Kr. Ali Elinssions, Intp.//elivironinent.gov.ab.ca/into/intaly/7730.pdf |
| | | | Total Particulate Matter - | | 1.09E+04 | air | | tonnes TPM | Alberta Environment Summary Report on 2004 NPRI Air Emissions, http://environment.gov.ab.ca/info/library/7758.pdf |
| | | | Power Generation Volatile Organic | | 9.39E+02 | air | | tonnes VOC | Alberta Environment Summary Report on 2004 NPRI Air Emissions, http://environment.gov.ab.ca/info/library/7758.pdf |
| | | | Compounds - 2004 Power Generation Emissions | | 0.002102 | uii | | tornics voo | Aborta Environment cuminary responsor 2004 in 1974 Ennicolity, http://environment.gov.ac.ca/monicia/y/7/00-pu |
| | | | | | E 64E . 04 | | | CMb | Fautranment Canada, 2006, NATIONAL INVENTORY DEPORT, OPERALIQUEE CAS COLUDERS AND SINKS IN CANADA, 4000 |
| | | | Electricity Generation in Alberta (2004) | | 5.64E+04 | | | GWh | Environment Canada. 2006. NATIONAL INVENTORY REPORT: GREENHOUSE GAS SOURCES AND SINKS IN CANADA, 1990 2006,http://www.ec.gc.ca/pdb/ghg/inventory_report/2006_report/tdm-toc_eng.cfm. |
| | | | Transmission Line Losses in Alberta | | 4.00E-02 | | | | Environment Canada. 2005. Report of the Development of a Canadian Electricity Sector Module for the Integrated Planning Model. Cha |
| | | | III Alberta | | | | | | Canadian Module Power System Operation Assumptions. Accessed online February 2009 at http://www.ec.gc.ca/cleanair- airpur/caol/canus/IPM_TECHNICAL/ipm_technical_report/c3_e.cfm. Values model the wholesale electric market and do not include the |
| | | | | | | | | | energy in the retail distribution of electricity. Canada average is weighted average on 2006 power generation. NWT, Yukon and Nunavut a use Canada average and specific data is not available. |
| | | | Line Loss Multiplier: | | 1.04E+00 | | | | |
| | | | | | | | | | |
| | | his dataset describes the transmission of low voltage electricity. Included a ctricity losses and direct SF6 emissions to air as well as the grid infrastruct | | | | | | | |
| to top | o ir | high nonulation describe | - In- | .4 | 100 CC0 E- | 4.065.00 | Jen / JAA/In | 1 005 00 | Feeignant VO plasticity described as a still HO |
| on dioxide, fossil on dioxide, fossil | air air | high population density low population density | kg | 1 | kg CO2-Eq kg CO2-Eq | 4.06E-02 6.19E-01 | kg / kWh kg / kWh | 4.06E-02 6.19E-01 | Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US |
| n dioxide, fossil | air | lower stratosphere + upper troposphere | ka ka | 1 | kg CO2-Eq | 1.92E-09 | kg / kWh | 1.92E-09 | Ecoinvent vz, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US |
| | air | | 9 | 1 | | 1.28E-01 | | | |
| on dioxide, fossil Carbon Dioxide Equivalents | air | unspecified | kg ka | 1 | kg CO2-Eq kg CO2-Eq | 9.30E-01 | kg / kWh kg / kWh | 1.28E-01 9.30E-01 | Ecoinvent V2, electricity, low voltage, at grid, US See calculations above |
| | air air | high population density | 9 | 1 1.5714 | | | | | |
| on monoxide, fossil | | high population density | kg | | kg CO2-Eq | 9.35E-06 | kg / kWh | 1.47E-05 | Ecoinvent V2, electricity, low voltage, at grid, US |
| on monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 8.35E-05 | kg / kWh | 1.31E-04 | Ecoinvent V2, electricity, low voltage, at grid, US |
| n monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 2.25E-12 | kg / kWh | 3.54E-12 | Ecoinvent V2, electricity, low voltage, at grid, US |
| on monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 2.58E-04 | kg / kWh | 4.05E-04 | Ecoinvent V2, electricity, low voltage, at grid, US |
| oform | air | high population density | kg | 30 | kg CO2-Eq | 2.33E-10 | kg / kWh | 6.99E-09 | Ecoinvent V2, electricity, low voltage, at grid, US |
| oform | air | low population density | kg | 30 | kg CO2-Eq | 1.18E-08 | kg / kWh | 3.54E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| oform | air | unspecified | kg | 30 | kg CO2-Eq | 1.11E-14 | kg / kWh | 3.33E-13 | Ecoinvent V2, electricity, low voltage, at grid, US |
| ogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 3.57E-06 | kg / kWh | 1.06E-03 | Ecoinvent V2, electricity, low voltage, at grid, US |
| gen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 1.95E-05 | kg / kWh | 5.82E-03 | Ecoinvent V2, electricity, low voltage, at grid, US |
| gen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.82E-14 | kg / kWh | 5.44E-12 | Ecoinvent V2, electricity, low voltage, at grid, US |
| gen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 2.69E-06 | kg / kWh | 8.03E-04 | Ecoinvent V2, electricity, low voltage, at grid, US |
| , 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 8.80E-13 | kg / kWh | 1.26E-09 | Ecoinvent V2, electricity, low voltage, at grid, US |
| 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 1.12E-09 | kg / kWh | 1.60E-06 | Ecoinvent V2, electricity, low voltage, at grid, US |
| 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | ka | 1430 | kg CO2-Eq | 2.04E-09 | kg / kWh | 2.92E-06 | Ecoinvent V2, electricity, low voltage, at grid, US |
| 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | ka | 6130 | kg CO2-Eq | 7.34E-14 | kg / kWh | 4.50E-10 | Ecoinvent V2, electricity, low voltage, at grid, US |
| 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | ka | 6130 | kg CO2-Eq | | ng / kttti | 0.00E+00 | Ecoinvent V2, electricity, low voltage, at grid, US |
| 1.1-difluoro HFC-152a | air | high population density | ka | 124 | kg CO2-Eq | 1.45E-10 | kg/kWh | 1.80E-08 | Ecoinvent V2, electricity, low voltage, at grid, US |
| 1,1-difluoro-, HFC-152a | air | low population density | ka | 124 | kg CO2-Eq | 7.TOL 10 | Ng / NVIII | 0.00E+00 | Ecoinvent V2, electricity, low voltage, at grid, US |
| 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | ka | 10000 | kg CO2-Eq | 1.59E-08 | kg / kWh | 1.59E-04 | Econivent V2, electricity, low voltage, at grid, US Econivent V2, electricity, low voltage, at grid, US |
| 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | ka | 609 | kg CO2-Eq | 1.03E-00 | Kg / KVVII | 0.00E+00 | Econivent V2, electricity, low voltage, at grid, US Econivent V2, electricity, low voltage, at grid, US |
| nexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 8.64E-12 | kg / kWh | 1.05E-07 | Econwent V2, electricity, low voltage, at grid, US Econwent V2, electricity, low voltage, at grid, US |
| exafluoro-, HFC-116 | air | | ka | 12200 | kg CO2-Eq | 2.51E-09 | kg / kWh | 3.07E-05 | Econivent V2, electricity, low voltage, at grid, US Econivent V2, electricity, low voltage, at grid, US |
| biogenic | | unspecified | . • | | | | | | |
| | air | high population density | kg | 25 | kg CO2-Eq | 6.44E-08 | kg / kWh | 1.61E-06 | Ecoinvent V2, electricity, low voltage, at grid, US |
| , biogenic | air | low population density | kg | 25 | kg CO2-Eq | 7.97E-06 | kg / kWh | 1.99E-04 | Ecoinvent V2, electricity, low voltage, at grid, US |
| , biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 3.87E-06 | kg / kWh | 9.67E-05 | Ecoinvent V2, electricity, low voltage, at grid, US |
| bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 3.01E-14 | kg / kWh | 1.51E-13 | Ecoinvent V2, electricity, low voltage, at grid, US |
| bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 8.19E-11 | kg / kWh | 1.55E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 8.68E-16 | kg / kWh | 6.20E-12 | Ecoinvent V2, electricity, low voltage, at grid, US |
| bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 5.21E-10 | kg / kWh | 3.72E-06 | Ecoinvent V2, electricity, low voltage, at grid, US |
| chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 1.38E-11 | kg / kWh | 2.50E-08 | Ecoinvent V2, electricity, low voltage, at grid, US |
| chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 6.83E-10 | kg / kWh | 1.24E-06 | Ecoinvent V2, electricity, low voltage, at grid, US |
| chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | | 0.00E+00 | Ecoinvent V2, electricity, low voltage, at grid, US |
| dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.00E-11 | kg / kWh | 1.74E-10 | Ecoinvent V2, electricity, low voltage, at grid, US |
| dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 3.50E-08 | kg / kWh | 3.04E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.53E-12 | kg / kWh | 1.67E-08 | Ecoinvent V2, electricity, low voltage, at grid, US |
| | air | low population density | · · · · · · · · · · · · · · · · · · · | 10900 | | | | | Econivent V2, electricity, low voltage, at grid, US Econivent V2, electricity, low voltage, at grid, US |
| dichlorodifluoro-, CFC-12 | | | kg | | kg CO2-Eq | 3.05E-13 | kg / kWh | 3.33E-09 | |
| dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 2.00E-14 | kg / kWh | 2.18E-10 | Ecoinvent V2, electricity, low voltage, at grid, US |
| , dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 2.50E-15 | kg / kWh | 5.26E-13 | Ecoinvent V2, electricity, low voltage, at grid, US |
| , fossil | air | high population density | kg | 25 | kg CO2-Eq | 5.10E-06 | kg / kWh | 1.28E-04 | Ecoinvent V2, electricity, low voltage, at grid, US |
| , fossil | air | low population density | kg | 25 | kg CO2-Eq | 8.12E-04 | kg / kWh | 2.03E-02 | Ecoinvent V2, electricity, low voltage, at grid, US |
| , fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 3.04E-14 | kg / kWh | 7.60E-13 | Ecoinvent V2, electricity, low voltage, at grid, US |
| e, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 6.58E-04 | kg / kWh | 1.64E-02 | Ecoinvent V2, electricity, low voltage, at grid, US |
| , tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 2.00E-10 | kg / kWh | 2.80E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| , tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 8.96E-12 | kg / kWh | 1.25E-08 | Ecoinvent V2, electricity, low voltage, at grid, US |
| tetrafluoro-, R-14 | air | high population density | ka | 7390 | kg CO2-Eq | 7.48E-12 | kg / kWh | 5.52E-08 | Ecoinvent V2, electricity, low voltage, at grid, US |
| , tetrafluoro-, R-14 | air | unspecified | ka | 7390 | kg CO2-Eq | 2.26E-08 | kg / kWh | 1.67E-04 | Ecoinvent VZ, electricity, low voltage, at grid, US |
| ne, trichlorofluoro-, CFC-11 | 242 | high population density | 1 | 4750 | kg CO2-Eg | 4.06E-15 | kg / kWh | 1.93E-11 | Ecoinvent V2, electricity, low voltage, at grid, US |

| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | | 0.00E+00 | Ecoinvent V2, electricity, low voltage, at grid, US |
|---|--|--|------------------------------|--|--|--|--|--|---|
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.48E-07 | kg/kWh | 3.37E-03 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Sulfur hexafluoride | air | unspecified | ka | 22800 | kg CO2-Eq | 5.75E-09 | kg / kWh | 1.31E-04 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Methane, monochloro-, R-40 | air | high population density | ka | 13 | kg CO2-Eq | 9.92E-14 | kg / kWh | 1.29E-12 | Ecoinvent V2, electricity, low voltage, at grid, US |
| | CONT. | | 3 | | | | | | |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 6.38E-08 | kg / kWh | 8.30E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 5.96E-05 | kg / kWh | 5.96E-05 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | | 0.00E+00 | Ecoinvent V2, electricity, low voltage, at grid, US |
| - | | | | | | | | 9.30E-01 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eg | 8.28E-07 | ka / kWh | 1.56E-06 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Ammonia | air | | | 1.88 | kg SO2-Eq | 2.20E-06 | kg / kWh | 4.14E-06 | |
| | Cili | low population density | kg | | | | 9 | | Ecoinvent V2, electricity, low voltage, at grid, US |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.98E-05 | kg / kWh | 5.60E-05 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Ammonia | air | | | 1.88 | kg SO2-Eq | 4.85E-06 | kg / kWh | 9.12E-06 | See calculations above |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eg | 8.33E-07 | kg / kWh | 7.33E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Hydrogen chloride | air | low population density | ka | 0.88 | kg SO2-Eq | 1.48E-04 | ka / kWh | 1.30E-04 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Hydrogen chloride | oir. | unspecified | lig lig | 0.88 | kg SO2-Eq | 6.21E-07 | kg / kWh | 5.47E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| | all . | | kg | | | | | | |
| Hydrogen fluoride | air | high population density | кg | 1.6 | kg SO2-Eq | 4.04E-08 | kg / kWh | 6.47E-08 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 1.87E-05 | kg / kWh | 2.99E-05 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 1.35E-07 | kg / kWh | 2.16E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Hydrogen sulfide | air | high population density | ka | 1.88 | kg SO2-Eg | 5.79E-10 | kg / kWh | 1.09E-09 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Hydrogen sulfide | air | low population density | ka | 1.88 | kg SO2-Eg | 8.16E-08 | kg / kWh | 1.53E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| , , | air | | lig lig | 1.88 | | 7.08E-08 | kg / kWh | 1.33E-07 | |
| Hydrogen sulfide | | unspecified | kg | | kg SO2-Eq | | 3 ' | | Ecoinvent V2, electricity, low voltage, at grid, US |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 1.14E-04 | kg / kWh | 7.98E-05 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 1.06E-03 | kg / kWh | 7.42E-04 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eg | 4.16E-04 | kg/kWh | 2.91E-04 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Nitrogen oxides | air | | ka | 0.7 | kg SO2-Eq | 1.60E-03 | kg / kWh | 1.12E-03 | See calculations above |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eg | 2.47E-04 | kg / kWh | 2.47E-04 | Ecoinvent V2, electricity, low voltage, at grid, US |
| | Cili | | 9 | 1 | | 3.03E-03 | | 3.03E-03 | |
| Sulfur dioxide | air | low population density | kg | the state of the s | kg SO2-Eq | | kg / kWh | | Ecoinvent V2, electricity, low voltage, at grid, US |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 1.12E-03 | kg / kWh | 1.12E-03 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Sulfur dioxide | air | | kg | 1 | kg SO2-Eq | 2.43E-03 | kg / kWh | 2.43E-03 | See calculations above |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 2.91E-09 | kg / kWh | 5.47E-09 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Sulfuric acid | soil | agricultural | ka | 0.65 | kg SO2-Eq | 2.01E-15 | kg / kWh | 1.30E-15 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Phosphoric acid | air | high population density | ka | 0.98 | kg SO2-Eq | | | 0.00E+00 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Sulfuric acid | air | | kg L- | 0.65 | kg SO2-Eq | 1.41E-13 | kg / kWh | 9.18E-14 | |
| Sullulic acid | all | low population density | ку | 0.05 | kg 302-Eq | 1.41E-13 | Kg / KVVII | | Ecoinvent V2, electricity, low voltage, at grid, US |
| | | | | | | | | 3.72E-03 | - · · · · · · · · · · · · · · · · · · · |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 3.62E-08 | kg / kWh | 1.11E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 6.11E-10 | kg / kWh | 1.87E-09 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Phosphorus | air | low population density, long-term | ka | 3.06 | ka PO4-Ea | 8.96E-09 | ka / kWh | 2.74E-08 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Phosphorus | air | unspecified | ka | 3.06 | kg PO4-Eg | 7.09E-12 | kg / kWh | 2.17E-11 | Ecoinvent V2, electricity, low voltage, at grid, US |
| Phosphorus | soil | agricultural | ka | 3.06 | kg PO4-Eq | 1.50E-07 | kg / kWh | 4.60E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| | soil | | ny Io | 3.06 | kg PO4-Eq | | kg / kWh | 6.76E-08 | |
| Phosphorus | | industrial | kg | | | 2.21E-08 | | | Ecoinvent V2, electricity, low voltage, at grid, US |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.71E-04 | kg / kWh | 3.77E-06 | Ecoinvent V2, electricity, low voltage, at grid, US |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 3.29E-05 | kg / kWh | 7.23E-07 | Ecoinvent V2, electricity, low voltage, at grid, US |
| | water | river | kg | 0.022 | kg PO4-Eq | 1.75E-04 | kg / kWh | 3.84E-06 | Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand | water | | | 0.022 | ka PO4-Ea | 5.41E-05 | ka / kWh | 1.19E-06 | Ecoinvent V2, electricity, low voltage, at grid, US |
| | water | unspecified | kg | | | | | | |
| COD, Chemical Oxygen Demand | water | | kg ka | 1 | | 6.02F-08 | ka / kWh | 6.02F-08 | Econyent V2_electricity_low_voltage_at_grid_US |
| COD, Chemical Oxygen Demand Phosphate | water water | river | kg kg | 1 | kg PO4-Eq | 6.02E-08 | kg / kWh | 6.02E-08 | Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus | water water water | river river | kg kg kg | 1 3.06 | kg PO4-Eq kg PO4-Eq | 1.52E-08 | kg / kWh | 4.64E-08 | Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus | water water water water | river river unspecified | kg kg kg kg | 1 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | | | 4.64E-08 1.94E-10 | Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus | water water water | river river | kg kg kg kg | 1 3.06 | kg PO4-Eq kg PO4-Eq | 1.52E-08 | kg / kWh | 4.64E-08 1.94E-10 0.00E+00 | Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus | water water water water | river river unspecified | kg kg kg kg kg | 1 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.52E-08 | kg / kWh | 4.64E-08 1.94E-10 | Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid | water water water water air | river river unspecified high population density | g | 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.52E-08 6.33E-11 | kg / kWh kg / kWh | 4.64E-08 1.94E-10 0.00E+00 1.03E-05 | Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground | water water water water air resource | river river unspecified high population density in ground | kg | 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq | 1.52E-08 6.33E-11 3.82E-02 | kg / kWh kg / kWh | 4.64E-08 1.94E-10 0.00E+00 1.03E-05 3.78E-01 | Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground | water water water water air resource resource | river river unspecified high population density in ground in ground | kg kg | 1 3.06 3.06 0.97 9.9 19.1 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq | 1.52E-08 6.33E-11 3.82E-02 3.30E-01 | kg / kWh kg / kWh kg / kWh kg / kWh | 4.64E-08 1.94E-10 0.00E+00 1.03E-05 3.78E-01 6.31E+00 | Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | water water water water water air resource resource resource | river river river unspecified high population density in ground in ground in ground in ground | kg kg Nm3 | 1 3.06 3.06 0.97 9.9 19.1 39.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 1.52E-08 6.33E-11 3.82E-02 3.30E-01 2.17E-03 | kg / kWh kg / kWh kg / kWh kg / kWh Nm3 / kWh | 4.64E-08 1.94E-10 0.00E+00 1.03E-05 3.78E-01 6.31E+00 8.63E-02 | Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | water water water water water air resource resource resource resource | river river river unspecified high population density in ground in ground in ground in ground in ground | kg kg Nm3 Nm3 | 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 1.52E-08 6.33E-11 3.82E-02 3.30E-01 2.17E-03 6.11E-02 | kg / kWh kg / kWh kg / kWh kg / kWh Nm3 / kWh Nm3 / kWh | 4.64E-08 1.94E-10 0.00E+00 1.03E-05 3.78E-01 6.31E+00 8.63E-02 2.34E+00 | Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | water water water water water air resource resource resource | river river river unspecified high population density in ground in ground in ground in ground | kg kg Nm3 | 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.52E-08 6.33E-11 3.82E-02 3.30E-01 2.17E-03 | kg / kWh kg / kWh kg / kWh kg / kWh Nm3 / kWh | 4.64E-08 1.94E-10 0.00E+00 1.03E-05 3.78E-01 6.31E+00 8.63E-02 | Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | water water water water water air resource resource resource resource | river river river unspecified high population density in ground in ground in ground in ground in ground | kg kg Nm3 Nm3 | 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 1.52E-08 6.33E-11 3.82E-02 3.30E-01 2.17E-03 6.11E-02 | kg / kWh kg / kWh kg / kWh kg / kWh Nm3 / kWh Nm3 / kWh | 4.64E-08 1.94E-10 0.00E+00 1.03E-05 3.78E-01 6.31E+00 8.63E-02 2.34E+00 | Ecoinvent V2, electricity, low voltage, at grid, US |
| COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | water water water water water air resource resource resource resource resource | river river river unspecified high population density in ground in ground in ground in ground in ground in ground | kg kg Nm3 Nm3 kg | 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.52E-08 6.33E-11 3.82E-02 3.30E-01 2.17E-03 6.11E-02 1.51E-02 | kg / kWh kg / kWh kg / kWh kg / kWh Nm3 / kWh Nm3 / kWh kg / kWh | 4.64E-08 1.94E-10 0.00E+00 1.03E-05 3.78E-01 6.31E+00 8.63E-02 2.34E+00 6.90E-01 | Ecoinvent V2, electricity, low voltage, at grid, US |

R1, R4, R7, R10 Ecoinvent V2, tied housing system, cattle, operation, CH O&M for cattle LU= livestock unit The inventory takes into account the energy and auxiliary materials like water. back to top lubricating oil and cleaning agents for the use of the described module for one year. buildings Also included is the use of the infrastructure with the binding of a certain part of the appropriate infrastructure module. Not taken into account were the direct emission of the animal husbandry, fodder production and produced waste water. Carbon dioxide fossil ka CO2-Ea 1 19F+02 1 19F+02 Ecoinvent V2, tied housing system, cattle, operation, CH high population density Carbon dioxide, fossil low population density kg CO2-Eq 1.17E+02 kg/LU 1.17E+02 Ecoinvent V2, tied housing system, cattle, operation, CH \$ Carbon dioxide, fossil lower stratosphere + upper troposphere kg CO2-Eq 1.49E-05 1.82E+02 kg/LU kg/LU 1.49E-05 1.82E+02 Ecoinvent V2, tied housing system, cattle, operation, CH Ecoinvent V2, tied housing system, cattle, operation, CH Carbon dioxide, fossil unspecified high population density low population density 1.5714 1.5714 kg CO2-Eq kg CO2-Eq 7.55E-02 2.00E-01 kg/LU kg/LU 1.19E-01 3.14E-01 Ecoinvent V2, tied housing system, cattle, operation, CH Ecoinvent V2, tied housing system, cattle, operation, CH Carbon monoxide, fossil Carbon monoxide, fossil kg/LU kg/LU kg/LU Carbon monoxide, fossil lower stratosphere + upper troposphere 1.5714 1.5714 kg CO2-Eq 1.74E-08 2.74E-08 Ecoinvent V2, tied housing system, cattle, operation, CH Carbon monoxide, fossil unspecified 9.83E-01 1.54E+00 Ecoinvent V2, tied housing system, cattle, operation, CH Chloroform high population density 4.83E-07 1.45E-05 Ecoinvent V2, tied housing system, cattle, operation, CH kg CO2-Eq kg/LU kg/LU 4.13E-07 Ecoinvent V2, tied housing system, cattle, operation, CH Ecoinvent V2, tied housing system, cattle, operation, CH Chloroform low population density 1.38E-08 Chloroform kg CO2-Eq unspecified 298 298 298 298 kg CO2-Eq kg CO2-Eq kg/LU kg/LU Ecoinvent V2, tied housing system, cattle, operation, CH Ecoinvent V2, tied housing system, cattle, operation, CH Dinitrogen monoxide high population density 4.60E-03 1.37E+00 low population density 8.88E-01 Dinitrogen monoxide 2.98E-03 kg/LU kg/LU kg/LU kg CO2-Eq kg CO2-Eq Ecoinvent V2, tied housing system, cattle, operation, CH Ecoinvent V2, tied housing system, cattle, operation, CH Dinitrogen monoxide lower stratosphere + upper troposphere 1.41E-10 4.21E-08 9.14E-03 2.72E+00 Dinitrogen monoxide unspecified Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 1430 1430 kg CO2-Eq 9.40E-09 5.65E-07 high population density 1.34E-05 Ecoinvent V2, tied housing system, cattle, operation, CH low population density kg/LU kg/LU kg/LU kg/LU 8.07E-04 Ecoinvent V2, tied housing system, cattle, operation, CH unspecified 1430 6130 kg CO2-Eq 4.52E-05 1.11E-09 6.46E-02 6.81E-06 Ecoinvent V2, tied housing system, cattle, operation, CH high population density Ecoinvent V2, tied housing system, cattle, operation, CH Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 unspecified 6130 kg CO2-Eq 0.00E+00 Ecoinvent V2, tied housing system, cattle, operation, CH 3.12E-07 kg/LU kg/LU kg CO2-Eq Ethane, 1,1-difluoro-, HFC-152a high population density 124 124 3.87E-05 Ecoinvent V2, tied housing system, cattle, operation, CH Ethane, 1,1-difluoro-, HFC-152a low population density kg CO2-Eq 0.00E+00 Ecoinvent V2, tied housing system, cattle, operation, CH Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 kg CO2-Eq kg CO2-Eq 1.12E-05 kg/LU kg/LU low population density 10000 1.12E-01 Ecoinvent V2, tied housing system, cattle, operation, CH Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 609 0.00E+00 Ecoinvent V2, tied housing system, cattle, operation, CH unspecified kg CO2-Eq Ecoinvent V2, tied housing system, cattle, operation, CH Ecoinvent V2, tied housing system, cattle, operation, CH Ethane, hexafluoro-, HFC-116 high population density 12200 8.42E-08 kg/LU 1.03E-03 Ethane, hexafluoro-, HFC-116 unspecified 12200 1.38E-05 1.68E-01

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| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 9.92E-04 | kg/LU | 2.48E-02 | Ecoinvent V2, tied housing system, cattle, operation, CH |
|---|-------------|--|-------|--------|-----------|----------|-----------|----------|---|
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.13E-02 | kg/LU | 2.83E-01 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 2.68E-03 | kg/LU | 6.69E-02 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 3.31E-14 | kg/LU | 1.66E-13 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 1.40E-06 | kg/LU | 2.65E-03 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 2.39E-12 | kg/LU | 1.70E-08 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.24E-06 | kg/LU | 8.87E-03 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 7.53E-07 | kg/LU | 1.36E-03 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 6.36E-06 | kg/LU | 1.15E-02 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | | | 14400 | kg CO2-Eq | 0.50E-00 | kg/LU | 0.00E+00 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| | | unspecified | kg | | | 0.405.00 | | | |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 8.16E-08 | kg/LU | 7.10E-07 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 4.07E-08 | kg/LU | 3.54E-07 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 9.48E-09 | kg/LU | 1.03E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 3.99E-09 | kg/LU | 4.35E-05 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 2.20E-14 | kg/LU | 2.40E-10 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 2.67E-11 | kg/LU | 5.61E-09 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 1.19E-01 | kg/LU | 2.96E+00 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 6.40E-01 | kg/LU | 1.60E+01 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 2.36E-10 | kg/LU | 5.89E-09 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 6.01E-03 | kg/LU | 1.50E-01 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, tetrachloro-, R-10 | air | | | 1400 | kg CO2-Eq | 1.26E-06 | kg/LU | 1.77E-03 | |
| | | high population density | kg | | | | | | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 9.85E-12 | kg/LU | 1.38E-08 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.61E-08 | kg/LU | 1.19E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 1.24E-04 | kg/LU | 9.18E-01 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 4.34E-11 | kg/LU | 2.06E-07 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 8.51E-09 | kg/LU | 1.26E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/LU | 0.00E+00 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.62E-07 | kg/LU | 3.69E-03 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 5.11E-05 | kg/LU | 1.17E+00 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 1.68E-08 | kg/LU | 2.18E-07 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| | air | | | | | | | | |
| Methane, monochloro-, R-40 | | low population density | kg | 13 | kg CO2-Eq | 7.44E-08 | kg/LU | 9.67E-07 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.18E-02 | kg/LU | 1.18E-02 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/LU | 0.00E+00 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| | | | | | | | | 4.47E+02 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 7.84E-03 | kg/LU | 1.47E-02 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 1.75E-03 | kg/LU | 3.29E-03 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 4.56E-02 | kg/LU | 8.57E-02 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 3.54E-03 | kg/LU | 3.11E-03 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 6.29E-03 | kg/LU | 5.53E-03 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Hydrogen chloride | air | unspecified | ka | 0.88 | kg SO2-Eg | 1.74E-02 | kg/LU | 1.53E-02 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.40E-04 | kg/LU | 2.25E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Hydrogen fluoride | oir | low population density | ka | 1.6 | kg SO2-Eq | 1.74E-03 | kg/LU | 2.78E-03 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| | ciii | | 3 | 1.6 | | 1.71E-03 | kg/LU | 2.73E-03 | |
| Hydrogen fluoride | all -:- | unspecified | kg | | kg SO2-Eq | | | | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 4.21E-05 | kg/LU | 7.92E-05 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Hydrogen sulfide | aır | low population density | kg | 1.88 | kg SO2-Eq | 1.10E-03 | kg/LU | 2.06E-03 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.68E-04 | kg/LU | 5.04E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 1.70E-01 | kg/LU | 1.19E-01 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 2.38E-01 | kg/LU | 1.66E-01 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 6.11E-01 | kg/LU | 4.28E-01 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eq | 1.69E-01 | kg/LU | 1.69E-01 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 5.68E-01 | kg/LU | 5.68E-01 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Sulfur dioxide | air | unspecified | kg | i | kg SO2-Eq | 1.03E-01 | kg/LU | 1.03E-01 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| | | taran da antara da a | ka | 1.88 | | | | 5.05E-05 | |
| Hydrogen sulfide | water | river | kg | | kg SO2-Eq | 2.69E-05 | kg/LU | | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 3.03E-11 | kg/LU | 1.97E-11 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | 0.445.40 | kg/LU | 0.00E+00 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 3.11E-10 | kg/LU | 2.02E-10 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| | | | | | | | | 1.69E+00 | |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 4.30E-05 | kg/LU | 1.31E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 2.09E-06 | kg/LU | 6.40E-06 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 1.83E-05 | kg/LU | 5.60E-05 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Phosphorus | air | unspecified | ka | 3.06 | kg PO4-Eg | 3.92E-08 | kg/LU | 1.20E-07 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Phosphorus | soil | agricultural | ka | 3.06 | kg PO4-Eq | 1.18E-04 | kg/LU | 3.60E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Phosphorus | soil | industrial | ka | 3.06 | kg PO4-Eq | 3.82E-05 | kg/LU | 1.17E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| BOD5, Biological Oxygen Demand | water | river | ka ka | 0.022 | kg PO4-Eq | 2.54E-01 | kg/LU | 5.59E-03 | |
| | | | ky | 0.022 | | | | 1.03E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH Ecoinvent V2, tied housing system, cattle, operation, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | | kg PO4-Eq | 4.69E-03 | kg/LU | | |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 2.83E-01 | kg/LU | 6.22E-03 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 5.19E-03 | kg/LU | 1.14E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.60E-04 | kg/LU | 1.60E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 2.92E-04 | kg/LU | 8.94E-04 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 1.62E-05 | kg/LU | 4.96E-05 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/LU | 0.00E+00 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| | | | | | - | | | 1.38E-02 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 5.12E+01 | kg/LU | 5.07E+02 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 6.82E+01 | kg/LU | 1.30E+03 | Ecoinvert V2, tied housing system, cattle, operation, CH |
| | resource | in ground | Nm3 | 39.8 | MJ-Eq | 7.11E-01 | Nm3/LU | 2.83E+01 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| | | | Nm3 | 38.293 | MJ-Eq | 3.29E+01 | Nm3/LU | 1.26E+03 | Econivent V2, tied housing system, cattle, operation, CH Econivent V2, tied housing system, cattle, operation, CH |
| Gas, mine, off-gas, process, coal mining | recource | | | | | J.ZJETUI | INITIO/LU | 1.ZULTU3 | |
| Gas, natural, in ground | resource | in ground | | | | | | | |
| Gas, natural, in ground Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 3.53E+01 | kg/LU | 1.62E+03 | Ecoinvent V2, tied housing system, cattle, operation, CH |
| Gas, natural, in ground | | | | | | | | | |

| | damaged/worn | | | | | | | | |
|-----------------------------------|----------------------|--|----|--------|-----------|----------|-------|----------|--|
| | components | | | | | | | | |
| | Remove damaged steel | includes energy for dismantling | | | | | | | proxy of Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| ck to top rbon dioxide, fossil | air | high population density | ka | 1 | kg CO2-Eq | 5.36E-03 | kg/kg | 5.36E-03 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| arbon dioxide, fossil | air | low population density | ka | 1 | kg CO2-Eq | 3.73E-03 | kg/kg | 3.73E-03 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| bon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 3.39E-10 | kg/kg | 3.39E-10 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| rbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 4.67E-02 | kg/kg | 4.67E-02 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| bon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 1.11E-06 | kg/kg | 1.75E-06 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| rbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 6.79E-06 | kg/kg | 1.07E-05 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| arbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 3.98E-13 | kg/kg | 6.25E-13 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |

| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.89E-04 | kg/kg | 2.97E-04 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
|---|---|--|--|---|--|---|---|--|--|
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 8.31E-13 | kg/kg | 2.49E-11 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 2.46E-14 | kg/kg | 7.39E-13 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Chloroform | air | | kg | 30 | kg CO2-Eq | 6.79E-21 | kg/kg | 2.04E-19 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| | | unspecified | | | | | | | |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 5.94E-08 | kg/kg | 1.77E-05 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 7.49E-08 | kg/kg | 2.23E-05 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 3.22E-15 | kg/kg | 9.61E-13 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 1.78E-06 | kg/kg | 5.31E-04 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 3.85E-14 | kg/kg | 5.50E-11 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 1.26E-12 | kg/kg | 1.80E-09 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| | | | | 1430 | | | | | |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | | kg CO2-Eq | 2.28E-10 | kg/kg | 3.27E-07 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 1.34E-14 | kg/kg | 8.18E-11 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 1.63E-12 | kg/kg | 2.02E-10 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 2.18E-11 | kg/kg | 2.18E-07 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Ethane, 2-chloro-1,1,2-tetrafluoro-, HCFC-124 | air | | kg | 609 | kg CO2-Eq | 2.10L-11 | | 0.00E+00 | |
| | | unspecified | • | | | 0.005.40 | kg/kg | | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 9.60E-13 | kg/kg | 1.17E-08 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 2.30E-11 | kg/kg | 2.81E-07 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 6.21E-10 | kg/kg | 1.55E-08 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 3.31E-08 | kg/kg | 8.27E-07 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 2.45E-08 | kg/kg | 6.12E-07 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| | | | | | | | | | |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 1.84E-20 | kg/kg | 9.20E-20 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 3.08E-11 | kg/kg | 5.82E-08 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 6.67E-18 | kg/kg | 4.76E-14 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eg | 5.77E-10 | kg/kg | 4.12E-06 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 9.88E-13 | kg/kg | 1.79E-09 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| | | | | | | | | | |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.16E-10 | kg/kg | 2.09E-07 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 5.70E-14 | kg/kg | 4.96E-13 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 7.29E-14 | kg/kg | 6.35E-13 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 5.61E-14 | kg/kg | 6.12E-10 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | 9 | | 10900 | | 1.49E-13 | | 1.62E-09 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| | | low population density | kg | | kg CO2-Eq | | kg/kg | | |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 1.22E-20 | kg/kg | 1.33E-16 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 1.10E-16 | kg/kg | 2.30E-14 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 1.12E-06 | kg/kg | 2.80E-05 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 3.32E-05 | kg/kg | 8.31E-04 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| | | | | | | | | | |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 5.37E-15 | kg/kg | 1.34E-13 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 2.37E-06 | kg/kg | 5.92E-05 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 1.07E-11 | kg/kg | 1.50E-08 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 5.47E-18 | kg/kg | 7.66E-15 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 8.36E-14 | kg/kg | 6.18E-10 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 2.07E-10 | kg/kg | 1.53E-06 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| | | | | | | | | | |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.78E-16 | kg/kg | 8.44E-13 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 3.48E-14 | kg/kg | 5.16E-10 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eg | 1.21E-13 | kg/kg | 2.77E-09 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Sulfur hexafluoride | air | unspecified | | | | | | | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| | | | | 22800 | ka CO2-Ea | 2 77F-10 | ka/ka | | |
| | | | kg | 22800 | kg CO2-Eq | 2.77E-10 | kg/kg | 6.32E-06 | |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 1.50E-15 | kg/kg | 1.94E-14 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 | | | • | | kg CO2-Eq kg CO2-Eq | 1.50E-15 1.33E-13 | kg/kg kg/kg | 1.94E-14 1.73E-12 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 1.50E-15 | kg/kg | 1.94E-14 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air | high population density low population density low population density | kg kg | 13 | kg CO2-Eq kg CO2-Eq kg CO2-Eq | 1.50E-15 1.33E-13 | kg/kg kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 | air air | high population density low population density | kg kg | 13 13 1 | kg CO2-Eq kg CO2-Eq | 1.50E-15 1.33E-13 | kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride | air air air air | high population density low population density low population density high population density | kg kg kg kg | 13 13 1 1 17200 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 1.50E-15 1.33E-13 3.03E-07 | kg/kg kg/kg kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia | air air | high population density low population density low population density high population density high population density | kg kg | 13 13 1 17200 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq | 1.50E-15 1.33E-13 3.03E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia | air air air air | high population density low population density low population density high population density high population density low population density | kg kg kg kg | 13 13 1 17200 1.88 1.88 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2-Eq | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia Ammonia | air air air air | high population density low population density low population density high population density high population density | kg kg kg kg | 13 13 1 17200 1.88 1.88 1.88 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 4.15E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 7.81E-07 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia | air air air air | high population density low population density low population density high population density high population density low population density | kg kg kg kg | 13 13 1 17200 1.88 1.88 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2-Eq | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia Hydrogen chloride | air air air air | high population density low population density low population density high population density high population density low population density unspecified high population density | kg kg kg kg kg kg | 13 13 1 17200 1.88 1.88 1.88 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 4.15E-07 5.38E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 7.81E-07 4.73E-08 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2 disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride | air air air air | high population density low population density low population density high population density high population density low population density unspecified high population density low population density | kg kg kg kg kg | 13 13 1 1 17200 1.88 1.88 1.88 0.88 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 4.15E-07 5.38E-08 1.33E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 7.81E-07 4.73E-08 1.17E-07 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen chloride | air air air air | high population density low population density low population density high population density high population density low population density unspecified high population density unspecified high population density low population density unspecified | kg kg kg kg kg kg kg | 13 13 1 17200 1.88 1.88 1.88 0.88 0.88 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 4.15E-07 5.38E-08 1.33E-07 5.31E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 7.81E-07 4.73E-08 1.17E-07 4.67E-08 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride | air air air air | high population density low population density low population density high population density high population density low population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density | kg kg kg kg kg kg | 13 1 1 17200 1.88 1.88 1.88 0.88 0.88 0.88 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 4.15E-07 5.38E-08 1.33E-07 5.31E-08 3.72E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1,94E-14 1,73E-12 3,03E-07 0,00E+00 5,76E-02 3,44E-08 1,26E-07 7,81E-07 4,73E-08 1,17E-07 4,67E-08 5,95E-09 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride | air air air air | high population density low population density low population density high population density high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density | kg kg kg kg kg kg kg | 13 1 1 17200 1.88 1.88 1.88 0.88 0.88 0.88 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 4.15E-07 5.38E-08 1.33E-07 5.31E-08 3.72E-09 2.79E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 7.81E-07 4.73E-08 1.17E-07 4.67E-08 5.95E-09 4.46E-08 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride | air air air air | high population density low population density low population density high population density high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified | kg kg kg kg kg kg kg | 13 13 1 17200 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 4.15E-07 5.38E-08 1.33E-07 5.31E-08 3.72E-09 2.79E-08 8.17E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 7.81E-07 4.73E-08 1.17E-07 4.67E-08 5.95E-09 4.46E-08 1.31E-08 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
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| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia Ahmmonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur | air | high population density low population density high population density high population density low population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density | \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ | 13 13 13 11 17200 1.88 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.0 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2 | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 4.15E-07 5.38E-08 1.33E-07 5.31E-08 3.72E-09 2.79E-08 8.17E-09 3.23E-12 2.52E-08 7.00E-09 5.55E-06 2.14E-05 6.49E-04 1.68E-05 5.21E-05 1.58E-05 7.23E-10 3.65E-16 1.61E-15 3.63E-10 3.17E-11 4.18E-11 7.74E-14 6.19E-10 2.49E-08 1.96E-04 1.35E-07 1.97E-04 1.36E-07 1.46E-08 3.20E-09 2.21E-11 | kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 7.81E-07 4.67E-08 5.95E-09 4.46E-08 1.31E-08 6.06E-12 4.74E-08 1.32E-08 3.88E-06 1.50E-05 4.54E-04 1.68E-05 5.21E-05 1.36E-09 2.37E-16 0.00E+00 1.05E-15 5.59E-04 1.11E-09 9.71E-11 1.28E-10 2.37E-13 1.89E-09 9.71E-11 1.28E-10 2.37E-13 1.89E-09 9.763E-08 4.30E-06 2.97E-09 4.33E-06 2.97E-09 1.46E-08 9.80E-09 6.75E-11 0.00E+00 8.74E-06 7.41E-06 7.41E-03 1.99E-02 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, buildi |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | high population density low population density high population density high population density low population density | \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ | 13 13 13 11 17200 1.88 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.0 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2 | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 4.15E-07 5.31E-08 1.33E-07 5.31E-08 3.72E-09 2.79E-08 8.17E-09 3.23E-12 2.52E-08 7.00E-09 5.55E-06 2.14E-05 5.21E-05 7.23E-10 3.65E-16 1.61E-15 3.63E-10 3.17E-11 4.18E-11 7.74E-14 6.19E-10 2.49E-08 1.96E-04 1.36E-07 1.46E-08 3.20E-09 2.21E-11 | kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 7.81E-07 4.73E-08 1.17E-07 4.67E-08 5.95E-09 4.46E-08 1.31E-08 6.06E-12 4.74E-08 1.32E-08 3.88E-06 1.50E-05 4.54E-04 1.68E-05 5.21E-05 1.56E-05 1.56E-05 1.56E-05 1.56E-05 1.56E-05 1.56E-05 1.36E-09 2.37E-16 0.00E+00 1.05E-15 5.59E-04 1.11E-09 9.71E-11 1.28E-10 2.37E-13 1.89E-09 9.765E-09 1.46E-08 9.80E-09 6.75E-11 0.00E+00 8.74E-06 7.41E-03 1.99E-02 4.03E-04 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, buildi |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia Ahmmonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | high population density low population density high population density high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density | kg kg kg kg kg kg kg kg kg kg kg kg kg k | 13 13 13 13 11 17200 1.88 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.6 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.0 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2 | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 4.15E-07 5.38E-08 1.33E-07 5.31E-08 8.17E-09 2.79E-08 8.17E-09 3.23E-12 2.52E-08 7.00E-09 5.55E-06 2.14E-05 6.49E-04 1.68E-05 1.58E-05 7.23E-10 3.65E-16 1.61E-15 3.63E-10 3.17E-11 4.18E-11 7.74E-14 6.19E-10 2.49E-08 1.96E-04 1.36E-07 1.46E-08 3.20E-09 2.21E-11 7.49E-04 1.04E-03 1.01E-05 1.27E-04 | kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 7.81E-07 4.73E-08 1.17E-07 4.67E-08 5.99E-09 4.46E-08 1.31E-08 6.06E-12 4.74E-08 1.32E-08 3.88E-06 1.50E-05 4.54E-04 1.68E-05 5.21E-05 1.56E-05 1.56E-05 1.56E-05 1.56E-05 1.36E-09 2.37E-16 0.00E+00 1.05E-15 5.59E-04 1.11E-09 9.71E-11 1.28E-10 2.37E-13 1.89E-09 7.63E-08 4.30E-06 2.97E-09 4.33E-06 2.97E-09 4.33E-06 2.98E-09 1.46E-08 9.80E-09 6.75E-11 0.00E+00 8.74E-06 7.74TE-03 1.99E-02 4.03E-04 4.88E-02 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, buildi |
| Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation Nitrogen fluoride Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | high population density low population density high population density high population density low population density | \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ | 13 13 13 11 17200 1.88 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.0 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg SO2-Eq kg SO2 | 1.50E-15 1.33E-13 3.03E-07 1.83E-08 6.69E-08 4.15E-07 5.31E-08 1.33E-07 5.31E-08 3.72E-09 2.79E-08 8.17E-09 3.23E-12 2.52E-08 7.00E-09 5.55E-06 2.14E-05 5.21E-05 7.23E-10 3.65E-16 1.61E-15 3.63E-10 3.17E-11 4.18E-11 7.74E-14 6.19E-10 2.49E-08 1.96E-04 1.36E-07 1.46E-08 3.20E-09 2.21E-11 | kg/kg | 1.94E-14 1.73E-12 3.03E-07 0.00E+00 5.76E-02 3.44E-08 1.26E-07 7.81E-07 4.73E-08 1.17E-07 4.67E-08 5.95E-09 4.46E-08 1.31E-08 6.06E-12 4.74E-08 1.32E-08 3.88E-06 1.50E-05 4.54E-04 1.68E-05 5.21E-05 1.56E-05 1.56E-05 1.56E-05 1.56E-05 1.56E-05 1.56E-05 1.36E-09 2.37E-16 0.00E+00 1.05E-15 5.59E-04 1.11E-09 9.71E-11 1.28E-10 2.37E-13 1.89E-09 9.765E-09 1.46E-08 9.80E-09 6.75E-11 0.00E+00 8.74E-06 7.41E-03 1.99E-02 4.03E-04 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH Ecoinvent V2, disposal, buildi |

| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 1.12E-08 | kg/kg | 1.11E-07 8.45E-01 | Ecoinvent V2, disposal, building, reinforcement steel, to recycling, CH |
|---|----------------|--|----------|------------------|------------------------|----------------------|----------------|----------------------|--|
| | Remove damaged | Includes transport to dismantling facilities, final disposal of waste material | | | | | | | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| back to top | wood | | | | | | | | |
| Carbon dioxide, fossil | air air | high population density low population density | kg kg | 1 | kg CO2-Eq kg CO2-Eq | 5.62E-03 1.42E-03 | kg/kg kg/kg | 5.62E-03 1.42E-03 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 7.57E-10 | kg/kg | 7.57E-10 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 4.57E-03 | kg/kg | 4.57E-03 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Carbon monoxide, fossil Carbon monoxide, fossil | air air | high population density low population density | kg kg | 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq | 1.53E-06 2.19E-06 | kg/kg kg/kg | 2.41E-06 3.44E-06 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 8.89E-13 | kg/kg | 1.40E-12 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Carbon monoxide, fossil Chloroform | air air | unspecified high population density | kg kg | 1.5714 30 | kg CO2-Eq kg CO2-Eq | 3.10E-05 1.69E-12 | kg/kg kg/kg | 4.87E-05 5.07E-11 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 2.13E-14 | kg/kg | 6.39E-13 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Chloroform Dinitrogen monoxide | air air | unspecified high population density | kg kg | 30 298 | kg CO2-Eq kg CO2-Eq | 1.32E-20 4.22E-06 | kg/kg kg/kg | 3.97E-19 1.26E-03 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 2.11E-08 | kg/kg | 6.30E-06 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Dinitrogen monoxide Dinitrogen monoxide | air air | lower stratosphere + upper troposphere unspecified | kg ka | 298 298 | kg CO2-Eq kg CO2-Eq | 7.21E-15 5.01E-08 | kg/kg kg/kg | 2.15E-12 1.49E-05 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 1.54E-13 | kg/kg | 2.20E-10 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air air | low population density unspecified | kg kg | 1430 1430 | kg CO2-Eq kg CO2-Eq | 9.57E-13 6.10E-09 | kg/kg kg/kg | 1.37E-09 8.72E-06 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 6.50E-14 | kg/kg | 3.98E-10 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a | air air | unspecified high population density | kg ka | 6130 124 | kg CO2-Eq kg CO2-Eq | 1.02E-12 | kg/kg kg/kg | 0.00E+00 1.26E-10 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air air | low population density unspecified | kg ka | 10000 609 | kg CO2-Eq kg CO2-Eq | 1.73E-11 | kg/kg kg/kg | 1.73E-07 0.00E+00 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 4.50E-12 | kg/kg | 5.49E-08 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Ethane, hexafluoro-, HFC-116 Methane, biogenic | air air | unspecified high population density | kg kg | 12200 25 | kg CO2-Eq kg CO2-Eq | 6.95E-11 6.38E-06 | kg/kg kg/kg | 8.48E-07 1.60E-04 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 2.29E-08 | kg/kg | 5.73E-07 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, biogenic Methane, bromo-, Halon 1001 | air air | unspecified unspecified | kg kg | 25 5 | kg CO2-Eq kg CO2-Eq | 1.43E-08 3.59E-20 | kg/kg kg/kg | 3.58E-07 1.79E-19 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 1.14E-10 | kg/kg | 2.15E-07 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 | air air | high population density low population density | kg kg | 7140 7140 | kg CO2-Eq kg CO2-Eq | 9.64E-17 6.70E-11 | kg/kg kg/kg | 6.88E-13 4.78E-07 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 2.46E-12 | kg/kg | 4.46E-09 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, chlorodifluoro-, HCFC-22 Methane, chlorotrifluoro-, CFC-13 | air air | low population density unspecified | kg ka | 1810 14400 | kg CO2-Eq kg CO2-Eq | 3.98E-10 | kg/kg kg/kg | 7.20E-07 0.00E+00 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 7.39E-14 | kg/kg | 6.43E-13 | Ecoinvent V2, disposal, building, waste wood, unreated, to final disposal, CH |
| Methane, dichloro-, HCC-30 Methane, dichlorodifluoro-, CFC-12 | air air | low population density high population density | kg kg | 8.7 10900 | kg CO2-Eq kg CO2-Eq | 6.31E-14 4.19E-13 | kg/kg kg/kg | 5.49E-13 4.57E-09 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 3.89E-13 | kg/kg | 4.24E-09 | Econivent V2, disposal, building, waste wood, unreated, to final disposal, CH |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorofluoro-, HCFC-21 | air air | unspecified high population density | kg kg | 10900 210 | kg CO2-Eq kg CO2-Eq | 2.39E-20 4.38E-16 | kg/kg kg/kg | 2.60E-16 9.20E-14 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 5.04E-07 | kg/kg | 1.26E-05 | Econivent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, fossil Methane, fossil | air air | low population density | kg ka | 25 25 | kg CO2-Eq kg CO2-Eq | 2.26E-05 1.20E-14 | kg/kg kg/kg | 5.64E-04 3.00E-13 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, fossil | air | lower stratosphere + upper troposphere unspecified | kg kg | 25 25 | kg CO2-Eq kg CO2-Eq | 6.26E-08 | kg/kg kg/kg | 1.56E-06 | Econivent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 1400 | kg CO2-Eq | 2.15E-11 | kg/kg | 3.00E-08 1.49E-14 | Eccinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, tetrachloro-, R-10 Methane, tetrafluoro-, R-14 | air air | unspecified high population density | kg kg | 7390 | kg CO2-Eq kg CO2-Eq | 1.07E-17 5.23E-14 | kg/kg kg/kg | 3.87E-10 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 4750 | kg CO2-Eq | 6.26E-10 | kg/kg | 4.62E-06 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, trichlorofluoro-, CFC-11 Methane, trifluoro-, HFC-23 | air air | high population density high population density | kg kg | 14800 | kg CO2-Eq kg CO2-Eq | 7.11E-16 1.39E-13 | kg/kg kg/kg | 3.38E-12 2.06E-09 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Sulfur hexafluoride Sulfur hexafluoride | air air | high population density | kg kg | 22800 22800 | kg CO2-Eq | 1.40E-13 | kg/kg | 0.00E+00 3.20E-09 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Sulfur hexafluoride Sulfur hexafluoride | air | low population density unspecified | kg kg | 22800 | kg CO2-Eq kg CO2-Eq | 1.67E-10 | kg/kg kg/kg | 3.81E-06 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 13 | kg CO2-Eq | 2.35E-15 | kg/kg | 3.06E-14 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air | low population density low population density | kg kg | 1 | kg CO2-Eq kg CO2-Eq | 1.15E-13 1.22E-07 | kg/kg kg/kg | 1.50E-12 1.22E-07 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 1.37E-02 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 8.56E-06 | kg/kg | 1.61E-05 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Ammonia Ammonia | air air | low population density unspecified | kg kg | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 1.66E-08 1.71E-07 | kg/kg kg/kg | 3.13E-08 3.21E-07 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 4.43E-08 | kg/kg | 3.90E-08 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Hydrogen chloride Hydrogen chloride | air air | low population density unspecified | kg kg | 0.88 0.88 | kg SO2-Eq kg SO2-Eq | 7.05E-08 5.98E-08 | kg/kg kg/kg | 6.20E-08 5.26E-08 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.32E-08 | kg/kg | 2.12E-08 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Hydrogen fluoride Hydrogen fluoride | air air | low population density unspecified | kg kg | 1.6 1.6 | kg SO2-Eq kg SO2-Eq | 1.54E-08 1.01E-08 | kg/kg kg/kg | 2.47E-08 1.62E-08 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 1.32E-10 | kg/kg | 2.48E-10 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Hydrogen sulfide Hydrogen sulfide | air air | low population density unspecified | kg kg | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 6.78E-08 7.72E-09 | kg/kg kg/kg | 1.27E-07 1.45E-08 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 3.53E-04 | kg/kg | 2.47E-04 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Nitrogen oxides Nitrogen oxides | air air | low population density unspecified | kg kg | 0.7 0.7 | kg SO2-Eq kg SO2-Eq | 4.88E-06 2.84E-05 | kg/kg kg/kg | 3.42E-06 1.99E-05 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 3.80E-06 | kg/kg | 3.80E-06 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Sulfur dioxide Sulfur dioxide | air air | low population density unspecified | kg kg | 1 | kg SO2-Eq kg SO2-Eq | 8.39E-06 1.87E-06 | kg/kg kg/kg | 8.39E-06 1.87E-06 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 8.07E-10 | kg/kg | 1.52E-09 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Sulfuric acid Phosphoric acid | soil air | agricultural high population density | kg kg | 0.65 0.98 | kg SO2-Eq kg SO2-Eq | 1.78E-15 | kg/kg kg/kg | 1.15E-15 0.00E+00 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 1.01E-15 | kg/kg | 6.57E-16 | Econivent V2, disposal, building, waste wood, untreated, to final disposal, CH Econivent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 1.09E-07 | kg/kg | 3.02E-04 3.34E-07 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 3.47E-11 | kg/kg | 1.06E-10 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Phosphorus Phosphorus | air air | low population density, long-term unspecified | kg kg | 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 3.15E-11 1.89E-13 | kg/kg kg/kg | 9.62E-11 5.77E-13 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 3.70E-10 | kg/kg | 1.13E-09 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Phosphorus BOD5, Biological Oxygen Demand | soil water | industrial river | kg ka | 3.06 0.022 | kg PO4-Eq kg PO4-Eq | 2.06E-09 2.50E-05 | kg/kg kg/kg | 6.31E-09 5.50E-07 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| onygon bomana | | | 9 | 0.022 | | 2.002 00 | 9,9 | 2.50E 01 | |

| BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | water water water water | unspecified river unspecified river | kg kg kg ka | 0.022 0.022 0.022 1 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.48E-07 3.71E-05 1.48E-07 2.82E-08 | kg/kg kg/kg kg/kg kg/kg | 3.26E-09 8.17E-07 3.27E-09 2.82E-08 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
|---|--|--|------------------------------|--|--|--|--|--|---|
| Phosphorus Phosphorus Phosphoric acid | water water air | river unspecified high population density | kg kg kg | 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.45E-09 9.87E-12 | kg/kg kg/kg kg/kg | 4.44E-09 3.02E-11 0.00E+00 1.75E-06 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground | resource resource resource resource resource resource | in ground in ground in ground in ground in ground biotic | kg kg Nm3 Nm3 kg | 9.9 19.1 39.8 38.293 45.8 9.9 | MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 4.22E-04 1.04E-03 1.07E-05 2.32E-03 1.51E-03 5.35E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 4.18E-03 1.98E-02 4.24E-04 8.89E-02 6.91E-02 5.30E-07 | Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH Ecoinvent V2, disposal, building, waste wood, untreated, to final disposal, CH |
| | Remove concrete Ene | ergy for dismantling, particulate matter emissions from dismantling and handling | · | | · | | ų v | 1.82E-01 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| back to top Carbon dioxide, fossil Carbon dioxide, fossil | air air | high population density low population density | kg kg | 1 1 | kg CO2-Eq kg CO2-Eq | 3.74E-04 2.61E-04 | kg/kg kg/kg | 3.74E-04 2.61E-04 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide, fossil | air air air air | lower stratosphere + upper troposphere unspecified high population density low population density | kg kg kg | 1 1 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 2.36E-11 3.26E-03 7.76E-08 4.74E-07 | kg/kg kg/kg kg/kg kg/kg | 2.36E-11 3.26E-03 1.22E-07 7.45E-07 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Carbon monoxide, fossil Carbon monoxide, fossil Chloroform | air air air | lower stratosphere + upper troposphere unspecified high population density | kg kg kg kg | 1.5714 1.5714 1.5714 30 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 2.78E-14 1.32E-05 5.80E-14 | kg/kg kg/kg kg/kg kg/kg | 4.36E-14 2.08E-05 1.74E-12 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Chloroform Chloroform Dinitrogen monoxide | air air air | low population density unspecified high population density | kg kg kg | 30 30 298 | kg CO2-Eq kg CO2-Eq kg CO2-Eq | 1.72E-15 4.74E-22 4.15E-09 | kg/kg kg/kg kg/kg | 5.16E-14 1.42E-20 1.24E-06 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air air air air | low population density lower stratosphere + upper troposphere unspecified high population density | kg kg kg kg | 298 298 298 1430 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 5.23E-09 2.25E-16 1.24E-07 2.69E-15 | kg/kg kg/kg kg/kg kg/kg | 1.56E-06 6.71E-14 3.71E-05 3.84E-12 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air air air | low population density unspecified high population density | kg kg kg | 1430 1430 6130 | kg CO2-Eq kg CO2-Eq kg CO2-Eq | 8.78E-14 1.59E-11 9.32E-16 | kg/kg kg/kg kg/kg kg/kg | 1.26E-10 2.28E-08 5.71E-12 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air air air air | unspecified high population density low population density low population density | kg kg kg kg | 6130 124 124 10000 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 1.14E-13 1.52E-12 | kg/kg kg/kg kg/kg | 0.00E+00 1.41E-11 0.00E+00 1.52E-08 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Ethane, -1,2-duclinor-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 | air air air | unspecified high population density unspecified | kg kg kg | 609 12200 12200 | kg CO2-Eq kg CO2-Eq kg CO2-Eq | 6.70E-14 1.61E-12 | kg/kg kg/kg kg/kg kg/kg | 0.00E+00 8.18E-10 1.96E-08 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromo-, Halon 1001 | air air air air | high population density low population density unspecified unspecified | kg kg kg kg | 25 25 25 5 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 4.33E-11 2.31E-09 1.71E-09 1.29E-21 | kg/kg kg/kg kg/kg kg/kg | 1.08E-09 5.77E-08 4.27E-08 6.43E-21 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Methane, bromochlorodifluoro-, Halon 1211 Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 | air air air | low population density high population density low population density | kg kg kg | 1890 7140 7140 | kg CO2-Eq kg CO2-Eq kg CO2-Eq | 2.15E-12 4.66E-19 4.03E-11 | kg/kg kg/kg kg/kg | 4.06E-09 3.33E-15 2.88E-07 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 Methane, chlorotrifluoro-, CFC-13 Methane, dichloro-, HCC-30 | air air air air | high population density low population density unspecified high population density | kg kg kg kg | 1810 1810 14400 8.7 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 6.89E-14 8.07E-12 3.98E-15 | kg/kg kg/kg kg/kg kg/kg | 1.25E-10 1.46E-08 0.00E+00 3.46E-14 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Methane, dichloro-, HCC-30 Methane, dichlorodifluoro-, CFC-12 Methane, dichlorodifluoro-, CFC-12 | air air air | low population density high population density low population density | kg kg kg | 8.7 10900 10900 | kg CO2-Eq kg CO2-Eq kg CO2-Eq | 5.09E-15 3.92E-15 1.04E-14 | kg/kg kg/kg kg/kg | 4.43E-14 4.27E-11 1.13E-10 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorofluoro-, HCFC-21 Methane, fossil Methane, fossil | air air air air | unspecified high population density high population density low population density | kg kg kg kg | 10900 210 25 25 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 8.54E-22 7.64E-18 7.83E-08 2.32E-06 | kg/kg kg/kg kg/kg kg/kg | 9.31E-18 1.61E-15 1.96E-06 5.80E-05 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Methane, fossil Methane, fossil Methane, tetrachloro-, R-10 | air air air | lower stratosphere + upper troposphere unspecified high population density | kg kg kg | 25 25 1400 | kg CO2-Eq kg CO2-Eq kg CO2-Eq | 3.75E-16 1.65E-07 7.47E-13 | kg/kg kg/kg kg/kg | 9.38E-15 4.13E-06 1.05E-09 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Methane, tetrachloro-, R-10 Methane, tetrafluoro-, R-14 Methane, tetrafluoro-, R-14 Methane, trichlorofluoro-, CFC-11 | air air air air | unspecified high population density unspecified high population density | kg kg kg kg | 1400 7390 7390 4750 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 3.82E-19 5.84E-15 1.45E-11 1.24E-17 | kg/kg kg/kg kg/kg kg/kg | 5.35E-16 4.31E-11 1.07E-07 5.89E-14 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Methane, trifluoro-, HFC-23 Sulfur hexafluoride Sulfur hexafluoride | air air air | high population density high population density low population density | kg kg kg | 14800 22800 22800 | kg CO2-Eq kg CO2-Eq kg CO2-Eq | 2.43E-15 8.47E-15 | kg/kg kg/kg kg/kg | 3.60E-11 0.00E+00 1.93E-10 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Sulfur hexafluoride Methane, monochloro-, R-40 Methane, monochloro-, R-40 Carbon dioxide, land transformation | air air air air | unspecified high population density low population density low population density | kg kg kg kg | 22800 13 13 1 | kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 1.93E-11 1.04E-16 9.30E-15 2.11E-08 | kg/kg kg/kg kg/kg kg/kg | 4.41E-07 1.36E-15 1.21E-13 2.11E-08 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Nitrogen fluoride Ammonia | air air | high population density high population density | kg kg | 17200 1.88 1.88 | kg CO2-Eq | 1.28E-09 | kg/kg kg/kg | 0.00E+00 4.02E-03 2.40E-09 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride | air air air air | low population density unspecified high population density low population density | kg kg kg kg | 1.88 1.88 0.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 4.67E-09 2.90E-08 3.75E-09 9.26E-09 | kg/kg kg/kg kg/kg kg/kg | 8.78E-09 5.45E-08 3.30E-09 8.14E-09 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Hydrogen chloride Hydrogen fluoride Hydrogen fluoride | air air air air | unspecified high population density low population density | kg kg kg | 0.88 1.6 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.71E-09 2.60E-10 1.95E-09 5.70E-10 | kg/kg kg/kg kg/kg | 3.26E-09 4.15E-10 3.12E-09 9.13E-10 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide | aır air air air | unspecified high population density low population density unspecified | kg kg kg kg | 1.88 1.88 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 5.70E-10 2.25E-13 1.76E-09 4.89E-10 | kg/kg kg/kg kg/kg kg/kg | 9.13E-10 4.23E-13 3.31E-09 9.19E-10 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Nitrogen oxides Nitrogen oxides Nitrogen oxides | air air air | high population density Iow population density unspecified | kg kg kg | 0.7 0.7 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.87E-07 1.50E-06 4.53E-05 | kg/kg kg/kg kg/kg | 2.71E-07 1.05E-06 3.17E-05 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Sulfur dioxide Sulfur dioxide | air air | high population density low population density | kg kg | 1 | kg SO2-Eq kg SO2-Eq | 1.17E-06 3.64E-06 | kg/kg kg/kg | 1.17E-06 3.64E-06 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |

| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 1.11E-06 | kg/kg | 1.11E-06 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
|--|----------|-----------------------------------|-----|--------|-----------|----------|-------|----------|---|
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 5.05E-11 | kg/kg | 9.49E-11 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eg | 2.55E-17 | kg/kg | 1.65E-17 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 1.13E-16 | kg/kg | 7.32E-17 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| | | | | | | | | 3.90E-05 | |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 2.53E-11 | kg/kg | 7.75E-11 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 2.21E-12 | kg/kg | 6.78E-12 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 2.92E-12 | kg/kg | 8.94E-12 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 5.40E-15 | kg/kg | 1.65E-14 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 4.32E-11 | kg/kg | 1.32E-10 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 1.74E-09 | kg/kg | 5.33E-09 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.36E-05 | kg/kg | 3.00E-07 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 9.43E-09 | kg/kg | 2.07E-10 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.37E-05 | kg/kg | 3.02E-07 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 9.46E-09 | kg/kg | 2.08E-10 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.02E-09 | kg/kg | 1.02E-09 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 2.23E-10 | kg/kg | 6.84E-10 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 1.54E-12 | kg/kg | 4.71E-12 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| | | | | | | | | 6.10E-07 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 5.23E-05 | kg/kg | 5.17E-04 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 7.28E-05 | kg/kg | 1.39E-03 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 7.07E-07 | kg/kg | 2.81E-05 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 8.89E-05 | kg/kg | 3.41E-03 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.17E-03 | kg/kg | 5.36E-02 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 7.81E-10 | kg/kg | 7.73E-09 | Ecoinvent V2, disposal, building, concrete gravel, to recycling, CH |
| | | | | | | | | 5.90E-02 | |

R5a Transport steel to See Transport, lorry >32t, EURO4 recycle center

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R8a Recycle steel components

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R5b Transport wood to Transport included in R2 - remove damaged wood. See R2 recycle center

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Recycle wood No recycling. Wood is considered waste. See R2 components

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R5c Transport concrete See Transport, lorry >32t. EURO4
for reuse as
aggregate

back to top

R3 Extract Gravel
Materials 1

| | Mine, gravel-sand | includes the area of the infrastructure (buildings, paved roads, etc.) and the machines used for the gravel mining, does not include the area of the actual mine, which is included in mining | | | | | | | Ecoinvent V2, mine, gravel/sand, CH |
|--|-------------------|---|----|--------|-----------|----------|---------|----------|-------------------------------------|
| back to top | | | | | | | | unit | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 5.55E+05 | kg/unit | 5.55E+05 | Ecoinvent V2, mine, gravel/sand, CH |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 4.45E+05 | kg/unit | 4.45E+05 | Ecoinvent V2, mine, gravel/sand, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 4.33E-02 | kg/unit | 4.33E-02 | Ecoinvent V2, mine, gravel/sand, CH |
| Carbon dioxide, fossil | air | unspecified | kg | . 1 | kg CO2-Eq | 1.04E+06 | kg/unit | 1.04E+06 | Ecoinvent V2, mine, gravel/sand, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 2.38E+02 | kg/unit | 3.73E+02 | Ecoinvent V2, mine, gravel/sand, CH |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 7.72E+02 | kg/unit | 1.21E+03 | Ecoinvent V2, mine, gravel/sand, CH |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 5.09E-05 | kg/unit | 8.00E-05 | Ecoinvent V2, mine, gravel/sand, CH |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.40E+04 | kg/unit | 2.21E+04 | Ecoinvent V2, mine, gravel/sand, CH |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 3.69E-04 | kg/unit | 1.11E-02 | Ecoinvent V2, mine, gravel/sand, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 3.05E-05 | kg/unit | 9.15E-04 | Ecoinvent V2, mine, gravel/sand, CH |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 1.82E-10 | kg/unit | 5.46E-09 | Ecoinvent V2, mine, gravel/sand, CH |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 1.65E+01 | kg/unit | 4.92E+03 | Ecoinvent V2, mine, gravel/sand, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 8.26E+00 | kg/unit | 2.46E+03 | Ecoinvent V2, mine, gravel/sand, CH |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 4.13E-07 | kg/unit | 1.23E-04 | Ecoinvent V2, mine, gravel/sand, CH |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 1.25E+01 | kg/unit | 3.72E+03 | Ecoinvent V2, mine, gravel/sand, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 9.38E-06 | kg/unit | 1.34E-02 | Ecoinvent V2, mine, gravel/sand, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 3.38E-04 | kg/unit | 4.83E-01 | Ecoinvent V2, mine, gravel/sand, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 2.03E-01 | kg/unit | 2.91E+02 | Ecoinvent V2, mine, gravel/sand, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 3.48E-06 | kg/unit | 2.13E-02 | Ecoinvent V2, mine, gravel/sand, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/unit | 0.00E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 2.68E-04 | kg/unit | 3.32E-02 | Ecoinvent V2, mine, gravel/sand, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/unit | 0.00E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 5.82E-03 | kg/unit | 5.82E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/unit | 0.00E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 2.46E-04 | kg/unit | 3.01E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 6.96E-01 | kg/unit | 8.50E+03 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eg | 3.23E+00 | kg/unit | 8.06E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.06E+01 | kg/unit | 2.65E+02 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eg | 3.72E+00 | kg/unit | 9.30E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eg | 4.94E-10 | kg/unit | 2.47E-09 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 7.20E-03 | kg/unit | 1.36E+01 | Ecoinvent V2, mine, gravel/sand, CH |

| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 4.91E-09 | kg/unit | 3.51E-05 | Ecoinvent V2, mine, gravel/sand, CH |
|--|---------------------------|---|-----------|-------------|-----------|----------|----------|----------------------|---------------------------------------|
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 6.70E-03 | kg/unit | 4.78E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 1.95E-02 | kg/unit | 3.54E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 2.68E-02 | kg/unit | 4.85E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/unit | 0.00E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.71E-04 | kg/unit | 2.36E-03 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 9.02E-05 | kg/unit | 7.85E-04 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.42E-05 | kg/unit | 1.55E-01 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 2.47E-05 | kg/unit | 2.69E-01 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 3.28E-10 | kg/unit | 3.58E-06 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 2.67E-08 | kg/unit | 5.60E-06 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 7.33E+02 | kg/unit | 1.83E+04 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 3.77E+03 | kg/unit | 9.43E+04 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 6.88E-07 | kg/unit | 1.72E-05 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 3.15E+01 | kg/unit | 7.87E+02 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 1.11E-02 | kg/unit | 1.55E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 1.47E-07 | kg/unit | 2.05E-04 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.38E-05 | kg/unit | 1.02E-01 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 6.27E+00 | kg/unit | 4.63E+04 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 4.33E-08 | kg/unit | 2.06E-04 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 8.49E-06 | kg/unit | 1.26E-01 | Ecoinvent V2, mine, gravel/sand, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/unit | 0.00E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 2.53E-04 | kg/unit | 5.76E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 4.33E-02 | kg/unit | 9.87E+02 | Ecoinvent V2, mine, gravel/sand, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 9.07E-06 | kg/unit | 1.18E-04 | Ecoinvent V2, mine, grave/sand, CH |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 1.65E-04 | kg/unit | 2.14E-03 | Econivent V2, mine, grave/sand, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 2.62E+02 | kg/unit | 2.62E+02 | Econivent V2, Inne, gravel/sand, CH |
| Nitrogen fluoride | air | high population density | kg kg | 17200 | kg CO2-Eq | 2.025702 | kg/unit | 0.00E+00 | Econvent V2, mine, graver/sand, CH |
| Millogen naonae | all | riigh population density | kg | 17200 | kg CO2-Eq | | kg/unit | 2.25E+06 | Econivers vz. nine, graversand, cri |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 1.26E+01 | kg/unit | 2.36E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 3.68E+01 | kg/unit | 6.92E+01 | Econivent V2, mine, gravel/sand, CH |
| | air | | ka | 1.88 | kg SO2-Eq | 1.91E+03 | | 3.60E+03 | |
| Ammonia | air | unspecified | 9 | 0.88 | | | kg/unit | | Ecoinvent V2, mine, gravel/sand, CH |
| Hydrogen chloride | air air | high population density | kg | | kg SO2-Eq | 3.00E+01 | kg/unit | 2.64E+01 2.34E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Hydrogen chloride | | low population density | kg | 0.88 | kg SO2-Eq | 2.66E+01 | kg/unit | | Ecoinvent V2, mine, gravel/sand, CH |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 8.44E+02 | kg/unit | 7.43E+02 | Ecoinvent V2, mine, gravel/sand, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.06E+00 | kg/unit | 1.70E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 6.47E+00 | kg/unit | 1.03E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 2.81E+01 | kg/unit | 4.49E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 5.58E-02 | kg/unit | 1.05E-01 | Ecoinvent V2, mine, gravel/sand, CH |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 9.93E+00 | kg/unit | 1.87E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 3.28E+00 | kg/unit | 6.16E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 7.76E+02 | kg/unit | 5.43E+02 | Ecoinvent V2, mine, gravel/sand, CH |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 1.48E+03 | kg/unit | 1.04E+03 | Ecoinvent V2, mine, gravel/sand, CH |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 4.22E+03 | kg/unit | 2.96E+03 | Ecoinvent V2, mine, gravel/sand, CH |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 1.04E+03 | kg/unit | 1.04E+03 | Ecoinvent V2, mine, gravel/sand, CH |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 5.66E+03 | kg/unit | 5.66E+03 | Ecoinvent V2, mine, gravel/sand, CH |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 1.06E+03 | kg/unit | 1.06E+03 | Ecoinvent V2, mine, gravel/sand, CH |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 3.67E-01 | kg/unit | 6.90E-01 | Ecoinvent V2, mine, gravel/sand, CH |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 9.50E-08 | kg/unit | 6.18E-08 | Ecoinvent V2, mine, gravel/sand, CH |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/unit | 0.00E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 2.66E-07 | kg/unit | 1.73E-07 | Ecoinvent V2, mine, gravel/sand, CH |
| | | | · · | | | | - | 1.69E+04 | · |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 1.62E-01 | kg/unit | 4.96E-01 | Ecoinvent V2, mine, gravel/sand, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 1.56E-02 | kg/unit | 4.77E-02 | Ecoinvent V2, mine, gravel/sand, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 1.03E-02 | kg/unit | 3.15E-02 | Ecoinvent V2, mine, gravel/sand, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eg | 1.98E-03 | kg/unit | 6.05E-03 | Ecoinvent V2, mine, gravel/sand, CH |
| Phosphorus | soil | agricultural | ka | 3.06 | kg PO4-Eq | 3.50E-01 | kg/unit | 1.07E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Phosphorus | soil | industrial | kq | 3.06 | kg PO4-Eq | 2.39E-01 | kg/unit | 7.32E-01 | Ecoinvent V2, mine, gravel/sand, CH |
| BOD5, Biological Oxygen Demand | water | river | kq | 0.022 | kg PO4-Eq | 1.58E+03 | kg/unit | 3.47E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kq | 0.022 | kg PO4-Eq | 8.06E+01 | kg/unit | 1.77E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| COD, Chemical Oxygen Demand | water | river | kq | 0.022 | kg PO4-Eq | 1.78E+03 | kg/unit | 3.92E+01 | Ecoinvent V2, mine, gravel/sand, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 8.21E+01 | kg/unit | 1.81E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.52E+00 | kg/unit | 1.52E+00 | Econivent V2, nine, gravel/sand, CH |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 1.69E+00 | kg/unit | 5.18E+00 | Econivent V2, mine, grave/sand, CH |
| Phosphorus | water | unspecified | kg ka | 3.06 | kg PO4-Eq | 4.14E-02 | kg/unit | 1.27E-01 | |
| | | | | 0.97 | | 4.14E-UZ | | 0.00E+00 | Ecoinvent V2, mine, gravel/sand, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/unit | | Ecoinvent V2, mine, gravel/sand, CH |
| Cool brown in ground | recourse | in around | ka | 0.0 | MIFa | 1.39E+05 | lea/unit | 8.67E+01 | Facilities VO mine gravelland CLI |
| Coal, brown, in ground | resource | in ground | kg | 9.9 19.1 | MJ-Eq | | kg/unit | 1.37E+06 | Ecoinvent V2, mine, gravel/sand, CH |
| Coal, hard, unspecified, in ground | resource | in ground | kg Nm2 | | MJ-Eq | 4.68E+05 | kg/unit | 8.94E+06 | Ecoinvent V2, mine, gravel/sand, CH |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 4.62E+03 | Nm3/unit | 1.84E+05 | Ecoinvent V2, mine, gravel/sand, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 1.77E+05 | Nm3/unit | 6.79E+06 | Ecoinvent V2, mine, gravel/sand, CH |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.94E+05 | kg/unit | 8.88E+06 | Ecoinvent V2, mine, gravel/sand, CH |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 5.79E+01 | kg/unit | 5.73E+02 | Ecoinvent V2, mine, gravel/sand, CH |
| | | | | | | | | 2.62E+07 | |
| | | | | | | | | | |
| | Gravel cruched at include | se the whole manufacturing process internal processes (transport, etc.) | \ and | | | | | | Econyant V2 gravel crushed at mine CH |

Gravel, crushed, at mine includes the whole manufacturing process, internal processes (transport, etc.) and infrastructure. No administration is included. Dust emission (particulates >PM10, >PM2.5 <PM10 and <PM2.5) share according to "mining limestone" process.

Ecoinvent V2, gravel, crushed, at mine, CH

| | | WE.5 <1 WITO and <1 WE.5) share according to Thinning infestone process. | | | | | | | |
|--|-----|--|----|--------|-----------|----------|-------|----------|--|
| | | Recultivation is taken into account. | | | | | | | |
| back to top | | | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 1.21E-03 | kg/kg | 1.21E-03 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 1.03E-03 | kg/kg | 1.03E-03 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 6.07E-11 | kg/kg | 6.07E-11 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.78E-03 | kg/kg | 1.78E-03 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 4.52E-07 | kg/kg | 7.11E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 8.14E-07 | kg/kg | 1.28E-06 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 7.13E-14 | kg/kg | 1.12E-13 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.35E-05 | kg/kg | 2.12E-05 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 3.95E-12 | kg/kg | 1.19E-10 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 1.30E-13 | kg/kg | 3.89E-12 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 1.80E-19 | kg/kg | 5.39E-18 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 2.44E-08 | kg/kg | 7.29E-06 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 2.48E-08 | kg/kg | 7.40E-06 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 5.78E-16 | kg/kg | 1.72E-13 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 9.73E-08 | kg/kg | 2.90E-05 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 2.20E-14 | kg/kg | 3.14E-11 | Ecoinvent V2, gravel, crushed, at mine, CH |

| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 4.91E-12 | kg/kg | 7.03E-09 | Ecoinvent V2, gravel, crushed, at mine, CH |
|--|--|--|--|--|--|---|---|--|--|
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 1.79E-10 | kg/kg | 2.56E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 3.30E-15 | kg/kg | 2.02E-11 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 2.65E-12 | kg/kg | 3.28E-10 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 9.77E-11 | kg/kg | 9.77E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 2.92E-13 | kg/kg | 3.57E-09 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 2.18E-10 | kg/kg | 2.66E-06 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 2.40E-09 | kg/kg | 6.01E-08 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 3.94E-08 | kg/kg | 9.84E-07 | Ecoinvent VZ, gravel, crushed, at mine, CH |
| Methane, biogenic | air | | kg | 25 | kg CO2-Eq | 2.19E-08 | kg/kg | 5.49E-07 | Econwent V2, gravel, crushed, at mine, CH |
| | | unspecified | S S | 25 | | 4.87E-19 | | 2.44E-18 | |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 4000 | kg CO2-Eq | | kg/kg | | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 1.07E-11 | kg/kg | 2.02E-08 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 1.75E-17 | kg/kg | 1.25E-13 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 2.48E-11 | kg/kg | 1.77E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 1.94E-11 | kg/kg | 3.51E-08 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 4.92E-11 | kg/kg | 8.90E-08 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 1.91E-13 | kg/kg | 1.66E-12 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 3.84E-13 | kg/kg | 3.34E-12 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 2.86E-14 | kg/kg | 3.12E-10 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 3.05E-14 | kg/kg | 3.33E-10 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 3.24E-19 | kg/kg | 3.53E-15 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 6.25E-17 | kg/kg | 1.31E-14 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 7.51E-07 | kg/kg | 1.88E-05 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 5.63E-06 | kg/kg | 1.41E-04 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 9.63E-16 | kg/kg | 2.41E-14 | Econwent VZ, gravel, crushed, at mine, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 8.39E-08 | kg/kg | 2.10E-06 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, tetrachloro-, R-10 | air | | S S | 1400 | | 9.73E-12 | | 1.36E-08 | |
| Methane, tetrachloro-, R-10 | | high population density | kg | 1400 | kg CO2-Eq | | kg/kg | | Ecoinvent V2, gravel, crushed, at mine, CH |
| | air | unspecified | kg | | kg CO2-Eq | 1.45E-16 | kg/kg | 2.03E-13 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.36E-13 | kg/kg | 1.01E-09 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 1.96E-09 | kg/kg | 1.45E-05 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.02E-16 | kg/kg | 4.82E-13 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 1.99E-14 | kg/kg | 2.94E-10 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.80E-13 | kg/kg | 4.11E-09 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 4.10E-10 | kg/kg | 9.36E-06 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 9.80E-15 | kg/kg | 1.27E-13 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 7.00E-13 | kg/kg | 9.11E-12 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 2.11E-07 | kg/kg | 2.11E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, gravel, crushed, at mine, CH |
| | | | | | ng ooz Eq | | | | |
| | | | | | | | ng/ng | 4.28E-03 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 9.87E-09 | kg/kg | 4.28E-03 1.86E-08 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia | air air | high population density low population density | kg kg | | | 9.87E-09 3.75E-08 | | | Ecoinvent V2, gravel, crushed, at mine, CH Ecoinvent V2, gravel, crushed, at mine, CH |
| | | | | 1.88 | kg SO2-Eq | | kg/kg | 1.86E-08 | |
| Ammonia Ammonia | | low population density | | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 3.75E-08 | kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 | Ecoinvent V2, gravel, crushed, at mine, CH Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride | air air | low population density unspecified high population density | kg kg | 1.88 1.88 1.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 | kg/kg kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 3.44E-06 | Ecoinvent V2, gravel, crushed, at mine, CH Ecoinvent V2, gravel, crushed, at mine, CH Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride | air air air | low population density unspecified high population density low population density | kg kg kg | 1.88 1.88 1.88 0.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride | air air air air | low population density unspecified high population density low population density unspecified | kg kg kg | 1.88 1.88 1.88 0.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride | air air air air air | low population density unspecified high population density low population density unspecified high population density | kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride | air air air air air | low population density unspecified high population density low population density unspecified high population density low population density | kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride | air air air air air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified | kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide | air air air air air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density | kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide | air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density | kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 1.6 1.6 1.8 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide | air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.8 | kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen floride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nydrogen sulfide Nitrogen oxides | air air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density unspecified high population density | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.8 1.88 | kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides | air air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.8 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides | air air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.8 1.88 | kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen floride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide | air air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density low population density unspecified high population density | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.8 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide | air air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.8 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide | air air air air air air air air air air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density low population density unspecified high population density | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 0.7 0.7 | kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen floride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified high population density unspecified niver | kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 1.88 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Sitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.7 0.7 0.7 1 1 1.88 0.65 | kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 9.93E-07 5.40E-10 5.86E-17 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Phosphoric acid | air | low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified river agricultural high population density | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 1.7 1.1 1.88 0.65 0.98 | kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Sitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.7 0.7 0.7 1 1 1.88 0.65 | kg SO2-Eq kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density low population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 4.73E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen flouride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified river agricultural high population density low population density low population density | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Sitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density low population density low population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 9.93E-07 5.40E-10 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfurioxide Phosphoria acid Phosphorus Phosphorus Phosphorus Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density, long-term unspecified | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Sitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Sitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density, long-term unspecified | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Hydrogen sulfide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Sitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoria acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density, long-term unspecified agricultural industrial fiver | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 | Ecoinvent V2. gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population densi | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 1.88 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 6.10E-08 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.58E-07 1.34E-09 | Ecoinvent V2. gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen flouride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 1.88 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 6.10E-08 1.46E-09 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.58E-07 1.31E-09 1.46E-09 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population densi | kg k | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.0E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 6.10E-08 1.46E-09 1.64E-09 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 1.58E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuri dioxide Sulfuri eacid Phosphoria eacid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population densi | K9 8 8 9 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2 | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 6.10E-08 1.46E-09 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.58E-07 1.34E-09 1.46E-09 5.00E-09 5.00E-09 1.21E-10 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population densi | kg k | 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg SO2-Eq | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.0E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 6.10E-08 1.46E-09 1.64E-09 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.58E-07 1.34E-09 1.46E-09 5.00E-09 1.21E-10 0.00E+00 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoria acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density unspecified agricultural industrial river unspecified river unspecified river unspecified high population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2 | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 6.10E-08 1.46E-09 1.64E-09 1.64E-09 1.64E-09 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 1.58E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphoric acid Coal, brown, in ground | air | low population density unspecified high population density low population density unspecified high population density low population density liver unspecified river unspecified river unspecified high population density in ground | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2 | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 6.10E-08 1.46E-09 1.64E-09 1.64E-09 3.95E-11 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 1.46E-09 5.00E-09 1.21E-10 0.00E+00 3.28E-07 3.99E-03 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified river agricultural high population density low population density low population density unspecified river agricultural high population density low population density river unspecified river unspecified river river unspecified high population density in ground in ground | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2 | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 6.10E-08 7.20E-06 6.10E-08 1.46E-09 1.64E-09 3.95E-11 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.58E-07 1.31E-09 1.46E-09 5.00E-09 1.21E-10 0.00E+00 3.28E-07 3.99E-03 1.07E-02 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low popula | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2 | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 6.10E-08 1.46E-09 1.64E-09 1.64E-09 3.95E-11 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 1.58E-07 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur oxides Sulfur dioxide Hydrogen sulfide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density ling population density in ground in ground in ground in ground in ground in ground | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 1.88 | kg SO2-Eq kg SO2 | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 6.10E-08 1.46E-09 1.64E-09 1.64E-09 3.95E-11 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 5.00E-09 1.21E-10 0.00E+00 3.28E-07 3.99E-03 1.07E-02 2.20E-04 9.46E-03 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphorus acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density in ground | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2 | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.13E-08 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 6.10E-08 1.46E-09 3.95E-11 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.55E-07 1.31E-09 1.46E-09 1.66E-09 1.26E-09 1.66E-09 1.00E+00 3.28E-07 3.99E-03 1.07E-02 2.20E-04 9.46E-03 3.18E-02 | Ecoinvent V2, gravel, crushed, at mine, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur oxides Sulfur dioxide Hydrogen sulfide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | air | low population density unspecified high population density low population density unspecified high population density low population density ling population density in ground in ground in ground in ground in ground in ground | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 1.88 | kg SO2-Eq kg SO2 | 3.75E-08 1.83E-06 2.28E-08 4.90E-08 8.28E-07 8.79E-10 1.39E-08 1.13E-08 5.09E-11 9.79E-09 2.67E-09 1.20E-06 2.45E-06 1.80E-05 1.76E-06 4.73E-06 9.93E-07 2.87E-10 9.01E-17 2.64E-15 1.72E-10 2.04E-11 1.59E-10 6.22E-13 5.04E-10 9.60E-10 7.03E-06 5.96E-08 7.20E-06 6.10E-08 1.46E-09 1.64E-09 1.64E-09 3.95E-11 | kg/kg | 1.86E-08 7.05E-08 3.44E-06 2.00E-08 4.32E-08 7.29E-07 1.41E-09 2.22E-08 1.81E-08 9.58E-11 1.84E-08 5.02E-09 8.43E-07 1.71E-06 1.26E-05 1.76E-06 4.73E-06 9.93E-07 5.40E-10 5.86E-17 0.00E+00 1.71E-15 2.70E-05 5.25E-10 6.24E-11 4.87E-10 1.90E-12 1.54E-09 2.94E-09 1.55E-07 1.31E-09 1.58E-07 1.34E-09 1.58E-07 1.34E-09 5.00E-09 1.21E-10 0.00E+00 3.28E-07 3.99E-03 1.07E-02 2.20E-04 9.46E-03 | Ecoinvent V2, gravel, crushed, at mine, CH |

R6 Transport gravel See Transport, lorry >32t, EURO4 materials

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| top | | Included in total energy used on beef farms | | | | | | | Pembina Institute _ http://lcva.ca/documents/Build_Gravel_Road |
|---|----------------------------------|--|----------|------------------|------------------------|----------------------|----------------|----------------------|--|
| | Plant cover crop or green manure | not specific for Alberta practices. Not calculated. | | | | | | | Temona nomine _ map., / netaca/ documents/ bund_oravei_noad |
| top | green manare | Included in total energy used on beef farms | | | | | | | |
| | Cultivate soil | Ecoinvent V2, tillage, harrowing, by spring tine harrow | | | | | | | |
| top | Guill valo 3511 | Included in total energy used on beef farms | | | | | | | |
| lioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 4.17E+00 | kg/ha | 4.17E+00 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| ioxide, fossil ioxide, fossil | air air | low population density lower stratosphere + upper troposphere | kg kg | 1 | kg CO2-Eq kg CO2-Eq | 1.62E+01 2.59E-07 | kg/ha kg/ha | 1.62E+01 2.59E-07 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| oxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 3.21E+00 | kg/ha | 3.21E+00 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| onoxide, fossil onoxide, fossil | air air | high population density low population density | kg kg | 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq | 1.74E-03 3.17E-02 | kg/ha kg/ha | 2.74E-03 4.98E-02 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| onoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 3.04E-10 | kg/ha | 4.77E-10 | Econvent V2, tillage, harrowing, by spring tine harrow |
| onoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 5.84E-02 | kg/ha | 9.18E-02 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| n n | air air | high population density low population density | kg kg | 30 30 | kg CO2-Eq kg CO2-Eq | 2.08E-09 7.81E-11 | kg/ha kg/ha | 6.24E-08 2.34E-09 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| n | air | unspecified | kg | 30 | kg CO2-Eq | 1.88E-16 | kg/ha | 5.65E-15 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| n monoxide | air | high population density | kg | 298 | kg CO2-Eq | 8.42E-05 | kg/ha | 2.51E-02 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| n monoxide n monoxide | air air | low population density lower stratosphere + upper troposphere | kg kg | 298 298 | kg CO2-Eq kg CO2-Eq | 5.81E-04 2.46E-12 | kg/ha kg/ha | 1.73E-01 7.34E-10 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| n monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 4.27E-05 | kg/ha | 1.27E-02 | Econvent V2, tillage, harrowing, by spring tine harrow |
| 1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 4.98E-11 | kg/ha | 7.12E-08 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| I,1,2-tetrafluoro-, HFC-134a | air air | low population density | kg | 1430 1430 | kg CO2-Eq kg CO2-Eq | 2.55E-09 8.55E-07 | kg/ha | 3.64E-06 1.22E-03 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| 1,1,2-tetrafluoro-, HFC-134a 1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air air | unspecified high population density | kg kg | 6130 | kg CO2-Eq kg CO2-Eq | 8.55E-07 1.78E-11 | kg/ha kg/ha | 1.22E-03 1.09E-07 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| ,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| I-difluoro-, HFC-152a | air | high population density | kg | 124 124 | kg CO2-Eq | 1.81E-09 | kg/ha | 2.24E-07 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| -difluoro-, HFC-152a -dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air air | low population density low population density | kg kg | 10000 | kg CO2-Eq kg CO2-Eq | 4.89E-08 | kg/ha kg/ha | 0.00E+00 4.89E-04 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| exafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 1.27E-09 | kg/ha | 1.55E-05 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| xafluoro-, HFC-116 biogenic | air air | unspecified high population density | kg kg | 12200 25 | kg CO2-Eq kg CO2-Eq | 4.69E-07 8.90E-06 | kg/ha kg/ha | 5.72E-03 2.23E-04 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| piogenic | air | low population density | kg | 25 | kg CO2-Eq | 3.54E-05 | kg/ha | 8.85E-04 | Ecoinvent V2, tillage, harrowing, by spring the harrow |
| iogenic | air | unspecified | kg | 25 | kg CO2-Eq | 2.02E-05 | kg/ha | 5.06E-04 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| oromo-, Halon 1001 oromochlorodifluoro-, Halon 1211 | air air | unspecified | kg | 5 1890 | kg CO2-Eq kg CO2-Eq | 5.10E-16 2.46E-08 | kg/ha kg/ha | 2.55E-15 4.65E-05 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| promotrifluoro-, Halon 1301 | air | low population density high population density | kg kg | 7140 | kg CO2-Eq | 1.22E-12 | kg/ha | 8.69E-09 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| oromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 2.49E-07 | kg/ha | 1.78E-03 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 1.15E-09 | kg/ha | 2.07E-06 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| chlorodifluoro-, HCFC-22 chlorotrifluoro-, CFC-13 | air air | low population density unspecified | kg kg | 1810 14400 | kg CO2-Eq kg CO2-Eq | 9.51E-08 | kg/ha kg/ha | 1.72E-04 0.00E+00 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 1.07E-10 | kg/ha | 9.34E-10 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 2.31E-10 | kg/ha | 2.01E-09 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| dichlorodifluoro-, CFC-12 dichlorodifluoro-, CFC-12 | air air | high population density low population density | kg | 10900 10900 | kg CO2-Eq kg CO2-Eq | 6.60E-11 9.07E-11 | kg/ha kg/ha | 7.19E-07 9.88E-07 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| dichlorodifluoro-, CFC-12 | air | unspecified | kg kg | 10900 | kg CO2-Eq | 3.39E-16 | kg/ha | 3.70E-12 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 1.42E-13 | kg/ha | 2.97E-11 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| fossil fossil | air air | high population density | kg kg | 25 25 | kg CO2-Eq | 1.39E-03 3.26E-02 | kg/ha kg/ha | 3.47E-02 8.14E-01 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| fossil | air | low population density lower stratosphere + upper troposphere | kg kg | 25 25 | kg CO2-Eq kg CO2-Eq | 4.10E-12 | kg/ha | 1.03E-10 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| fossil | air | unspecified | kg | 25 | kg CO2-Eq | 6.26E-05 | kg/ha | 1.57E-03 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 1.21E-08 | kg/ha | 1.69E-05 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| etrachloro-, R-10 etrafluoro-, R-14 | air air | unspecified high population density | kg kg | 1400 7390 | kg CO2-Eq kg CO2-Eq | 1.52E-13 9.29E-11 | kg/ha kg/ha | 2.12E-10 6.86E-07 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| etrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 4.22E-06 | kg/ha | 3.12E-02 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| richlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 2.30E-13 | kg/ha | 1.09E-09 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| rifluoro-, HFC-23 afluoride | air air | high population density high population density | kg kg | 14800 22800 | kg CO2-Eq kg CO2-Eq | 4.51E-11 | kg/ha kg/ha | 6.67E-07 0.00E+00 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| afluoride | air | low population density | kg kg | 22800 | kg CO2-Eq kg CO2-Eq | 1.51E-09 | kg/ha | 3.45E-05 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| afluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 2.72E-07 | kg/ha | 6.21E-03 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| monochloro-, R-40 | air air | high population density | kg | 13 13 | kg CO2-Eq | 1.98E-12 4.22E-10 | kg/ha | 2.58E-11 5.49E-09 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| nonochloro-, R-40 oxide, land transformation | air air | low population density low population density | kg kg | 13 | kg CO2-Eq kg CO2-Eq | 4.22E-10 1.62E-04 | kg/ha kg/ha | 5.49E-09 1.62E-04 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| uoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| | | | , | 4.00 | | 0 70E 07 | | 2.49E+01 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| | air air | high population density low population density | kg kg | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 2.78E-05 1.34E-04 | kg/ha kg/ha | 5.22E-05 2.51E-04 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| | air | unspecified | kg | 1.88 | kg SO2-Eq | 3.21E-04 | kg/ha | 6.03E-04 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 1.94E-04 | kg/ha | 1.70E-04 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| chloride chloride | air air | low population density unspecified | kg kg | 0.88 0.88 | kg SO2-Eq kg SO2-Eq | 8.60E-05 1.07E-04 | kg/ha kg/ha | 7.57E-05 9.39E-05 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| fluoride | air | high population density | kg kg | 1.6 | kg SO2-Eq kg SO2-Eq | 6.84E-06 | kg/ha | 9.59E-05 1.09E-05 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 2.01E-05 | kg/ha | 3.21E-05 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 2.74E-05 | kg/ha | 4.39E-05 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| sulfide sulfide | air air | high population density low population density | kg kg | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 8.99E-07 4.33E-05 | kg/ha kg/ha | 1.69E-06 8.15E-05 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.76E-05 | kg/ha | 3.30E-05 | Econvent V2, tillage, harrowing, by spring tine harrow |
| oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 4.21E-03 | kg/ha | 2.95E-03 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| oxides | air | low population density | kg | 0.7 0.7 | kg SO2-Eq | 2.10E-01 | kg/ha | 1.47E-01 6.61E-03 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| oxides xide | air air | unspecified high population density | kg kg | 0.7 | kg SO2-Eq kg SO2-Eq | 9.44E-03 8.44E-03 | kg/ha kg/ha | 6.61E-03 8.44E-03 | Ecoinvent V2, tillage, harrowing, by spring tine harrow Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| xide | air | low population density | kg | 1 | kg SO2-Eq | 2.35E-02 | kg/ha | 2.35E-02 | Econvent V2, tillage, harrowing, by spring tine harrow |
| xide | air | unspecified | kg | 1 | kg SO2-Eq | 3.05E-03 | kg/ha | 3.05E-03 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| n sulfide | water | river | kg | 1.88 | kg SO2-Eq | 1.84E-06 | kg/ha | 3.47E-06 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |

| Sulfuric acid | soil | agricultural | ka | 0.65 | kg SO2-Eq | 4.87E-13 | kg/ha | 3.17E-13 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
|--|------------|--|-----------|--------------|------------------------|----------------------|----------------|----------------------|--|
| Phosphoric acid | air | agricultural high population density | kg kg | 0.98 | kg SO2-Eq kg SO2-Eq | 4.6/E-13 | kg/ha | 0.00E+00 | Econvent V2, tillage, narrowing, by spring tine harrow Econvent V2, tillage, harrowing, by spring tine harrow |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 1.80E-12 | kg/ha | 1.17E-12 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Surant usia | | ion population density | | 0.00 | g 002 24 | 1.002 12 | ngma | 1.93E-01 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 5.27E-07 | kg/ha | 1.61E-06 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 8.02E-08 | kg/ha | 2.45E-07 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 8.26E-08 | kg/ha | 2.53E-07 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 1.34E-09 | kg/ha | 4.10E-09 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 5.01E-07 | kg/ha | 1.53E-06 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 6.67E-06 | kg/ha | 2.04E-05 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 4.48E-02 | kg/ha | 9.86E-04 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 2.58E-04 | kg/ha | 5.68E-06 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 4.56E-02 | kg/ha | 1.00E-03 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 2.60E-04 | kg/ha | 5.72E-06 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 7.22E-06 | kg/ha | 7.22E-06 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 4.50E-06 | kg/ha | 1.38E-05 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 5.05E-08 | kg/ha | 1.54E-07 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| | | | | | | | | 2.05E-03 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 5.29E-01 | kg/ha | 5.24E+00 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 2.14E+00 | kg/ha | 4.08E+01 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 2.10E-02 | Nm3/ha | 8.36E-01 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 8.88E-01 | Nm3/ha | 3.40E+01 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 5.90E+00 | kg/ha | 2.70E+02 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 1.68E-04 | kg/ha | 1.66E-03 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| | | | | | | | | 3.51E+02 | Ecoinvent V2, tillage, harrowing, by spring tine harrow |
| | | Fooinvent VO Tillege and the state of the st | | | | | | | |
| Carbon dioxide, fossil | oin | Ecoinvent V2, Tillage, cultivating, chiseling | les. | 4 | kg CO2-Eq | 8.82E+00 | ka/ha | 8.82E+00 | Engineent V2 Tillage guiltivating phicaling |
| Carbon dioxide, fossil Carbon dioxide, fossil | air air | high population density low population density | kg | 1 | kg CO2-Eq | 8.82E+00 5.45E+01 | kg/ha kg/ha | 8.82E+00 5.45E+01 | Ecoinvent V2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Carbon dioxide, fossil | air air | low population density lower stratosphere + upper troposphere | kg kg | 1 | kg CO2-Eq | 5.45E+01 5.79E-07 | кg/na kg/ha | 5.45E+01 5.79E-07 | Econvent v2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 5.79E-07 5.03E+00 | kg/na kg/ha | 5.79E-07 5.03E+00 | Econwent V2, Tillage, cultivating, chiseling Econwent V2, Tillage, cultivating, chiseling |
| Carbon monoxide, fossil | air air | unspecined high population density | кg kg | 1.5714 | kg CO2-Eq | 3.54E-03 | кg/na kg/ha | 5.56E-03 | Econvent v2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 3.54E-03 1.41E-01 | kg/ha | 2.22E-01 | Ecoinvent V2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 6.80E-10 | kg/ha | 1.07E-09 | Ecoinvent V2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 9.71E-02 | kg/ha | 1.53E-01 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 3.81E-09 | kg/ha | 1.14E-07 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 1.47E-10 | kg/ha | 4.41E-09 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 3.77E-16 | kg/ha | 1.13E-14 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 1.59E-04 | kg/ha | 4.73E-02 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 1.98E-03 | kg/ha | 5.89E-01 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 5.51E-12 | kg/ha | 1.64E-09 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 8.20E-05 | kg/ha | 2.45E-02 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 1.01E-10 | kg/ha | 1.45E-07 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 4.68E-09 | kg/ha | 6.70E-06 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 1.91E-06 | kg/ha | 2.73E-03 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 3.67E-11 | kg/ha | 2.25E-07 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 3.49E-09 | kg/ha | 4.33E-07 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 8.91E-08 | kg/ha | 8.91E-04 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 2.61E-09 | kg/ha | 3.19E-05 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 9.91E-07 | kg/ha | 1.21E-02 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 1.45E-05 | kg/ha | 3.64E-04 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 6.87E-05 | kg/ha | 1.72E-03 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 4.08E-05 | kg/ha | 1.02E-03 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 1.02E-15 | kg/ha | 5.11E-15 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 4.49E-08 | kg/ha | 8.49E-05 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 2.61E-12 | kg/ha | 1.87E-08 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 8.00E-07 | kg/ha | 5.71E-03 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 2.27E-09 | kg/ha | 4.11E-06 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.75E-07 | kg/ha | 3.16E-04 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | 0.005.40 | kg/ha | 0.00E+00 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, dichloro, HCC 30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.08E-10 | kg/ha | 1.81E-09 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 4.35E-10 | kg/ha | 3.78E-09 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.33E-10 | kg/ha | 1.45E-06 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 1.79E-10 | kg/ha | 1.96E-06 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorofluoro-, HCFC-21 | air | unspecified | kg | 10900 210 | kg CO2-Eq kg CO2-Eq | 6.79E-16 2.88E-13 | kg/ha | 7.40E-12 6.04E-11 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, fossil | air air | high population density high population density | kg kg | 25 | kg CO2-Eq | 2.88E-13 3.09E-03 | kg/ha kg/ha | 7.72E-02 | Ecoinvent V2, Tillage, cultivating, chiseling |
| | | | | | | | | | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, fossil Methane, fossil | air air | lower stratesphere + upper trapesphere | kg kg | 25 25 | kg CO2-Eq kg CO2-Eq | 8.37E-02 9.19E-12 | kg/ha kg/ha | 2.09E+00 2.30E-10 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, fossil | air | lower stratosphere + upper troposphere unspecified | кg kg | 25 25 | kg CO2-Eq | 9.19E-12 1.01E-04 | кg/na kg/ha | 2.52E-03 | Ecoinvent V2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 2.25E-08 | kg/ha | 3.15E-05 | Ecoinvent V2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, tetrachloro-, R-10 | air | unspecified | kg kg | 1400 | kg CO2-Eq | 3.04E-13 | kg/na kg/ha | 4.25E-10 | Ecoinvent V2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, tetrafluoro-, R-10 | air | high population density | kg | 7390 | kg CO2-Eq | 1.80E-10 | kg/ha | 1.33E-06 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg kg | 7390 | kg CO2-Eq | 8.92E-06 | kg/na kg/ha | 6.59E-02 | Ecoinvent V2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg kg | 4750 | kg CO2-Eq | 4.67E-13 | kg/na kg/ha | 2.22E-09 | Ecoinvent V2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, trifluoro-, HFC-23 | air | high population density | kg kg | 14800 | kg CO2-Eq | 9.16E-11 | kg/na kg/ha | 1.36E-06 | Ecoinvent V2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Sulfur hexafluoride | air | high population density | kg kg | 22800 | kg CO2-Eq | J.10L-11 | kg/na kg/ha | 0.00E+00 | Ecoinvent V2, Tillage, cultivating, chiseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Sulfur hexafluoride Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.63E-09 | kg/na kg/ha | 3.72E-05 | Econwent V2, Tillage, cultivating, chiseling Econwent V2, Tillage, cultivating, chiseling |
| Sulfur hexafluoride Sulfur hexafluoride | air | unspecified | kg kg | 22800 | kg CO2-Eq | 5.38E-07 | kg/na kg/ha | 1.23E-02 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Methane, monochloro-, R-40 | air | high population density | kg kg | 13 | kg CO2-Eq | 3.60E-12 | kg/na kg/ha | 4.68E-11 | Econwent v2, Thiage, cultivating, chiseling Econwent V2, Tillage, cultivating, chiseling |
| Methane, monochloro-, R-40 | air | low population density | kg kg | 13 | kg CO2-Eq | 7.94E-10 | kg/ha | 1.03E-08 | Econwent v2, Thiage, cultivating, chiseling Econwent V2, Tillage, cultivating, chiseling |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 3.79E-04 | kg/ha | 3.79E-04 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | 0.135-04 | kg/ha | 0.00E+00 | Ecoinvent V2, Tillage, cultivating, chiseling |
| THE OF THE OTHER | an | ingli population density | ng | 11200 | ng GOZ-Eq | | кула | 7.16E+01 | Ecoinvent V2, Tillage, cultivating, criseling Ecoinvent V2, Tillage, cultivating, chiseling |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 4.83E-05 | kg/ha | 9.09E-05 | Ecoinvent V2, Tillage, cultivating, chiseling |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 4.03E-03 4.11E-04 | kg/ha | 7.72E-04 | Ecoinvent V2, Tillage, cultivating, chiseling |
| - | | F-L | 8 | | | | nga | | |

| Second | 1 | kg SO2-Eq 3.29E-04 kg/ha 2.89E-04 Ecoinvent V2, Tillage, kg SO2-Eq 1.84E-04 kg/ha 1.62E-04 Ecoinvent V2, Tillage, kg SO2-Eq 1.78E-04 kg/ha 1.56E-04 Ecoinvent V2, Tillage, kg SO2-Eq 1.25E-05 kg/ha 2.00E-05 Ecoinvent V2, Tillage, | .04 kg/ba | | | | | | |
|--|---|--|--|---|--|---|--|--|---|
| Second column | 1 | kg SO2-Eq 1.84E-04 kg/ha 1.62E-04 Ecoinvent V2, Tillage, kg SO2-Eq 1.78E-04 kg/ha 1.56E-04 Ecoinvent V2, Tillage, kg SO2-Eq 1.25E-05 kg/ha 2.00E-05 Ecoinvent V2, Tillage, | -04 kg/11a | kg SO2-Eq 5.41E-04 | 1.88 | kg | unspecified | air | Ammonia |
| Second | 1 | kg SO2-Eq 1.78E-04 kg/ha 1.56E-04 Ecoinvent V2, Tillage, kg SO2-Eq 1.25E-05 kg/ha 2.00E-05 Ecoinvent V2, Tillage, | -04 kg/ha | kg SO2-Eq 3.29E-04 | 0.88 | kg | high population density | air | Hydrogen chloride |
| March Marc | 1 | kg SO2-Eq 1.78E-04 kg/ha 1.56E-04 Ecoinvent V2, Tillage, kg SO2-Eq 1.25E-05 kg/ha 2.00E-05 Ecoinvent V2, Tillage, | -04 kg/ha | ka SO2-Ea 1.84E-04 | 0.88 | | low population density | air | Hydrogen chloride |
| Information | 1 | kg SO2-Eq 1.25E-05 kg/ha 2.00E-05 Ecoinvent V2, Tillage, | | | | | | | |
| Description 1 | 1 | | | | | | | | |
| State Stat | 1 | | | | | | | | |
| Control Cont | 1 | | | | | | | | |
| December 1 | 1 | | | | | | | | |
| Second Content | 1 | | | | | | | | |
| Membrands | 1 | | | | | | | | |
| Second S | 1 | | | | | | | | |
| Second | 18 | | | | | | | | |
| March Marc | 16 | kg SO2-Eq 6.41E-01 kg/ha 4.49E-01 Ecoinvent V2, Tillage, | -01 kg/ha | kg SO2-Eq 6.41E-01 | 0.7 | kg | low population density | air | Nitrogen oxides |
| Professor 1 | 15 | kg SO2-Eq 1.72E-02 kg/ha 1.21E-02 Ecoinvent V2, Tillage, | -02 kg/ha | kg SO2-Eq 1.72E-02 | 0.7 | kg | unspecified | air | Nitrogen oxides |
| Professor 1 | 15 | kg SO2-Eq 2.04E-02 kg/ha 2.04E-02 Ecoinvent V2, Tillage, | -02 kg/ha | kg SO2-Eq 2.04E-02 | 1 | kg | high population density | air | Sulfur dioxide |
| Control Cont | 1 | | -02 kg/ha | kg SO2-Eg 6.59E-02 | 1 | kg | low population density | air | Sulfur dioxide |
| Management 10 | Total Fig. | | | | 1 | | | air | Sulfur dioxide |
| Second S | March | | | | 1.88 | | • | water | |
| Part | 1 | | | | | | | | |
| The column The property of the column T | 10 | | | | | | | | |
| Margine | Parameter Para | | | | | | | | |
| Martine Mart | March Marc | | -12 kg/na | kg 502-Eq 5.47E-12 | 0.65 | KĘ | low population density | air | Sulturic acid |
| Profession | 1 | | 07 | L DO 4 E 0.00E 05 | 0.00 | | 11.1 1.0 1.0 | | PL I |
| Description | ar is pepulate dangle (page 1) | | | | | | | | |
| Production 1 | ## 150 September 1 September 2 September 2 September 3 Septemb | | · · | | | | | | |
| Second S | and self-animal segments and segme | | | | | kg | low population density, long-term | air | Phosphorus |
| Design | March Marc | | | kg PO4-Eq 2.83E-09 | | kg | | air | Phosphorus |
| | Second Walk Second Wal | | | | | kg | | | |
| | Samed was greatly and seemed with a series of the series o | | -05 kg/ha | kg PO4-Eq 2.12E-05 | 3.06 | kg | industrial | soil | |
| Medical Control of the Control of | ward ward specified by 10 10 10 10 10 10 10 10 10 10 10 10 10 | kg PO4-Eq 1.43E-01 kg/ha 3.14E-03 Ecoinvent V2, Tillage, | -01 kg/ha | kg PO4-Eq 1.43E-01 | 0.022 | kg | river | water | BOD5, Biological Oxygen Demand |
| College Coll | Mark | | | | | ks | | water | |
| March Color Colo | und winds winds wingstald by \$ 0.002 in 170-166 1416 of 1870 1416 of 1416 | | | | | | | | |
| Perform 1987 | March Property March Property March | | | | | | | | |
| Procedure Process Pr | Mark | | | | | | • | | |
| Property of the Company of the Com | Market Section Secti | | | | | | | | |
| Park | Second S | | | | | | | | |
| Part Section Part Section Part Section Sec | Second S | | | | | | | | |
| Column Second S | Posture Post | | kg/ha | kg PO4-Eq | 0.97 | kg | high population density | air | Phosphoric acid |
| Section of the property of t | round or source age many age is ground in a ground in | | | | | | | | |
| Section of the process of animal process of the p | Note | | | | | | in ground | resource | |
| Comment Security Comment Com | Property | | +00 kg/ha | MJ-Eq 3.63E+00 | 19.1 | kg | in ground | resource | Coal, hard, unspecified, in ground |
| | Part | MJ-Eq 3.54E-02 Nm3/ha 1.41E+00 Ecoinvent V2, Tillage, | -02 Nm3/ha | MJ-Eq 3.54E-02 | 39.8 | Nn | in ground | resource | Gas, mine, off-gas, process, coal mining |
| Married Section Sect | Part | | +00 Nm3/ha | MJ-Eq 2.15E+00 | 38.293 | Nn | in ground | resource | Gas, natural, in ground |
| Part | Part | | +01 kg/ha | MJ-Eq 1.88E+01 | 45.8 | kg | in ground | resource | Oil, crude, in ground |
| Cales Condo Canda Section Sect | Feorward V2, Tiliga, rotary ordinator | | | | | | | resource | |
| Comment Comm | Section 1982 Sect | 1.03E+03 | - | · | | | | | |
| Carlon clands Section | air high population density is g 1 kg 1 kg 102-6g 18-10-10 kg/ha 18-10 kg/ha 18-10-10 kg/ha 18-1 | | | | | | Ecoinvent V2, Tillage, rotary cultivat | | |
| Carlo models (cont. 18 | Second | kg CO2-Eq 1.20E+01 kg/ha 1.20E+01 Ecoinvent V2, Tillag | +01 kg/ha | kg CO2-Eg 1.20E+01 | 1 | | | air | Carbon dioxide, fossil |
| Carlo minach, found 1 | Second | | | | 1 | | | air | Carbon dioxide, fossil |
| Carlon contents February Carlon contents | Section Sect | | | | 1 | | | | |
| Column monotion found 1 | Second | | | | 1 | | | | |
| Carlo manusach, famil 2 | Second S | | | | 1 5714 | | | | |
| Carbon monosation, fiscal air Most statistophers - support reportable 1 | Second | | | | | | | | |
| Columnomouse, feed | Second Company Seco | | | | | | * * | | |
| Checkrow 1 | Feb Part P | | | | | | | | |
| Charleton | Section | | -01 kg/na | | | | | | |
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| Distrigen monoside sir | Part | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillag | | kg CO2-Eq 5.85E-09 | | | | | |
| Distringers monotode if the population density 6; 28 | Fig. 1 | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillag kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillag | -10 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 | 30 | kg | low population density | | Chloroform |
| Distrogen monoside if unspectfied kg 288 kg CO2-5c 1.8E-7d kg 328 | Fig. 19 19 19 19 19 19 19 1 | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillag kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillag kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillag | -10 kg/ha -16 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 | 30 30 | kg kg | low population density unspecified | air | Chloroform Chloroform |
| District 1.1. February | Second S | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -04 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 | 30 30 298 | եջ հչ հչ | low population density unspecified high population density | air air | Chloroform Chloroform Dinitrogen monoxide |
| Palman Lil. 2-tertalhorns HEC 134 sir bigh population density kg 1430 kg CO2-Eg 7.48-F0 kg ha 1.08-EG Eccineven V2. Tillage, creary cultivater Palman Lil. 2-tertalhorn HEC 134 sir umpecfied kg 1430 kg CO2-Eg 2.2EE-69 kg ha 3.1F-EG Eccineven V2. Tillage, creary cultivater Palman Lil. 2-tertalhorn Lil. 2-tert | HPC-134a air high population density kg 1430 kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Left-O144a | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 | 30 30 298 298 | kg kg kg kg | low population density unspecified high population density low population density | air air | Chloroform Chloroform Dinitrogen monoxide |
| Palman 11.1.2-fertallusco-s HFC-1344 air losy population density kg 1490 kg CO2-Eq 2.2E-166 kg/ha 1.9E-645 Ecoinwent V2. Tillage, roatry cultivator Ethans, 1.1.2-fertallusco-s HFC-1344 air unspecified kg 6180 kg CO2-Eq 2.2E-166 kg/ha 2.3E-67 control Ecoinwent V2. Tillage, roatry cultivator Ecoinwent V2. Tillage, roatry cultivator Ecoinwent V2. Tillage, roatry cultivator CO2-Eq 2.2E-166 kg/ha 2.2E-167 kg/ha 2.2E-167 control Ecoinwent V2. Tillage, roatry cultivator CO2-Eq 2.2E-167 kg/ha 2.2E-167 control CO2-Eq 2.2E-1 | HFC-134a air low population density kg 1430 kg CO2-Eq 7.4HE-09 kg/ha 1.0BE-05 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-113 air high population density kg 6130 kg CO2-Eq 3.8BE-11 kg/ha 2.3BE-07 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-113 air high population density kg 6130 kg CO2-Eq 3.8BE-11 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-113 air high population density kg 6130 kg CO2-Eq 5.3BE-09 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-113 air high population density kg 124 kg CO2-Eq 5.3BE-09 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 air low population density kg 1000 kg CO2-Eq 1.43F-07 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 air low population density kg 609 kg CO2-Eq 1.43F-07 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 air high population density kg 609 kg CO2-Eq 1.43F-07 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotary cultivator influoro. CFC-114 kg/ha 0.0BE-00 Ecoinvent VZ, Tillage, rotar | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillag kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillag kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillag kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillag kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillag kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillag | -10 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 5.81E-12 | 30 30 298 298 298 | kg kg kg kg | low population density unspecified high population density low population density | air air air | Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide |
| Elbane, 1.1.2 retralatoro , 1FC-114 | HFC-134 air uspecified kg 1430 kg CO2-Eq 2.2E-06 kg/ha 3.17E-03 Ecoinvent VZ. Tillage, rotary cultivator influoro. CFC-134 air high population density kg 6130 kg CO2-Eq 3.89E-11 kg/ha 0.00E-00 Ecoinvent VZ. Tillage, rotary cultivator unspecified unspecified unspecified kg 124 kg CO2-Eq 5.30E-09 kg/ha 0.00E-00 Ecoinvent VZ. Tillage, rotary cultivator influoro. CFC-113 air high population density kg 124 kg CO2-Eq 5.30E-09 kg/ha 0.00E-00 Ecoinvent VZ. Tillage, rotary cultivator influoro. CFC-114 air low population density kg 124 kg CO2-Eq 1.43E-07 kg/ha 0.00E-00 Ecoinvent VZ. Tillage, rotary cultivator influoro. CFC-114 air low population density kg 1200 kg CO2-Eq 1.43E-07 kg/ha 0.00E-00 Ecoinvent VZ. Tillage, rotary cultivator influoro. CFC-114 air unspecified kg 609 kg CO2-Eq 1.43E-07 kg/ha 0.00E-00 Ecoinvent VZ. Tillage, rotary cultivator influoro. CFC-114 ingore the control of | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillag kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillag kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillag kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillag kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillag kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillag | -10 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 5.81E-12 | 30 30 298 298 298 | հչ հչ հչ հչ հչ | low population density unspecified high population density low population density lower stratosphere + upper troposph | air air air air | Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide |
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| Elbane, I.1 diffuoro, IRC 152a air high population density kg 124 kg CO2-Eq S.DE 09 kg/ha 0.70E 07 Ecniverent V2. Tillage, rotary cultivator Elbane, I.2 dichloro - I.1.2 detenfuoro CFC-114 air low population density kg 10000 kg CO2-Eq L8E 01 kg/ha L8E 01 Ecniverent V2. Tillage, rotary cultivator Elbane, 2-Ednoro- I.1.2 detenfuoro IRC-114 air low population density kg 69 kg CO2-Eq 8.DE 09 kg/ha 0.00E-00 Ecniverent V2. Tillage, rotary cultivator Elbane, bearfuoro-, IRC-116 air lugh population density kg 12200 kg CO2-Eq 8.DE 09 kg/ha 0.00E-00 Ecniverent V2. Tillage, rotary cultivator Elbane, bearfuoro-, IRC-116 air lugh population density kg 25 kg CO2-Eq 1.4E 05 kg/ha 0.00E-00 Elbane, biogenic air lugh population density kg 25 kg CO2-Eq 1.4E 05 kg/ha 0.00E-00 Elbane, biogenic air lugh population density kg 25 kg CO2-Eq 1.4E 05 kg/ha 0.00E-00 Elbane, biogenic air lugh population density kg 25 kg CO2-Eq 1.4E 05 kg/ha 0.00E-00 Elbane, biogenic air lugh population density kg 25 kg CO2-Eq 1.4E 05 kg/ha 0.00E-00 Elbane, biogenic air lugh population density kg 25 kg CO2-Eq 5.DEE 05 kg/ha 1.3EE 03 Elbane, biogenic air lugh population density kg 8 8 8 0.00E-00 Elbane, biogenic air lugh population density kg 8 7 4 6 6 6 6 Ecniverent V2. Tillage, rotary cultivator 4 6 6 6 6 6 6 Ecniverent V2. Tillage, rotary cultivator 4 6 6 6 6 6 6 6 6 Ecniverent V2. Tillage, rotary cultivator 4 6 6 6 6 6 6 6 6 6 | 524 air high population density kg 124 kg CO2-Eq 5.30E-09 kg/ha 6.57E-07 Ecoinvent V2, Tillage, rotary cultivator 525 air low population density kg 1000 kg CO2-Eq 1.43E-07 kg/ha 1.43E-03 Ecoinvent V2, Tillage, rotary cultivator 6 diffuoro, HCFC-124 air unspecified kg 609 kg CO2-Eq 8.1E-09 kg/ha 3.43E-05 Ecoinvent V2, Tillage, rotary cultivator 6 air high population density kg 1220 kg CO2-Eq 8.9E-07 kg/ha 3.43E-05 Ecoinvent V2, Tillage, rotary cultivator 6 air high population density kg 1220 kg CO2-Eq 8.9E-07 kg/ha 3.0E-04 Ecoinvent V2, Tillage, rotary cultivator 6 air high population density kg 25 kg CO2-Eq 8.9E-07 kg/ha 3.0E-04 Ecoinvent V2, Tillage, rotary cultivator 10 air high population density kg 25 kg CO2-Eq 5.9E-05 kg/ha 2.3SE-03 | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -09 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 2.22E-06 | 30 30 298 298 298 298 1430 1430 | հչ հչ հչ Ե Ե հչ հչ հչ | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified | air air air air air air air air | Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a |
| Elbane, 1.4 elflutor-, HFC-182 air low population density kg 124 kg CO2-Eq L316 T loghe L046-05 Ecoinvent V2, Tillage, rodary cultivator Elbane, 2.chloro-1, L1.2-terflutoro-, HFC-124 air unspecified kg 609 kg CO2-Eq L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L316 T loghe L316 T loghe L316 T loghe L316 L | 52a air low poulation density kg 124 kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage, rotary cultivator etrafluoro, CFC-114 air low population density kg 1000 kg CO2-Eq 1.43E-07 kg/ha 1.43E-03 Ecoinvent V2, Tillage, rotary cultivator 6 air high population density kg 12200 kg CO2-Eq 2.81E-09 kg/ha 3.43E-05 Ecoinvent V2, Tillage, rotary cultivator 6 air unspecified kg 12200 kg CO2-Eq 2.81E-09 kg/ha 3.43E-05 Ecoinvent V2, Tillage, rotary cultivator 6 air unspecified kg 25 kg CO2-Eq 1.44E-05 kg/ha 3.60E-04 Ecoinvent V2, Tillage, rotary cultivator air low population density kg 25 kg CO2-Eq 9.41E-05 kg/ha 2.35E-03 Ecoinvent V2, Tillage, rotary cultivator air unspecified kg 25 kg CO2-Eq 5.92E-05 kg/ha 1.48E-03 Ecoinvent V2, Tillage, rotary cultivator <t< td=""><td>kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2, Tillage</td><td>-10 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -09 kg/ha -06 kg/ha</td><td>kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 5.81E-12 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11</td><td>30 30 298 298 298 298 1430 1430 1430 6130</td><td>եջ Եջ Եջ Եջ Էջ Էջ Էջ Էջ</td><td>low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density</td><td>air air air air air air air air air</td><td>Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113</td></t<> | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -09 kg/ha -06 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 5.81E-12 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11 | 30 30 298 298 298 298 1430 1430 1430 6130 | ե ջ Եջ Եջ Եջ Էջ Էջ Էջ Էջ | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density | air air air air air air air air air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 |
| Ehane, 1.2-dicthoro-1, 1.2.2-tertaflouro-, CFC-14 air low population density kg 1000 kg CO2-Eq kg/ha 0.006-0.00 Ecoinvent V2, Tillage, rotary cultivator Ecoinvent V2, Tillage, | Feed a filton Feed a filto | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha -11 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 5.81E-12 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq | 30 30 298 298 298 298 1430 1430 1430 6130 | և ջ և ջ և ջ Ե Ե և ջ և ջ և ջ և ջ և ջ | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified | air air air air air air air air air air | Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 |
| Elbane, 2-chloro-J. L12-sterafluoro, HFC-124 air "upspecified sig "sigh population density" sig 12200 kg CO2-Eq 2.81E-99 kg/ha 3.45E-05 Ecniverent VZ. Illiage, rotary cultivator with propulation density sig 12200 kg CO2-Eq 8.29E-07 kg/ha 3.45E-05 Ecniverent VZ. Illiage, rotary cultivator with propulation density sigh population density sig 25 kg CO2-Eq 8.29E-07 kg/ha 3.60E-04 Ecniverent VZ. Illiage, rotary cultivator with propulation density sign and sign sign sign sign sign sign sign sign | iffluoro-, HCFC-124 air unspecified kg 609 kg CO2-Eq kg/ha 0.00E-00 kg/ha 0.0E-00 kg/ha 0.0 | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq 5.30E-09 kg/ha 6.57E-07 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -09 kg/ha -11 kg/ha -11 kg/ha -109 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 5.81E-12 kg CO2-Eq 1.15E-10 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq kg CO2-Eq kg CO2-Eq 5.30E-09 | 30 30 298 298 298 298 1430 1430 1430 6130 6130 | և Եջ Եջ Եջ Աջ Աջ Աջ Աջ Աջ Աջ Աջ Աջ | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density | air air air air air air air air air air | Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1.1,1,2-tetrafluoro-, HFC-134a Ethane, 1.1,1,2-tetrafluoro-, HFC-134a Ethane, 1.1,1,2-trichloro-1,2-2-trifluoro-, CFC-113 Ethane, 1.1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1.1,2-trichloro-1,2,2-trifluoro-, CFC-113 |
| Ehane, hecafluoro - HPC-18 | ir high population density kg 12200 kg CO2-Eq 2.81E-09 kg/ha 3.43E-05 Ecoinvent V2, Tillage, rotary cultivator by Kg/ha in the secondary cultivator by Kg/ha in | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq 5.30E-09 kg/ha 6.57E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -01 kg/ha -09 kg/ha -11 kg/ha -09 kg/ha -09 kg/ha -09 kg/ha -09 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 2.07E-10 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.15E-12 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 7.42E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq 5.30E-09 kg CO2-Eq 5.30E-09 | 30 30 298 298 298 298 298 1430 1430 6130 6130 6130 | kg kg kg kg kg kg kg kg kg | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density | air air air air air air air air air air | Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,4,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a |
| Ethane, hexafluoro-, HFC-16 sir unspecified kg 1200 kg CQ2-Eq 8.28-07 kg/ha 1.01-EQ2 Ecoinvent V.T.Illage, rotary cultivator high population density kg 2.5 kg CQ2-Eq 3.44-E05 kg/ha 2.35-Ed3 Ecoinvent V.T.Illage, rotary cultivator Methane, blogenic sir unspecified kg 2.5 kg CQ2-Eq 3.44-E05 kg/ha 2.35-Ed3 Ecoinvent V.T.Illage, rotary cultivator with the promoting of | air unspecified kg 12200 kg CO2-Eq 8.29E-07 kg/ha 1.01E-02 Ecoinvent V2, Tillage, rotary cultivator air high population density kg 25 kg CO2-Eq 1.44E-05 kg/ha 3.60E-04 Ecoinvent V2, Tillage, rotary cultivator air low population density kg 25 kg CO2-Eq 9.41E-05 kg/ha 3.50E-03 Ecoinvent V2, Tillage, rotary cultivator air unspecified kg 25 kg CO2-Eq 5.92E-05 kg/ha 1.48E-03 Ecoinvent V2, Tillage, rotary cultivator air unspecified kg 25 kg CO2-Eq 5.92E-05 kg/ha 1.48E-03 Ecoinvent V2, Tillage, rotary cultivator to the convent V2 | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq | -10 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha -11 kg/ha -09 kg/ha -10 kg/ha -17 kg/ha -18 kg/ha -19 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 5.81E-12 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq 5.30E-09 kg CO2-Eq kg CO2-Eq 1.43E-07 | 30 30 298 298 298 298 1430 1430 6130 6130 124 124 10000 | kg kg kg kg e kg kg kg kg kg | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density low population density | air air air air air air air air air air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 |
| Methane, blogenic air high population density kg 2.5 kg CO2-Eq 9.14-05 kg/ha 3.000-04 Eccinvent V2. Tillage, rotary cultivator Methane, blogenic air low population density kg 2.5 kg CO2-Eq 9.18-05 kg/ha 2.35E-03 Eccinvent V2. Tillage, rotary cultivator Methane, Dromothor Illorors, Halon 101 air unspecified kg 5.87E-05 kg/ha 1.38E-04 Eccinvent V2. Tillage, rotary cultivator Methane, Dromothor Illorors, Halon 1211 air low population density kg 1.90 kg CO2-Eq 2.98E-05 kg/ha 1.38E-04 Eccinvent V2. Tillage, rotary cultivator Methane, Dromotrifluoro, Halon 1301 air log population density kg 7.140 kg CO2-Eq 7.88E-07 kg/ha 1.4FE-08 kg/ha 1.4FE-08 Methane, Chlorofilhuoro, HCP-22 air high population density kg 1.810 kg CO2-Eq 2.78E-09 kg/ha 1.4FE-03 Eccinvent V2. Tillage, rotary cultivator Methane, Chlorofilhuoro, EVC-22 air high population density kg </td <td>air high population density kg 25 kg CO2-Eq 1.44E-05 kg/ha 3.60E-04 Ecoinvent V2, Tillage, rotary cultivator air low population density kg 25 kg CO2-Eq 9.41E-05 kg/ha 1.38E-03 Ecoinvent V2, Tillage, rotary cultivator air unspecified kg 25 kg CO2-Eq 5.9E-05 kg/ha 1.48E-03 Ecoinvent V2, Tillage, rotary cultivator air unspecified kg 5 kg CO2-Eq 1.06E-15 kg/ha 5.3E-15 Ecoinvent V2, Tillage, rotary cultivator oro., Halon 1211 air low population density kg 1890 kg CO2-Eq 7.29E-08 kg/ha 1.38E-04 Ecoinvent V2, Tillage, rotary cultivator lalon 1301 air high population density kg 7140 kg CO2-Eq 2.05E-12 kg/ha 1.47E-08 Ecoinvent V2, Tillage, rotary cultivator lalon 1301 air low population density kg 7140 kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator</td> <td>kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq 5.30E-09 kg/ha 6.57E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage</td> <td>-10 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -09 kg/ha -11 kg/ha</td> <td>kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 5.81E-12 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq 4</td> <td>30 30 298 298 298 298 1430 1430 1430 6130 6130 124 124 10000 609</td> <td>kg kg kg kg kg kg kg kg kg kg</td> <td>low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density low population density low population density low population density</td> <td>air air air air air air air air air air</td> <td>Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124</td> | air high population 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| Methane, blogenic air low population density kg 25 kg CO2-Eq 9.18-05 kg/ha 2.35E-03 Ecoinvent V2, Tillage, rotary cultivator Methane, bromor, Halon 1001 air unspecified kg 5 kg CO2-Eq 1.08E-15 kg/ha 5.32E-15 Ecoinvent V2, Tillage, rotary cultivator Methane, bromortifiloron, Halon 1211 air low population density kg 180 kg CO2-Eq 7.08E-08 kg/ha 1.38E-04 Ecoinvent V2, Tillage, rotary cultivator Methane, bromortifiloron, Halon 1201 air low population density kg 7.140 kg CO2-Eq 7.08E-08 kg/ha 1.47E-08 Ecoinvent V2, Tillage, rotary cultivator Methane, chlorodiflutoron, HCPC-22 air low population density kg 110 kg CO2-Eq 7.08E-08 kg/ha 5.4E-03 Ecoinvent V2, Tillage, rotary cultivator Methane, Chlorodiflutoron, HCPC-22 air low population density kg 1810 kg CO2-Eq 2.8BE-07 kg/ha 5.4BE-03 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodiflutoro, CPC-12 air <td>air low population density kg 25 kg CO2-Eq 9.41E-05 kg/ha 2.35E-03 Ecoinvent V2, Tillage, rotary cultivator in the 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kg CO2-Eq 7.44E-09 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq kg CO2-Eq 4.43E-07 kg CO2-Eq 4.43E-07 kg CO2-Eq 4.43E-07 kg CO2-Eq 2.81E-09</td> <td>30 30 298 298 298 298 1430 1430 6130 6130 6130 6130 124 124 10000 609 12200</td> <td>kg kg kg kg kg kg kg kg kg kg</td> <td>low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density low population density low population density unspecified high population density</td> <td>air air air air air air air air air air</td> <td>Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116</td> | air low population density kg 25 kg CO2-Eq 9.41E-05 kg/ha 2.35E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density in the population density kg 25 kg CO2-Eq 5.92E-05 kg/ha 1.48E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg 5 kg CO2-Eq 1.06E-15 kg/ha 5.32E-15 Ecoinvent V2, Tillage, rotary cultivator in the population density kg 1890 kg CO2-Eq 7.29E-08 kg/ha 1.38E-04 Ecoinvent V2, Tillage, rotary cultivator in the population density kg 7140 kg CO2-Eq 7.29E-08 kg/ha 1.47E-08 Ecoinvent V2, Tillage, rotary cultivator in the population density kg 7140 kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg 7140 kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator in the population density kg CO2-Eq 7.63E-07 kg/ha | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq 1.43E-07 kg/ha 0.00E+00 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -09 kg/ha -11 kg/ha -11 kg/ha -09 kg/ha -09 kg/ha -09 kg/ha -09 kg/ha -09 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 2.07E-10 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.88E-04 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.15E-10 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq kg CO2-Eq 4.43E-07 kg CO2-Eq 4.43E-07 kg CO2-Eq 4.43E-07 kg CO2-Eq 2.81E-09 | 30 30 298 298 298 298 1430 1430 6130 6130 6130 6130 124 124 10000 609 12200 | kg kg kg kg kg kg kg kg kg kg | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density low population density low population density unspecified high population density | air air air air air air air air air air | Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 |
| Methane, biogenic air unspecified kg 25 kg CO2-Eq 5.92E.05 kg/ha 1.48E.03 Ecoinvent V2, Tillage, rotary cultivator Methane, bromo-Halon 1001 air unspecified kg 5 kg CO2-Eq 1.08E.15 kg/ha 5.32E.15 Ecoinvent V2, Tillage, rotary cultivator Methane, bromo-Halon 1201 air low population density kg 7.40 kg CO2-Eq 2.98E.08 kg/ha 1.38E.04 Ecoinvent V2, Tillage, rotary cultivator Methane, bromo-fillutoro-, Halon 1301 air high population density kg 7.7140 kg CO2-Eq 2.08E-12 kg/ha 1.4Te.08 Ecoinvent V2, Tillage, rotary cultivator Methane, Chlorodifluoro-, HCFC-22 air high population density kg 1810 kg CO2-Eq 2.70E-09 kg/ha 4.89E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, chlorodifluoro-, HCFC-22 air low population density kg 1810 kg CO2-Eq 2.81E-07 kg/ha 5.99E-04 Ecoinvent V2, Tillage, rotary cultivator Methane, cilchlorod-HCFC-30 air high popul | air unspecified kg 25 kg CO2-Eq 5.92E-05 kg/ha 1.48E-03 Ecoinvent V2, Tillage, rotary cultivator in air unspecified kg 5 kg CO2-Eq 1.06E-15 kg/ha 5.32E-15 Ecoinvent V2, Tillage, rotary cultivator in air low population density kg 1890 kg CO2-Eq 7.29E-08 kg/ha 5.32E-15 Ecoinvent V2, Tillage, rotary cultivator ialon 1301 air high population density kg 7140 kg CO2-Eq 2.05E-12 kg/ha 1.47E-08 Ecoinvent V2, Tillage, rotary cultivator ialon 1301 air low population density kg 7140 kg CO2-Eq 2.05E-12 kg/ha 1.47E-08 Ecoinvent V2, Tillage, rotary cultivator ialon 1301 air low population density kg 7140 kg CO2-Eq 2.05E-12 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq 5.30E-09 kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -09 kg/ha -11 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.88E-04 kg CO2-Eq 1.15E-10 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq 8.29E-07 | 30 30 298 298 298 298 1430 1430 6130 6130 6130 124 124 10000 609 12200 | kg kg kg kg kg kg kg kg kg kg | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified | air air air air air air air air air air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 |
| Methane, bromo-, Halon 1001 air uspecified kg 5 kg CO2-Eq 1.06E-15 kg/ha 5.32E-15 Ecoinwent V2; Illage, rotary cultivator Methane, bromo-thlorofilluoro-, Halon 1301 air hoppulation density kg 7140 kg CO2-Eq 2.05E-12 kg/ha 1.38E-04 Ecoinwent V2; Illage, rotary cultivator Methane, bromo-thlororilluoro-, Halon 1301 air hoppulation density kg 7140 kg CO2-Eq 7.68E-07 kg/ha 1.47E-08 Ecoinwent V2; Illage, rotary cultivator Methane, bromo-thlororilluoro-, Halon 1301 air hoppulation density kg 7140 kg CO2-Eq 7.68E-07 kg/ha 5.44E-03 Ecoinwent V2; Illage, rotary cultivator Methane, Chlorofilluoro-, HCC-22 air low population density kg 1810 kg CO2-Eq 2.81E-07 kg/ha 5.09E-04 Ecoinwent V2; Illage, rotary cultivator Methane, Chlorofilluoro-, HCC-32 air low population density kg 187 kg CO2-Eq 2.81E-07 kg/ha 5.09E-04 Ecoinwent V2; Illage, rotary cultivator Methane, Chlorofilluoro-, HCC-32 | 11 air unspecified kg 5 kg CO2-Eq 1.06E-15 kg/ha 5.32E-15 Ecoinvent V2, Tillage, rotar'y cultivator 180 propulation density kg 1890 kg CO2-Eq 7.29E-08 kg/ha 1.38E-04 Ecoinvent V2, Tillage, rotar'y cultivator 1810 lalon 1301 air high population density kg 7140 kg CO2-Eq 2.05E-12 kg/ha 1.47E-08 Ecoinvent V2, Tillage, rotary cultivator 1810 lalon 1301 air low population density kg 7140 kg CO2-Eq 7.63E-07 kg/ha 5.42E-03 Ecoinvent V2, Tillage, rotary cultivator | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 8.99E-11 kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq 5.30E-09 kg/ha 6.57E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -09 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 5.81E-12 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.18E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq 45.00E-09 kg CO2-Eq 45.00E-09 kg CO2-Eq 2.81E-09 kg CO2-Eq 2.81E-09 kg CO2-Eq 2.81E-09 kg CO2-Eq 2.82E-07 kg CO2-Eq 2.82E-07 kg CO2-Eq 2.82E-07 kg CO2-Eq 3.29E-07 kg CO2-Eq 48.29E-07 | 30 30 30 298 298 298 298 1430 1430 6130 6130 6130 124 124 10000 609 12200 12200 25 | kg kg kg kg kg kg kg kg kg kg kg | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density | air air air air air air air air air air | Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1.2-tetrafluoro-, HFC-134a Ethane, 1,1,1.2-tetrafluoro-, HFC-134a Ethane, 1,1,1.2-tetrafluoro-, LFC-134a Ethane, 1,1.2-trichloro-1,2.2-trifluoro-, CFC-113 Ethane, 1,1.2-trichloro-1,2.2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1.2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 Methane, biogenic |
| Methane, bromochlorodifluoro-, Halon 1211 air low population density kg 189 kg $CO2-Eq$ 7.29E-08 kg/ha 1.38E-04 Ecoinvent V2. Tillage, rotary cultivator Methane, bromotrifluoro-, Halon 1301 air low population density kg 7140 kg $CO2-Eq$ 7.20E-12 kg/ha 1.47E-08 Ecoinvent V2. Tillage, rotary cultivator Methane, bromotrifluoro-, Halon 1301 air low population density kg 1810 kg $CO2-Eq$ 2.08E-12 kg/ha 5.44E-03 Ecoinvent V2. Tillage, rotary cultivator Methane, chlorodifluoro-, HCPC-22 air low population density kg 1810 kg $CO2-Eq$ 2.81E-09 kg/ha 4.89E-06 Ecoinvent V2. Tillage, rotary cultivator Methane, chlorofifluoro-, CFC-13 air log population density kg 8.87 kg $CO2-Eq$ 2.81E-10 kg/ha 0.00E-00 Ecoinvent V2. Tillage, rotary cultivator Methane, chlororo-, CFC-13 air log population density kg 8.87 kg $CO2-Eq$ 2.81E-10 kg/ha 0.00E-00 Ecoinvent V2. Tillage, rotary cultivator Methane, dichloro-, HCC-30 air log population density kg 8.87 kg $CO2-Eq$ 6.18E-10 kg/ha 0.48E-09 Ecoinvent V2. Tillage, rotary cultivator Methane, dichloro-, CFC-12 air log population density kg 19900 kg $CO2-Eq$ 6.18E-10 kg/ha 0.49E-06 Ecoinvent V2. Tillage, rotary cultivator Methane, dichloro-, CFC-12 air log population density kg 19900 kg $CO2-Eq$ 1.55E-10 kg/ha 0.54E-09 Ecoinvent V2. Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air log population density kg 19900 kg $CO2-Eq$ 1.55E-10 kg/ha 1.69E-06 Ecoinvent V2. Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air log population density kg 19900 kg $CO2-Eq$ 1.70E-16 kg/ha 1.69E-06 Ecoinvent V2. Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air log population density kg 19900 kg $CO2-Eq$ 1.70E-16 kg/ha 7.71E-12 Ecoinvent V2. Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air log population density kg 2.5 kg $CO2-Eq$ 2.70E-10 kg/ha 6.87E-11 Ecoinvent V2. Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air log population density kg 2.5 kg $CO2-Eq$ 2.70E-16 kg/ha 6.87E-11 Ecoinvent V2. Tillage, rotary cultivator Methane, | horo-, Halon 1211 air low population density kg 1890 kg CO2-Eq 7.29E-08 kg/ha 1.38E-04 Ecoinvent V2, Tillage, rotary cultivator lalon 1301 air high population density kg 7140 kg CO2-Eq 2.05E-12 kg/ha 1.47E-08 Ecoinvent V2, Tillage, rotary cultivator lalon 1301 air low population density kg 7140 kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator Ecoinvent V2, Tillage, rotary cultivator | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq 1.43E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -10 kg/ha -10 kg/ha -09 kg/ha -11 kg | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 2.07E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.15E-10 kg CO2-Eq 1.15E-10 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq 4.43E-07 kg CO2-Eq 1.43E-07 kg CO2-Eq 2.82E-09 kg CO2-Eq 2.82E-09 kg CO2-Eq 2.81E-09 kg CO2-Eq 2.81E-09 kg CO2-Eq 8.29E-07 kg CO2-Eq 8.29E-07 kg CO2-Eq 8.29E-07 kg CO2-Eq 1.44E-05 kg CO2-Eq 1.44E-05 | 30 30 298 298 298 298 1430 1430 1430 6130 6130 6130 124 124 124 10000 609 12200 12200 25 25 | kg kg kg kg kg kg kg kg kg kg kg | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density | air air air air air air air air air air | Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1.1,1.2-tetrafluoro-, HFC-134a Ethane, 1.1,1.2-tetrafluoro-, HFC-134a Ethane, 1.1,1.2-tetrafluoro-, HFC-134a Ethane, 1.1,2-trichloro-1.2,2-trifluoro-, CFC-113 Ethane, 1.1,2-trichloro-1.2,2-trifluoro-, CFC-113 Ethane, 1.1-difluoro-, HFC-152a Ethane, 1.1-difluoro-, HFC-152a Ethane, 1.2-dichloro-1.1,2.2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1.1,1.2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic |
| Methane, bromotrifluoro-, Halon 1301 air high population density kg 7140 kg CO2-Eq 2.05E-12 kg/ha 1.47E-08 Ecoinvent V2, Tillage, rotary cultivator Methane, chlorodifluoro-, Halon 1301 air low population density kg 7140 kg CO2-Eq 7.63E-07 kg/ha 5.48E-03 Ecoinvent V2, Tillage, rotary cultivator Methane, chlorodifluoro-, HCFC-22 air low population density kg 1810 kg CO2-Eq 2.70E-09 kg/ha 5.99E-04 Ecoinvent V2, Tillage, rotary cultivator Methane, chlorodifluoro-, HCFC-22 air low population density kg 1810 kg CO2-Eq 2.81E-07 kg/ha 5.99E-04 Ecoinvent V2, Tillage, rotary cultivator unspecified kg 1840 kg CO2-Eq 2.81E-07 kg/ha 0.509E-04 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air high population density kg 8.77 kg CO2-Eq 2.81E-10 kg/ha 0.55E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air high population density kg 8.77 kg CO2-Eq 2.81E-10 kg/ha 0.54E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air high population density kg 8.78 kg CO2-Eq 1.55E-10 kg/ha 0.54E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air high population density kg 8.78 kg CO2-Eq 1.55E-10 kg/ha 0.54E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-12 air how population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 2.45E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-20 air how population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 2.45E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-21 air high population density kg 2.02 kg CO2-Eq 3.70E-16 kg/ha 7.71E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-21 air high population density kg 2.02 kg CO2-Eq 3.70E-16 kg/ha 7.71E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-21 air high population density kg 2.02 kg CO2-Eq 2.99E-03 kg/ha 7.71E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-21 air high population density kg 2.02 kg CO2-Eq 2.99E-03 kg/ha 7.71E-12 Ecoinvent V2, Tillage, rotar | Ialon 1301 air high population density kg 7140 kg CO2-Eq 2.05E-12 kg/ha 1.47E-08 Ecoinvent V2, Tillage, rotary cultivator Ialon 1301 air low population density kg 7140 kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.34E-05 Ecoinvent V2, Tillage kg CO2-Eq kg/ha | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -11 kg | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.81E-12 kg CO2-Eq 1.15E-10 kg CO2-Eq 1.15E-10 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq 8.29E-07 kg CO2-Eq 1.44E-05 kg CO2-Eq 9.41E-05 kg CO2-Eq 9.41E-05 kg CO2-Eq 5.92E-05 | 30 30 298 298 298 298 1430 1430 1430 6130 6130 6130 124 124 124 10000 609 12200 12200 25 25 | kg kg kg kg e kg | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density low population density | air air air air air air air air air air | Chloroform Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, Pexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic |
| Methane, bromotrifluoro-, Halon 1301 air low population density kg 7140 kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator Methane, chlorodifluoro-, HCFC-22 air low population density kg 1810 kg CO2-Eq 2.70E-09 kg/ha 5.09E-04 Ecoinvent V2, Tillage, rotary cultivator Methane, chlorodifluoro-, HCFC-23 air low population density kg 1840 kg CO2-Eq 2.81E-07 kg/ha 5.09E-04 Ecoinvent V2, Tillage, rotary cultivator Methane, chlororifluoro-, CFC-13 air luspecified kg 1440 kg CO2-Eq 2.81E-10 kg/ha 2.05E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air low population density kg 8.7 kg CO2-Eq 2.81E-10 kg/ha 2.05E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air low population density kg 8.7 kg CO2-Eq 2.81E-10 kg/ha 5.34E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 1.55E-10 kg/ha 1.69B-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 1.55E-10 kg/ha 2.94E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 2.94E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air unspecified kg 10900 kg CO2-Eq 3.70E-16 kg/ha 7.71E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air luspectified kg 10900 kg CO2-Eq 3.27E-13 kg/ha 6.71E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air high population density kg 2.5 kg CO2-Eq 3.27E-13 kg/ha 6.74E-10 Ecoinvent V2, Tillage, rotary cultivator Methane, fossil high population density kg 2.5 kg CO2-Eq 3.27E-13 kg/ha 6.74E-10 Ecoinvent V2, Tillage, rotary cultivator Methane, fossil high population density kg 2.5 kg CO2-Eq 3.27E-13 kg/ha 7.46E-10 Ecoinvent V2, Tillage, rotary cultivator Methane, fossil high population density kg 2.5 kg CO2-Eq 3.27E-13 kg/ha 7.46E-10 Ecoinvent V2, Tillage, rota | lalon 1301 air low population density kg 7140 kg CO2-Eq 7.63E-07 kg/ha 5.44E-03 Ecoinvent V2, Tillage, rotary cultivator | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -07 kg/ha -07 kg/ha -07 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.81E-12 kg CO2-Eq 1.15E-10 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 2.2E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq 5.30E-09 kg CO2-Eq 4.43E-07 kg CO2-Eq 4.43E-07 kg CO2-Eq 4.43E-07 kg CO2-Eq 4.43E-07 kg CO2-Eq 5.92E-07 kg CO2-Eq 5.92E-07 kg CO2-Eq 5.92E-05 kg CO2-Eq 9.41E-05 kg CO2-Eq 9.41E-05 kg CO2-Eq 9.41E-05 kg CO2-Eq 5.92E-05 kg CO2-Eq 5.92E-05 kg CO2-Eq 5.92E-05 | 30 30 30 298 298 298 298 1430 1430 6130 6130 6130 124 124 10000 609 12200 12200 25 25 25 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density unspecified unspecified unspecified unspecified | air air air air air air air air air air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-terafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromo-, Halon 1001 |
| Methane, chlorodifluoro-, HCFC-22 air high population density kg 1810 kg CO2-Eq 2.70E-09 kg/ha 4.89E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, chlorodifluoro-, HCFC-22 air lov population density kg 1440 kg CO2-Eq 2.81E-07 kg/ha 0.09E-04 Ecoinvent V2, Tillage, rotary cultivator Methane, chlorodifluoro-, CFC-13 air high population density kg 8.7 kg CO2-Eq 2.81E-10 kg/ha 0.90E-04 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air lov population density kg 8.7 kg CO2-Eq 2.81E-10 kg/ha 0.34E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air lov population density kg 1900 kg CO2-Eq 1.55E-10 kg/ha 1.34E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air high population density kg 1900 kg CO2-Eq 2.70E-10 kg/ha 1.62E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air lov population density kg 1900 kg CO2-Eq 2.70E-10 kg/ha 1.62E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air unspecified kg 1900 kg CO2-Eq 2.70E-10 kg/ha 1.62E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air unspecified kg 1900 kg CO2-Eq 2.70E-16 kg/ha 7.71E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air high population density kg 210 kg CO2-Eq 2.90E-03 kg/ha 7.8E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dishlorodifluoro-, CFC-12 air high population density kg CO2-Eq 2.90E-03 kg/ha 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator Methane, dishlorodifluoro-, CFC-12 air high population density kg CO2-Eq 2.90E-03 kg/ha 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator Methane, dishlorodifluoro-, CFC-12 air Ecoinvent V2, Tillage, rotary cultivator Methane, dishlorodifluoro-, CFC-12 air Ecoinvent V2, Tillage, rotary cultivator Methane, dishlorodifluoro-, CFC-12 air Ecoinvent V2, Tillage, rotary cultivator Methane, dishlorodifluoro-, CFC-12 air Ecoinvent V2, Tillage, rotary cultivator Methane, dishlorodifluoro-, CFC-12 air Eco | | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.54E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 3.43E-05 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 3.43E-05 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 3.60E-04 | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -10 kg/ha -10 kg/ha -09 kg/ha -11 kg/ha -09 kg/ha -09 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -09 kg/ha -01 kg/ha -02 kg/ha -03 kg/ha -05 kg/ha -06 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 2.07E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.15E-10 kg CO2-Eq 1.15E-10 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-17 kg CO2-Eq 4.43E-07 kg CO2-Eq 1.43E-07 kg CO2-Eq 2.22E-06 kg CO2-Eq 1.44E-05 kg CO2-Eq 2.81E-09 kg CO2-Eq 8.29E-07 kg CO2-Eq 8.29E-07 kg CO2-Eq 8.29E-07 kg CO2-Eq 8.29E-07 kg CO2-Eq 9.41E-05 kg CO2-Eq 9.41E-05 kg CO2-Eq 5.92E-05 kg CO2-Eq 1.06E-15 kg CO2-Eq 1.06E-15 kg CO2-Eq 7.29E-08 | 30 30 298 298 298 298 1430 1430 1430 6130 6130 6130 124 124 1220 12200 12200 25 25 25 5 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified low population density | air air air air air air air air air air | Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, bromo-, Halon 1001 Methane, bromo-, Halon 1001 Methane, bromo-horodifluoro-, Halon 1211 |
| Methane, chlorodifluoro-, HCFC-22 air low population density kg 1810 kg CO2-Eq 2.81E-07 kg/ha 5.09E-04 Ecoinvent V2, Tillage, rotary cultivator Methane, chlorotrifluoro-, CFC-13 air unspecified kg 8.7 kg CO2-Eq 2.81E-10 kg/ha 0.00E-00 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air low population density kg 8.7 kg CO2-Eq 6.14E-10 kg/ha 5.34E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air low population density kg 8.7 kg CO2-Eq 6.14E-10 kg/ha 5.34E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-12 air low population density kg 10900 kg CO2-Eq 1.55E-10 kg/ha 1.69E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 2.94E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air unspecified kg 10900 kg CO2-Eq 7.07E-16 kg/ha 7.70E-16 kg/ha 7.71E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro-, HCFC-21 air high population density kg 25 kg CO2-Eq 3.27E-13 kg/ha 6.87E-11 Ecoinvent V2, Tillage, rotary cultivator Methane, fichlorofluoro-, HCFC-21 air high population density kg 25 kg CO2-Eq 2.99E-03 kg/ha 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator Methane, fossil air high population density kg 25 kg CO2-Eq 2.99E-03 kg/ha 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator | | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.43E-03 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 3.43E-05 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 3.43E-05 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 3.43E-05 | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -04 kg/ha -09 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -09 kg/ha -05 kg/ha -068 kg/ha -08 | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.88E-04 kg CO2-Eq 1.15E-12 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq 4.43E-07 kg CO2-Eq 4.43E-07 kg CO2-Eq 1.43E-07 kg CO2-Eq 1.43E-07 kg CO2-Eq 1.44E-05 kg CO2-Eq 8.29E-07 kg CO2-Eq 1.44E-05 kg CO2-Eq 1.46E-05 kg CO2-Eq 1.46E-05 kg CO2-Eq 1.66E-15 kg CO2-Eq 1.06E-15 kg CO2-Eq 1.06E-15 kg CO2-Eq 1.06E-15 kg CO2-Eq 7.29E-08 kg CO2-Eq 1.06E-15 | 30 30 30 298 298 298 298 1430 1430 6130 6130 6130 6130 124 124 10000 609 12200 25 25 25 5 1890 7140 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified unspecified low population density high population density | air air air air air air air air air air | Chloroform Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromo-, Halon 1001 Methane, bromo-, Halon 1001 Methane, bromo-hlorodifluoro-, Halon 1211 Methane, bromothlorodifluoro-, Halon 1301 |
| Methane, chlorotifluoro-, HCFC-22 air low population density kg 1810 kg CO2-Eq 2.81E-07 kg/ha 5.09E-04 Ecoinvent V2, Tillage, rotary cultivator Methane, chlorotifluoro-, CFC-13 air unspecified kg 14400 kg CO2-Eq 2.81E-10 kg/ha 0.00E-00 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air low population density kg 8.7 kg CO2-Eq 6.14E-10 kg/ha 5.34E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air low population density kg 8.7 kg CO2-Eq 6.14E-10 kg/ha 5.34E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air low population density kg 10900 kg CO2-Eq 1.55E-10 kg/ha 1.69E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 2.94E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air unspecified kg 10900 kg CO2-Eq 7.07E-16 kg/ha 2.94E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air low population density kg 200-Eq 3.27E-13 kg/ha 6.87E-11 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro-, HCFC-21 air logopulation density kg 25 kg CO2-Eq 3.27E-13 kg/ha 6.87E-11 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro-, HCFC-21 air logopulation density kg 25 kg CO2-Eq 2.99E-03 kg/ha 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator Methane, fossil air high population density kg 25 kg CO2-Eq 2.99E-03 kg/ha 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator | CFC-22 air high population density kg 1810 kg CO2-Eq 2.70E-09 kg/ha 4.89E-06 Ecoinvent V2, Tillage, rotary cultivator | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -09 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -07 kg/ha -08 kg/ha -15 kg/ha -15 kg/ha -15 kg/ha -12 kg/ha -12 kg/ha -11 kg/ha -11 kg/ha -12 kg/ha -15 kg/ha -15 kg/ha -16 kg/ha -17 kg/ha -17 kg/ha -18 kg/ha -19 kg/ha -19 kg/ha -19 kg/ha -19 kg/ha -19 kg/ha -19 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.81E-12 kg CO2-Eq 1.15E-10 kg CO2-Eq 1.15E-10 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq 4.41E-05 kg CO2-Eq 4.42E-07 kg CO2-Eq 4.43E-07 kg CO2-Eq 4.43E-07 kg CO2-Eq 4.44E-05 kg CO2-Eq 5.92E-07 kg CO2-Eq 5.92E-05 kg CO2-Eq 1.44E-05 kg CO2-Eq 5.92E-05 kg CO2-Eq 9.41E-05 kg CO2-Eq 9.41E-05 kg CO2-Eq 1.06E-15 kg CO2-Eq 7.29E-08 kg CO2-Eq 7.29E-08 kg CO2-Eq 7.29E-08 kg CO2-Eq 7.29E-08 | 30 30 398 298 298 298 298 1430 1430 6130 6130 6130 124 124 10000 609 12200 12200 25 25 25 5 1890 7140 7140 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density unspecified low population density low population density unspecified unspecified low population density high population density high population density | air air air air air air air air air air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromot-, Halon 1001 Methane, bromot-, Halon 1001 Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 |
| Methane, chlorotrifluoro , CFC-13 air unspecified kg 14400 kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro , HCC-30 air high population density kg 8.7 kg CO2-Eq 2.81E-10 kg/ha 2.45E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air high population density kg 8.7 kg CO2-Eq 6.14E-10 kg/ha 5.34E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air high population density kg 10900 kg CO2-Eq 1.55E-10 kg/ha 1.69E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro , CFC-12 air low population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 2.94E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro , CFC-12 air unspecified kg 10900 kg CO2-Eq 7.07E-16 kg/ha 7.17E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro , HCFC-21 air Ecoinvent V2, Tillage, 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population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density low population density unspecified unspecified unspecified low population density high population density | air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromot-, Halon 1001 Methane, bromot-, Halon 1001 Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 |
| Methane, dichloro-, HCC-30 air high population density kg 8.7 kg CO2-Eq 2.81E-10 kg/ha 2.45E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCC-30 air low population density kg 8.7 kg CO2-Eq 6.14E-10 kg/ha 5.34E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-diffuoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 1.55E-10 kg/ha 2.94E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-diffuoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 2.94E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, CFC-12 air low population density kg 10900 kg CO2-Eq 7.07E-16 kg/ha 7.15E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloro-, HCFC-21 air low population density kg 210 kg CO2-Eq 7.07E-16 kg/ha 7.15E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, fossil air high population density kg 25 kg CO2-Eq 2.99E-03 kg/ha 7.46E-12 Ecoinvent V2, Tillage, rotary cultivator | | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.88E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq 5.30E-09 kg/ha 0.57E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq 8.29E-07 kg/ha 0.00E-00 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -00 kg/ha -10 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -07 kg/ha -07 kg/ha -07 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -08 kg/ha -09 kg/ha | kg CO2-Eq | 30 30 30 298 298 298 298 1430 1430 6130 6130 6130 6130 124 124 10000 609 12200 12200 25 25 25 5 1890 7140 7140 | kg k | low population density unspecified high population density lower stratosphere + upper troposph unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified low population density low population density low population density unspecified low population density high population density high population density | air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromo-, Halon 1001 Methane, bromo-halon 1001 Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, chlorodifluoro-, HCFC-22 |
| Methane, dichloro-, HCC-30 air low population density kg 8.7 kg CO2-Eq 6.14E-10 kg/ha 5.34E-09 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 1.55E-10 kg/ha 1.69E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 2.94E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 7.71E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, HCFC-21 air figh population density kg 210 kg CO2-Eq 3.27E-13 kg/ha 6.87E-11 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro-, HCFC-21 air figh population density kg 25 kg CO2-Eq 2.99E-03 kg/ha 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator Methane, fossil | | kg CO2-Eq | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -10 kg/ha -10 kg/ha -09 kg/ha -11 kg/ha kg/ha -09 kg/ha -09 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -08 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -09 kg/ha -01 kg/ha -02 kg/ha -03 kg/ha -04 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -07 kg/ha -08 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -08 kg/ha -09 kg/ha -09 kg/ha -09 kg/ha | kg CO2-Eq | 30 30 30 298 298 298 298 1430 1430 6130 6130 6130 124 10000 609 12200 12200 25 25 25 5 1890 7140 7140 7140 1810 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density low population density low population density low population density high population density | air | Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromochlorodifluoro-, Halon 1211 Methane, bromochlorodifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 |
| Methane, dichlorodifluoro-, CFC-12 air high population density kg 1090 kg CO2-Eq 1.55E-10 kg/ha 1.69E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 2.94E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air scoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodifluoro-, CFC-12 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro-, HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro-, HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro-, HCFC-21 air Ecoinvent V2, Tillage, rotary cultivator Methane, fossil air high population density kg 25 kg CO2-Eq 2.99E-03 kg/ha 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator | | kg CO2-Eq 5.85E.09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 1.5E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 1.0E-05 Ecoinvent V2, Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E-00 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 3.43E-05 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 3.43E-05 Ecoinvent V2, Tillage kg CO2-Eq kg/ha < | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -07 kg/ha -08 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -08 kg/ha -07 kg/ha -08 kg/ha -07 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 3.92E-16 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.83E-03 kg CO2-Eq 5.81E-12 kg CO2-Eq 1.15E-10 kg CO2-Eq 1.15E-10 kg CO2-Eq 7.44E-09 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 4.02-Eq 1.43E-07 kg CO2-Eq 2.22E-06 kg CO2-Eq 2.22E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 1.43E-07 kg CO2-Eq 1.44E-05 kg CO2-Eq 1.46E-05 kg CO2-Eq 1.06E-15 kg CO2-Eq 7.29E-08 kg CO2-Eq 7.29E-08 kg CO2-Eq 7.63E-07 kg CO2-Eq 2.70E-09 kg CO2-Eq 2.81E-07 kg CO2-Eq 2.70E-09 kg CO2-Eq 2.81E-07 | 30 30 30 298 298 298 298 1430 1430 1430 6130 6130 124 124 10000 609 12200 25 25 25 5 1890 7140 7140 1810 1810 1810 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density low population density low population density unspecified low population density high population density low population density high population density low population density high population density high population density high population density low population density | air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,2,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromothorodifluoro-, Halon 1211 Methane, bromothorodifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, chlorodifluoro-, HGFC-22 Methane, chlorodifluoro-, CFC-22 Methane, chlorodifluoro-, CFC-22 Methane, chlorodifluoro-, CFC-22 Methane, chlorodifluoro-, CFC-22 |
| Methane, dichlorodiffuoro-, CFC-12 air low population density kg 10900 kg CO2-Eq 2.70E-10 kg/ha 2.94E-06 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodiffuoro-, CFC-12 air unspecified kg 10900 kg CO2-Eq 7.07E-16 kg/ha 7.71E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichloroffuoro-, CFC-12 air Ecoinvent V2, Tillage, rotary cultivator Methane, fossil air high population density kg 25 kg CO2-Eq 2.99E-03 kg/ha 7.46E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodiffuoro-, CFC-12 air Ecoinvent V2, Tillage, rotary cultivator Methane, fossil 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorodiffuoro-, CFC-12 air Ecoinvent V2, Tillage, rotary cultivator | | kg CO2-Eq 5.85E.09 kg/ha 1.76E-07 Ecoinvent V2, Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2, Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2, Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2, Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2, Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2, Tillage kg CO2-Eq 1.15E-10 kg/ha 1.64E-07 Ecoinvent V2, Tillage kg CO2-Eq 7.44E-09 kg/ha 1.06E-05 Ecoinvent V2, Tillage kg CO2-Eq 2.22E-06 kg/ha 3.17E-03 Ecoinvent V2, Tillage kg CO2-Eq 5.30E-09 kg/ha 0.00E+00 Ecoinvent V2, Tillage kg CO2-Eq 5.30E-09 kg/ha 0.57E-07 Ecoinvent V2, Tillage kg CO2-Eq kg/ha 0.00E+00 Ecoinvent V2, Tillage | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -07 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -05 kg/ha -07 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -09 kg/ha -005 kg/ha -010 kg/ha | kg CO2-Eq 5.85E-09 kg CO2-Eq 2.07E-10 kg CO2-Eq 3.92E-16 kg CO2-Eq 2.10E-04 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.83E-03 kg CO2-Eq 1.81E-10 kg CO2-Eq 1.18E-04 kg CO2-Eq 1.18E-04 kg CO2-Eq 2.2E-06 kg CO2-Eq 3.89E-11 kg CO2-Eq 3.89E-11 kg CO2-Eq 5.30E-09 kg CO2-Eq 4.48E-09 kg CO2-Eq 4.48E-09 kg CO2-Eq 4.48E-09 kg CO2-Eq 4.48E-07 kg CO2-Eq 4.48E-05 kg CO2-Eq 5.30E-09 kg CO2-Eq 5.30E-09 kg CO2-Eq 1.44E-05 kg CO2-Eq 5.92E-05 kg CO2-Eq 1.44E-05 kg CO2-Eq 9.41E-05 kg CO2-Eq 9.41E-05 kg CO2-Eq 1.06E-15 kg CO2-Eq 1.06E-15 kg CO2-Eq 2.05E-12 kg CO2-Eq 2.81E-07 | 30 30 30 298 298 298 298 1430 1430 1430 6130 6130 124 124 10000 609 12200 25 25 25 5 1890 7140 7140 1810 1810 1840 8.7 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density unspecified low population density low population density low population density unspecified low population density high population density high population density low population density high population density high population density high population density high population density low population density high population density unspecified high population density | air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,12-tetrafluoro-, HFC-134a Ethane, 1,1,12-tetrafluoro-, HFC-134a Ethane, 1,1,12-tetrafluoro-, LFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,12-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,12-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromo-, Halon 1001 Methane, bromo-, Halon 1001 Methane, bromotrifluoro-, Halon 1301 Methane, chlorodifluoro-, Halon 1301 Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 Methane, chlorotifluoro-, HCFC-13 Methane, dichloro-, HCC-30 |
| Methane, dichlorodifluoro-, CFC-12 air unspecified kg 10900 kg CO2-Eq 7.07E-16 kg/ha 7.71E-12 Ecoinvent V2, Tillage, rotary cultivator Methane, dichlorofluoro-, HCFC-21 air high population density kg 210 kg CO2-Eq 3.27E-13 kg/ha 6.87E-11 Ecoinvent V2, Tillage, rotary cultivator Methane, fossil air high population density kg 25 kg CO2-Eq 2.99E-03 kg/ha 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator | | kg CO2-Eq | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha -12 kg/ha -13 kg/ha -14 kg/ha -15 kg/ha -15 kg/ha -16 kg/ha -17 kg/ha -18 kg/ha -19 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha | kg CO2-Eq | 30 30 30 298 298 298 298 1430 1430 1430 6130 6130 6130 124 10000 609 12200 12200 25 25 5 1890 7140 7140 1810 1810 14400 8.7 8.7 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified low population density low population density low population density unspecified unspecified unspecified low population density high population density high population density low population density unspecified high population density | air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromo-, Halon 1001 Methane, bromo-fluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 Methane, chlorotrifluoro-, HCFC-22 Methane, chlorotrifluoro-, HCC-30 Methane, dichloro-, HCC-30 Methane, dichloro-, HCC-30 |
| Methane, dichlorofluoro-, HCFC-21 air high population density kg 210 kg CO2-Eq 3.27E-13 kg/ha 6.87E-11 Ecoinvent V2, Tillage, rotary cultivator Methane, fossil air high population density kg 25 kg CO2-Eq 2.99E-03 kg/ha 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator | | kg CO2-Eq | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -04 kg/ha -05 kg/ha -07 kg/ha -08 kg/ha -09 kg/ha -09 kg/ha -007 kg/ha -008 kg/ha -009 kg/ha | kg CO2-Eq | 30 30 30 298 298 298 298 1430 1430 6130 6130 6130 6130 124 124 10000 609 12200 25 25 25 5 1890 7140 7140 1810 1810 1440 8.7 8.7 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density low population density low population density low population density unspecified low population density high population density high population density low population density low population density high population density low population density | air | Chloroform Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,2,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromorifluoro-, Halon 1301 Methane, bromotifluoro-, Halon 1301 Methane, bromotifluoro-, Halon 1301 Methane, bromotifluoro-, HGFC-22 Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCC-30 Methane, dichloro-, HCC-30 |
| Methane, fossil air high population density kg 25 kg CO2-Eq 2.99E-03 kg/ha 7.46E-02 Ecoinvent V2, Tillage, rotary cultivator | | kg CO2-Eq 5.85E-09 kg/ha 1.76E-07 Ecoinvent V2. Tillage kg CO2-Eq 2.07E-10 kg/ha 6.22E-09 Ecoinvent V2. Tillage kg CO2-Eq 3.92E-16 kg/ha 1.18E-14 Ecoinvent V2. Tillage kg CO2-Eq 2.10E-04 kg/ha 6.27E-02 Ecoinvent V2. Tillage kg CO2-Eq 1.83E-03 kg/ha 6.27E-02 Ecoinvent V2. Tillage kg CO2-Eq 1.83E-03 kg/ha 5.46E-01 Ecoinvent V2. Tillage kg CO2-Eq 5.81E-12 kg/ha 1.73E-09 Ecoinvent V2. Tillage kg CO2-Eq 1.18E-04 kg/ha 3.53E-02 Ecoinvent V2. Tillage kg CO2-Eq 1.18E-04 kg/ha 1.64E-07 Ecoinvent V2. Tillage kg CO2-Eq 1.18E-04 kg/ha 1.64E-07 Ecoinvent V2. Tillage kg CO2-Eq 7.44E-09 kg/ha 1.64E-07 Ecoinvent V2. Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2. Tillage kg CO2-Eq 3.89E-11 kg/ha 2.38E-07 Ecoinvent V2. Tillage kg CO2-Eq 3.89E-11 kg/ha 0.00E-00 Ecoinvent V2. Tillage kg CO2-Eq 4.43E-07 kg/ha 0.00E-00 Ecoinvent V2. Tillage kg CO2-Eq 4.44E-09 kg/ha 0.00E-00 Ecoinvent V2. Tillage kg CO2-Eq 5.30E-09 kg/ha 0.00E-00 Ecoinvent V2. Tillage kg CO2-Eq 4.82E-07 kg/ha 0.00E-00 Ecoinvent V2. Tillage kg CO2-Eq 4.43E-07 kg/ha 1.43E-03 Ecoinvent V2. Tillage kg CO2-Eq 4.82E-07 kg/ha 1.43E-03 Ecoinvent V2. Tillage kg CO2-Eq 4.82E-07 kg/ha 3.43E-05 Ecoinvent V2. Tillage kg CO2-Eq 4.94E-05 kg/ha 3.43E-05 Ecoinvent V2. Tillage kg CO2-Eq 4.94E-05 kg/ha 3.43E-05 Ecoinvent V2. Tillage kg CO2-Eq 4.44E-05 kg/ha 3.60E-04 Ecoinvent V2. Tillage kg CO2-Eq 5.92E-05 kg/ha 1.48E-03 Ecoinvent V2. Tillage kg CO2-Eq 5.92E-05 kg/ha 1.48E-03 Ecoinvent V2. Tillage kg CO2-Eq 5.92E-05 kg/ha 1.48E-03 Ecoinvent V2. Tillage kg CO2-Eq 2.76E-09 kg/ha 5.32E-15 Ecoinvent V2. Tillage kg CO2-Eq 2.76E-09 kg/ha 5.32E-15 Ecoinvent V2. Tillage kg CO2-Eq 2.76E-09 kg/ha 5.32E-15 Ecoinvent V2. Tillage kg CO2-Eq 2.76E-09 kg/ha 5.34E-09 Ecoinvent V2. Tillage kg CO2-Eq 2.76E-09 kg/ha 5.34E-09 Ecoinvent V2. Tillage kg CO2-Eq 2.76E-09 kg/ha 5.34E-09 Ecoinvent V2. Tillage kg CO2-Eq 6.14E-10 kg/ha 5.34E | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha -11 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -08 kg/ha -07 kg/ha -09 kg/ha -10 kg/ha | kg CO2-Eq | 30 30 30 298 298 298 298 1430 1430 1430 6130 124 124 10000 609 12200 12200 25 25 25 25 5 1880 7140 7140 1810 1840 8.7 8.7 10900 10900 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density low population density high population density high population density low population density high population density high population density high population density high population density | air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, LFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-, HFC-152a Ethane, 1,2-dichloro-1,1,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-terafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-13 Methane, dichlorodifluoro-, CFC-13 Methane, dichlorodifluoro-, CFC-12 |
| | | kg CO2-Eq | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -08 kg/ha -09 kg/ha -10 kg/ha | kg CO2-Eq | 30 30 30 30 298 298 298 298 1430 1430 1430 6130 6130 124 124 10000 609 12200 12200 25 25 25 5 1890 7140 7140 1810 1810 1840 8.7 8.7 8.7 10900 10900 10900 10900 | kg k | low population density unspecified high population density lower stratosphere + upper troposph unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified low population density low population density low population density unspecified low population density high population density high population density high population density low population density high population density low population density | air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HFC-124 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromor-Halon 1001 Methane, bromortifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 Methane, dichloro-, HCC-30 Methane, dichlorodifluoro-, CFC-12 |
| Melnane, rossu air tow population density kg 25 kg C/O2-Eq 1.01E-01 kg/ba 2.52E-00 Ecoinvent V2. Tillage, rotary cultivator | | kg CO2-Eq | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -04 kg/ha -09 kg/ha -11 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -08 kg/ha -09 kg/ha -09 kg/ha -005 kg/ha -005 kg/ha -005 kg/ha -007 kg/ha -007 kg/ha -10 kg/ha | kg CO2-Eq | 30 30 30 298 298 298 298 1430 1430 1430 6130 6130 6130 6130 124 124 10000 609 12200 25 25 25 5 1890 7140 7140 1810 1810 1810 1810 1840 8.7 10900 10900 10900 10900 210 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified low population density low population density low population density unspecified low population density unspecified low population density high population density high population density low population density | air | Chloroform Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,2,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromo-, Halon 1001 Methane, bromo-, Halon 1001 Methane, bromotifluoro-, Halon 1301 Methane, bromotifluoro-, Halon 1301 Methane, bromotifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 Methane, dichloro-, HCC-30 Methane, dichloro-difluoro-, CFC-12 Methane, dichlorodifluoro-, HCFC-21 |
| | | kg CO2-Eq | -10 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -09 kg/ha -09 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -07 kg/ha -08 kg/ha -07 kg/ha -08 kg/ha -09 kg/ha -005 kg/ha -005 kg/ha -10 kg/ha -11 kg/ha -13 kg/ha | kg CO2-Eq | 30 30 30 298 298 298 298 1430 1430 1430 6130 6130 124 124 10000 609 12200 25 25 25 25 5 1890 7140 7140 1810 1810 14400 8.7 8.7 10900 10900 10900 10900 210 | kg k | low population density unspecified high population density low population density lower stratosphere + upper troposph unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density low population density low population density low population density unspecified unspecified unspecified low population density high population density low population density low population density low population density low population density unspecified high population density low population density unspecified high population density | air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, LFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, bexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromot-, Halon 1001 Methane, bromot-, Halon 1001 Methane, bromot-fluoro-, Halon 1301 Methane, chlorodifluoro-, Halon 1301 Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 Methane, dichloro-, HCC-30 Methane, dichloro-, HCC-30 Methane, dichloro-, HCC-30 Methane, dichloro-, HCC-30 Methane, dichloro-, CFC-12 Methane, dichlorodifluoro-, CFC-12 Methane, dichlorofiluoro-, CFC-12 Methane, dichlorofiluoro-, CFC-12 Methane, dichlorofiluoro-, HCFC-21 Methane, dichlorofluoro-, HCFC-21 Methane, dichlorofluoro-, HCFC-21 Methane, dichlorofluoro-, HCFC-21 Methane, fossil |
| | | kg CO2-Eq | -10 kg/ha -16 kg/ha -04 kg/ha -04 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -10 kg/ha -10 kg/ha -10 kg/ha -11 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -07 kg/ha -05 kg/ha -07 kg/ha -08 kg/ha -09 kg/ha -01 kg/ha -11 kg/ha -11 kg/ha -12 kg/ha -10 kg/ha -11 kg/ha -10 kg/ha -11 kg/ha -10 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha -11 kg/ha | kg CO2-Eq | 30 30 30 30 298 298 298 298 1430 1430 1430 6130 6130 124 124 1000 609 12200 25 25 25 5 1880 7140 7140 1810 1810 1840 8.7 8.7 10900 10900 10900 10900 210 25 25 25 25 | kg k | low population density unspecified high population density lower stratosphere + upper troposph unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified low population density low population density low population density low population density unspecified high population density low population density high population density high population density low population density high population density high population density | air | Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,12-tetrafluoro-, HFC-134a Ethane, 1,1,12-tetrafluoro-, HFC-134a Ethane, 1,1,12-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromor-, Halon 1001 Methane, bromor-, Halon 1001 Methane, bromortifluoro-, Halon 1301 Methane, bromotrifluoro-, Halon 1301 Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCC-30 Methane, dichloro-, HCC-30 Methane, dichlorodifluoro-, CFC-12 Methane, fossil Methane, fossil |
| Methane, fossil air unspecified kg 25 kg CO2-Eq 1.19E-04 kg/ha 2.98E-03 Ecoinvent V2, Tillage, rotary cultivator | air unspecified kg 25 kg CO2-Eq 1.19E-04 kg/ha 2.98E-03 Ecoinvent V2, Tillage, rotary cultivator | kg CO2-Eq | -10 kg/ha -16 kg/ha -16 kg/ha -04 kg/ha -03 kg/ha -03 kg/ha -12 kg/ha -04 kg/ha -04 kg/ha -09 kg/ha -11 kg/ha -09 kg/ha -11 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -07 kg/ha -09 kg/ha -07 kg/ha -09 kg/ha -007 kg/ha -005 kg/ha -007 kg/ha -007 kg/ha -100 kg/ha | kg CO2-Eq | 30 30 30 30 398 298 298 298 298 1430 1430 1430 6130 6130 6130 6130 124 124 10000 609 12200 25 25 5 1890 7140 7140 7140 1810 1810 18400 8.7 8.7 10900 10900 10900 10900 210 25 25 25 25 25 25 25 25 25 25 25 25 25 | kg k | low population density unspecified high population density low population density low population density lower stratosphere + upper troposph unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density low population density low population density low population density unspecified unspecified low population density high population density high population density low population density high population density high population density low population density lower stratosphere + upper troposph | air | Chloroform Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,2,2-tetrafluoro-, HCFC-124 Ethane, hexafluoro-, HFC-116 Methane, biogenic Methane, biogenic Methane, biogenic Methane, biogenic Methane, bromo-, Halon 1001 Methane, bromo-, Halon 1011 Methane, bromotifluoro-, Halon 1301 Methane, bromotifluoro-, Halon 1301 Methane, bromotifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 Methane, dichloro-, HCC-30 Methane, dichlorofiluoro-, CFC-12 Methane, dichlorofiluoro-, CFC-12 Methane, fossil Methane, fossil Methane, fossil |

| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 3.19E-08 | kg/ha | 4.47E-05 | Ecoinvent V2, Tillage, rotary cultivator |
|---|----------|-----------------------------------|----------|-------------|----------------|----------------------|----------------|----------------------|--|
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 3.16E-13 | kg/ha | 4.43E-10 | Ecoinvent V2, Tillage, rotary cultivator |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 2.72E-10 | kg/ha | 2.01E-06 | Ecoinvent V2, Tillage, rotary cultivator |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 7.46E-06 | kg/ha | 5.51E-02 | Ecoinvent V2, Tillage, rotary cultivator |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 5.31E-13 | kg/ha | 2.52E-09 | Ecoinvent V2, Tillage, rotary cultivator |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 1.04E-10 | kg/ha | 1.54E-06 | Ecoinvent V2, Tillage, rotary cultivator |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eg | | kg/ha | 0.00E+00 | Ecoinvent V2, Tillage, rotary cultivator |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 2.19E-09 | kg/ha | 4.99E-05 | Ecoinvent V2, Tillage, rotary cultivator |
| Sulfur hexafluoride Sulfur hexafluoride | air | | kg | | | 7.86E-07 | | 1.79E-02 | |
| | | unspecified | 0 | 22800 | kg CO2-Eq | | kg/ha | | Ecoinvent V2, Tillage, rotary cultivator |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 5.12E-12 | kg/ha | 6.66E-11 | Ecoinvent V2, Tillage, rotary cultivator |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 1.12E-09 | kg/ha | 1.46E-08 | Ecoinvent V2, Tillage, rotary cultivator |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 4.66E-04 | kg/ha | 4.66E-04 | Ecoinvent V2, Tillage, rotary cultivator |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, Tillage, rotary cultivator |
| | | | | | | | | 7.56E+01 | Ecoinvent V2, Tillage, rotary cultivator |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 5.72E-05 | kg/ha | 1.08E-04 | Ecoinvent V2, Tillage, rotary cultivator |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 4.18E-04 | kg/ha | 7.86E-04 | Ecoinvent V2, Tillage, rotary cultivator |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 8.69E-04 | kg/ha | 1.63E-03 | Ecoinvent V2, Tillage, rotary cultivator |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 6.35E-04 | kg/ha | 5.59E-04 | Ecoinvent V2, Tillage, rotary cultivator |
| Hydrogen chloride | air | | kg | 0.88 | kg SO2-Eq | 2.46E-04 | kg/ha | 2.16E-04 | |
| | air | low population density | o o | | | | | | Ecoinvent V2, Tillage, rotary cultivator |
| Hydrogen chloride | | unspecified | kg | 0.88 | kg SO2-Eq | 3.20E-04 | kg/ha | 2.81E-04 | Ecoinvent V2, Tillage, rotary cultivator |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 2.22E-05 | kg/ha | 3.54E-05 | Ecoinvent V2, Tillage, rotary cultivator |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 5.66E-05 | kg/ha | 9.05E-05 | Ecoinvent V2, Tillage, rotary cultivator |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 7.42E-05 | kg/ha | 1.19E-04 | Ecoinvent V2, Tillage, rotary cultivator |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 1.18E-06 | kg/ha | 2.22E-06 | Ecoinvent V2, Tillage, rotary cultivator |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 1.38E-04 | kg/ha | 2.59E-04 | Ecoinvent V2, Tillage, rotary cultivator |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eg | 5.72E-05 | kg/ha | 1.08E-04 | Ecoinvent V2, Tillage, rotary cultivator |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eg | 1.21E-02 | kg/ha | 8.50E-03 | Ecoinvent V2, Tillage, rotary cultivator |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eg | 6.19E-01 | kg/ha | 4.33E-01 | Ecoinvent V2, Tillage, rotary cultivator |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eg | 2.41E-02 | kg/ha | 1.69E-02 | Ecoinvent V2, Tillage, rotary cultivator |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 2.53E-02 | kg/ha | 2.53E-02 | Econivent V2, Tinage, totary cultivator |
| | | | o o | <u> </u> | | | | | |
| Sulfur dioxide | air | low population density | kg | ! | kg SO2-Eq | 7.00E-02 | kg/ha | 7.00E-02 | Ecoinvent V2, Tillage, rotary cultivator |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 8.99E-03 | kg/ha | 8.99E-03 | Ecoinvent V2, Tillage, rotary cultivator |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 6.02E-06 | kg/ha | 1.13E-05 | Ecoinvent V2, Tillage, rotary cultivator |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 1.06E-12 | kg/ha | 6.90E-13 | Ecoinvent V2, Tillage, rotary cultivator |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, Tillage, rotary cultivator |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 5.27E-12 | kg/ha | 3.42E-12 | Ecoinvent V2, Tillage, rotary cultivator |
| | | | | | | | | 5.67E-01 | Ecoinvent V2, Tillage, rotary cultivator |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eg | 1.47E-06 | kg/ha | 4.50E-06 | Ecoinvent V2, Tillage, rotary cultivator |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 2.60E-07 | kg/ha | 7.96E-07 | Ecoinvent V2, Tillage, rotary cultivator |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 2.42E-07 | kg/ha | 7.40E-07 | Ecoinvent V2, Tillage, rotary cultivator |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 2.38E-09 | kg/ha | 7.27E-09 | |
| | | | | | | | | | Ecoinvent V2, Tillage, rotary cultivator |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 1.45E-06 | kg/ha | 4.43E-06 | Ecoinvent V2, Tillage, rotary cultivator |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 2.05E-05 | kg/ha | 6.26E-05 | Ecoinvent V2, Tillage, rotary cultivator |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.37E-01 | kg/ha | 3.02E-03 | Ecoinvent V2, Tillage, rotary cultivator |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 8.33E-04 | kg/ha | 1.83E-05 | Ecoinvent V2, Tillage, rotary cultivator |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.39E-01 | kg/ha | 3.06E-03 | Ecoinvent V2, Tillage, rotary cultivator |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 8.37E-04 | kg/ha | 1.84E-05 | Ecoinvent V2, Tillage, rotary cultivator |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.73E-05 | kg/ha | 1.73E-05 | Ecoinvent V2, Tillage, rotary cultivator |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 1.20E-05 | kg/ha | 3.67E-05 | Ecoinvent V2, Tillage, rotary cultivator |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 9.94E-08 | kg/ha | 3.04E-07 | Ecoinvent V2, Tillage, rotary cultivator |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | 0.01L 00 | kg/ha | 0.00E+00 | Econivent V2, Tillage, rotary cultivator |
| i nosphone delu | dii | nigh population density | ку | 0.97 | ky FO4-Eq | | кула | | |
| | <u> </u> | | | | | | | 6.24E-03 | Ecoinvent V2, Tillage, rotary cultivator |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 1.52E+00 | kg/ha | 1.51E+01 | Ecoinvent V2, Tillage, rotary cultivator |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 6.73E+00 | kg/ha | 1.29E+02 | Ecoinvent V2, Tillage, rotary cultivator |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 6.56E-02 | Nm3/ha | 2.61E+00 | Ecoinvent V2, Tillage, rotary cultivator |
| | resource | in ground | Nm3 | 38.293 | MJ-Eq | 2.62E+00 | Nm3/ha | 1.00E+02 | Ecoinvent V2, Tillage, rotary cultivator |
| Gas, natural, in ground | resource | | | | | | | | |
| Gas, natural, in ground Oil, crude, in ground | resource | | kg | 45.8 | MJ-Eq | 1.80E+01 | kg/ha | 8.24E+02 | Ecoinvent V2, Tillage, rotary cultivator |
| | | in ground biotic | kg kg | 45.8 9.9 | MJ-Eq MJ-Eq | 1.80E+01 2.89E-04 | kg/ha kg/ha | 8.24E+02 2.86E-03 | Ecoinvent V2, Tillage, rotary cultivator Ecoinvent V2, Tillage, rotary cultivator |

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Broadcasting, See FC2
Ecoinvent V2, fertilizing, by broadcaster, CH

Ecoinvent, V2 tillage, harrowing, by rotary harrow

| back to top | | | | | | | | | |
|--|-----|--|----|--------|-----------|----------|-------|----------|--|
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 1.03E+01 | kg/ha | 1.03E+01 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 4.19E+01 | kg/ha | 4.19E+01 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 5.18E-07 | kg/ha | 5.18E-07 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 7.28E+00 | kg/ha | 7.28E+00 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 3.84E-03 | kg/ha | 6.04E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 1.04E-01 | kg/ha | 1.64E-01 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 6.09E-10 | kg/ha | 9.57E-10 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.63E-01 | kg/ha | 2.56E-01 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 5.08E-09 | kg/ha | 1.52E-07 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 1.81E-10 | kg/ha | 5.43E-09 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 3.47E-16 | kg/ha | 1.04E-14 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 1.79E-04 | kg/ha | 5.33E-02 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 1.50E-03 | kg/ha | 4.47E-01 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 4.94E-12 | kg/ha | 1.47E-09 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 1.01E-04 | kg/ha | 3.02E-02 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 9.87E-11 | kg/ha | 1.41E-07 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 6.46E-09 | kg/ha | 9.23E-06 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 1.82E-06 | kg/ha | 2.61E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 3.33E-11 | kg/ha | 2.04E-07 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 4.57E-09 | kg/ha | 5.67E-07 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 1.24E-07 | kg/ha | 1.24E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| | | | | | | | | | |

| Til o ll 4440 | | 10.1 | • | 200 | 1 000 F | | | 0.000 | |
|--|----------|--|------------|----------------|----------------|----------------------|--------|----------------------|---|
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 2.41E-09 | kg/ha | 2.94E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 7.39E-07 | kg/ha | 9.01E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 1.19E-05 | kg/ha | 2.96E-04 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 8.04E-05 | kg/ha | 2.01E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, biogenic | air | | kg | 25 | kg CO2-Eq | 5.09E-05 | kg/ha | 1.27E-03 | |
| | | unspecified | | | | | | | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 9.42E-16 | kg/ha | 4.71E-15 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 6.33E-08 | kg/ha | 1.20E-04 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 1.84E-12 | kg/ha | 1.32E-08 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 6.27E-07 | kg/ha | 4.48E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 2.28E-09 | kg/ha | 4.13E-06 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| | | | | | | | | | |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 2.44E-07 | kg/ha | 4.41E-04 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.43E-10 | kg/ha | 2.11E-09 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 5.36E-10 | kg/ha | 4.66E-09 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.33E-10 | kg/ha | 1.44E-06 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| | | | | 10900 | | | | | |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | | kg CO2-Eq | 2.33E-10 | kg/ha | 2.54E-06 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 6.26E-16 | kg/ha | 6.83E-12 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 2.81E-13 | kg/ha | 5.89E-11 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 2.57E-03 | kg/ha | 6.42E-02 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 8.50E-02 | kg/ha | 2.12E+00 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, fossil | air | | | 25 | | 8.23E-12 | kg/ha | 2.06E-10 | |
| | | lower stratosphere + upper troposphere | kg | | kg CO2-Eq | | | | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 9.61E-05 | kg/ha | 2.40E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 2.70E-08 | kg/ha | 3.78E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 2.80E-13 | kg/ha | 3.92E-10 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 2.35E-10 | kg/ha | 1.74E-06 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, tetrafluoro-, R-14 | | | | | | | | | |
| | air | unspecified | kg | 7390 | kg CO2-Eq | 6.65E-06 | kg/ha | 4.91E-02 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 4.56E-13 | kg/ha | 2.16E-09 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 8.93E-11 | kg/ha | 1.32E-06 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.61E-09 | kg/ha | 3.66E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Sulfur hexafluoride | air | | kg | 22800 | | 6.77E-07 | kg/ha | 1.54E-02 | |
| | | unspecified | | | kg CO2-Eq | | • | | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 4.35E-12 | kg/ha | 5.66E-11 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 9.78E-10 | kg/ha | 1.27E-08 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 3.95E-04 | kg/ha | 3.95E-04 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Will ogen nuoride | dii | mgn population density | Kg. | 17200 | Ng OOZ Eq | | Ng/Tid | 6.27E+01 | |
| | | | | | | | | | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 4.75E-05 | kg/ha | 8.93E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 3.46E-04 | kg/ha | 6.50E-04 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 7.47E-04 | kg/ha | 1.40E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Hydrogen chloride | air | high population density | ka | 0.88 | kg SO2-Eq | 5.55E-04 | kg/ha | 4.89E-04 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| | air | | lea lea | 0.88 | | 2.10E-04 | kg/ha | 1.85E-04 | |
| Hydrogen chloride | | low population density | кg | | kg SO2-Eq | | | | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 2.76E-04 | kg/ha | 2.43E-04 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.93E-05 | kg/ha | 3.08E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 4.85E-05 | kg/ha | 7.77E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Hydrogen fluoride | air | unspecified | kσ | 1.6 | kg SO2-Eq | 6.51E-05 | kg/ha | 1.04E-04 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| | air | | ng loo | 1.88 | kg SO2-Eq | 8.41E-07 | kg/ha | 1.58E-06 | |
| Hydrogen sulfide | | high population density | , kg | | | | | | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 1.20E-04 | kg/ha | 2.26E-04 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 5.00E-05 | kg/ha | 9.41E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 1.04E-02 | kg/ha | 7.25E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Nitrogen oxides | air | low population density | ka | 0.7 | kg SO2-Eq | 4.99E-01 | kg/ha | 3.49E-01 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| | air | | ng loo | 0.7 | | | | | |
| Nitrogen oxides | | unspecified | кg | 0.7 | kg SO2-Eq | 2.01E-02 | kg/ha | 1.41E-02 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 2.15E-02 | kg/ha | 2.15E-02 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 5.84E-02 | kg/ha | 5.84E-02 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 7.79E-03 | kg/ha | 7.79E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Hydrogen sulfide | water | river | kσ | 1.88 | kg SO2-Eq | 5.26E-06 | kg/ha | 9.89E-06 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Sulfuric acid | soil | agricultural | *6 ka | 0.65 | kg SO2-Eq | 9.10E-13 | kg/ha | 5.91E-13 | |
| | | | kg | | | 5.10E-13 | | | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 4.55E-12 | kg/ha | 2.95E-12 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| | | | | | | | | 4.62E-01 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 1.27E-06 | kg/ha | 3.88E-06 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 2.27E-07 | kg/ha | 6.96E-07 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| • | | | 0 | | | | 3 | | |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 2.10E-07 | kg/ha | 6.42E-07 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 2.12E-09 | kg/ha | 6.47E-09 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 1.24E-06 | kg/ha | 3.81E-06 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 1.69E-05 | kg/ha | 5.16E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.13E-01 | kg/ha | 2.49E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| | | | | | | | • | | |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 7.28E-04 | kg/ha | 1.60E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.14E-01 | kg/ha | 2.52E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 7.31E-04 | kg/ha | 1.61E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.51E-05 | kg/ha | 1.51E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 1.03E-05 | kg/ha | 3.15E-05 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Phosphorus | | | | | kg PO4-Eq | 8.15E-08 | • | 2.49E-07 | |
| • | water | unspecified | kg | 3.06 | | 6.13E-U8 | kg/ha | | Ecoinvent, Vz tillage, harrowing, by rotary harrow |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/ha | 0.00E+00 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| | | | | | | | | 5.14E-03 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 1.30E+00 | kg/ha | 1.29E+01 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| | resource | in ground | kg | 19.1 | MJ-Eq | 5.87E+00 | kg/ha | 1.12E+02 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Coal, hard, unspecified, in ground | resource | | | 39.8 | | 5.71E-02 | Nm3/ha | 2.27E+00 | |
| | | in ground | Nm3 | | MJ-Eq | | | | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | | and the control of th | | | | | | | |
| Gas, mine, off-gas, process, coal mining Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 2.22E+00 | Nm3/ha | 8.50E+01 | Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Gas, mine, off-gas, process, coal mining | | in ground in ground | Nm3 kg | 38.293 45.8 | MJ-Eq MJ-Eq | 2.22E+00 1.48E+01 | kg/ha | 8.50E+01 6.78E+02 | Ecoinvent, V2 tillage, harrowing, by rotary harrow Ecoinvent, V2 tillage, harrowing, by rotary harrow |
| Gas, mine, off-gas, process, coal mining Gas, natural, in ground | resource | | | | | | | | |

CC4 Plant Crop Ecoinvent V2, planting, CH

Planting

The inventory takes into account the diesel fuel consumption and the amount of agricultural machinery and of the shed, which has to be attributed to the planter. Also taken into consideration is the amount of emissions to the air from combustion and the emission to the soil from tyre abrasion during the work process. The following activities where considered part of the work process: preliminary work at the farm, like attaching the adequate machine to the tractor; transfer to field (with an assumed distance of 1 km); field work (for a parcel of land of 1 ha surface); transfer to farm and concluding work, like uncoupling the machine. The overlapping during the field work is considered. The planting material is not taken into account. Not included are dust other than from combustion and noise.

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| The second column 1 | | | | | | | | | | |
|--|---------------------------------|-----|-------------------------|---------------------------------------|--------|-----------|----------|-------|----------------------|----------------------------|
| The content of the | | | high population density | | 1 | kg CO2-Eq | 2.07E+01 | kg/ha | 2.07E+01 | Ecoinvent V2, planting, CH |
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| March Marc | | air | | | | | | | | |
| Hermone of the personal of the | rbon monoxide, fossil | air | | | 1.5714 | kg CO2-Eq | 2.01E-01 | | 3.16E-01 | |
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| Process | | air | | | | | | | | |
| The content of the | ane, 1,1-difluoro-, HFC-152a | air | | kg | 124 | | 7.78E-09 | | 9.64E-07 | Ecoinvent V2, planting, CH |
| The content of the | ane, 1,1-difluoro-, HFC-152a | air | | kg | 124 | kg CO2-Eq | | kg/ha | | |
| Manus Manu | | | low population density | kg | | | 2.16E-07 | | | |
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| ulfur dioxide air low population density kg 1 kg SQ2-Eq 1.03E-01 kg/ha 1.03E-01 kg/ha 1.03E-01 coinvent V2, planting, CH ulfur dioxide air unspecified kg 1 kg SQ2-Eq 1.11E-02 kg/ha 1.11E-02 kg/ha 1.11E-02 kg/ha 1.11E-02 kg/ha 1.13E-05 coinvent V2, planting, CH decoinvent V2, planting, CH ulfur caid soil agricultural kg 0.65 kg SQ2-Eq 3.54E-12 kg/ha 2.30E-12 coinvent V2, planting, CH decoinvent V2, planting, CH decoinve | rogen oxides | air | | | 0.7 | kg SO2-Eq | 3.37E-02 | kg/ha | | Ecoinvent V2, planting, CH |
| uffur dioxideairunspecifiedkg1kg SO2-Eq1.11E-02kg/ha1.11E-02kg/ha1.11E-02ydrogen sulfidewaterriverkg1.88kg SO2-Eq6.02E-06kg/ha1.13E-05Ecoinvent V2, planting, CHuffuric acidsoilagriculturalkg0.65kg SO2-Eq8,74E-12kg/ha2.30E-12Ecoinvent V2, planting, CHosphoric acidairhigh population densitykg0.98kg SO2-Eqkg/ha0.00E+00Ecoinvent V2, planting, CHuffuric acidairlow population densitykg0.65kg SO2-Eq7.73E-12kg/ha5.03E-12Ecoinvent V2, planting, CH | | | | kg | 1 | | | | | |
| ydrogen sulfide water river kg 1.88 kg SO2-Eq 6.02E-06 kg/ha 1.13E-05 Ecoinvent V2, planting, CH ulfuric acid soil agricultural kg 0.65 kg SO2-Eq 3.54E-12 kg/ha 2.30E-12 Ecoinvent V2, planting, CH Ecoinvent V2, planting, CH air high population density kg 0.98 kg SO2-Eq kg/ha 0.06E+10 Ecoinvent V2, planting, CH ulfuric acid air low population density kg 0.56 kg SO2-Eq 7.73E-12 kg/ha 5.05E-12 Ecoinvent V2, planting, CH | | | | | 1 | | | | | |
| ulfuric acid soil agricultural kg 0.65 kg SO2-Eq 3.54E-12 kg/ha 2.30E-12 Ecoinvent V2, planting, CH high population density kg 0.98 kg SO2-Eq Kg/ha 0.00E+00 Ecoinvent V2, planting, CH luftic acid air low population density kg 0.65 kg SO2-Eq 7.73E-12 kg/ha 5.03E-12 Ecoinvent V2, planting, CH | | | | . • | 1 | | | | | |
| nosphoric acid air high population density kg 0.98 kg SO2-Eq kg/ha 0.00E+00 Ecoinvent V2, planting, CH ulfuric acid air low population density kg 0.65 kg SO2-Eq 7.73E-12 kg/ha 5.03E-12 Ecoinvent V2, planting, CH | | | | | | | | | | |
| ulfuric acid air low population density kg 0.65 kg SO2-Eq 7.73E-12 kg/ha 5.03E-12 Ecoinvent V2, planting, CH | | | | | | | 3.54E-12 | | | |
| | | | | | 0.98 | | 7 725 12 | | | |
| | ilulio aciu | all | low population density | кд | 0.05 | ky SOZ-Eq | 1.13E-12 | kg/na | 5.03E-12 7.59E-01 | Econvent v2, planting, CH |

| DI I | | | | 0.00 | 1 0015 | 0.405.00 | | 0.505.00 | F : |
|--|----------|-----------------------------------|-----|--------|-----------|----------|--------|----------|----------------------------|
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 2.13E-06 | kg/ha | 6.50E-06 | Ecoinvent V2, planting, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 2.67E-07 | kg/ha | 8.17E-07 | Ecoinvent V2, planting, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 3.65E-07 | kg/ha | 1.12E-06 | Ecoinvent V2, planting, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 1.40E-08 | kg/ha | 4.27E-08 | Ecoinvent V2, planting, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 2.16E-06 | kg/ha | 6.62E-06 | Ecoinvent V2, planting, CH |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 2.76E-05 | kg/ha | 8.44E-05 | Ecoinvent V2, planting, CH |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.87E-01 | kg/ha | 4.11E-03 | Ecoinvent V2, planting, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 8.58E-04 | kg/ha | 1.89E-05 | Ecoinvent V2, planting, CH |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.90E-01 | kg/ha | 4.17E-03 | Ecoinvent V2, planting, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 8.69E-04 | kg/ha | 1.91E-05 | Ecoinvent V2, planting, CH |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 5.15E-05 | kg/ha | 5.15E-05 | Ecoinvent V2, planting, CH |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 2.46E-05 | kg/ha | 7.54E-05 | Ecoinvent V2, planting, CH |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 2.68E-07 | kg/ha | 8.22E-07 | Ecoinvent V2, planting, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, planting, CH |
| | | | | | | | | 8.55E-03 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 2.37E+00 | kg/ha | 2.35E+01 | Ecoinvent V2, planting, CH |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 7.43E+00 | kg/ha | 1.42E+02 | Ecoinvent V2, planting, CH |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 7.23E-02 | Nm3/ha | 2.88E+00 | Ecoinvent V2, planting, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 3.94E+00 | Nm3/ha | 1.51E+02 | Ecoinvent V2, planting, CH |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 2.49E+01 | kg/ha | 1.14E+03 | Ecoinvent V2, planting, CH |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 1.29E-03 | kg/ha | 1.27E-02 | Ecoinvent V2, planting, CH |
| | | | | | | | | 1.46E+03 | |

CC5 back to top Irrigate Crop

CC6 Apply Chemical Treatment Ecoinvent V2, application of plant protection products, by field sprayer, CH

The inventory takes into account the diesel fuel consumption and the amount of agricultural machinery and of the shed, which has to be attributed to the application of plant protection. Also taken into consideration is the amount of emissions to the air from combustion and the emission to the soil from tyre abrasion during the work process. The following activities where considered part of the work process: preliminary work at the farm, like attaching the adequate machine to the tractor; transfer to field (with an assumed distance of 1 km); field work (for a parcel of land of 1 ha surface); transfer to farm and concluding work, like uncoupling the machine. The overlapping during the field work is considered. The amount of sprayed plant protection products is not taken into account. Not included are dust other than from

| | | protection products is not taken into account. Not included are dust other than from | | | | | | | |
|--|-----|--|----------|--------|-----------|----------------------|----------------|----------|--|
| back to top | | | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 2.24E+00 | kg/ha | 2.24E+00 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 6.68E+00 | kg/ha | 6.68E+00 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 1.61E-07 | kg/ha | 1.61E-07 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.54E+00 | kg/ha | 1.54E+00 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 1.09E-03 | kg/ha | 1.71E-03 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 1.22E-02 | kg/ha | 1.91E-02 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 1.89E-10 | kg/ha | 2.97E-10 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 3.18E-02 | kg/ha | 4.99E-02 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 1.19E-09 | kg/ha | 3.57E-08 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 4.77E-11 | kg/ha | 1.43E-09 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 1.38E-16 | kg/ha | 4.14E-15 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 4.54E-05 | kg/ha | 1.35E-02 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 2.37E-04 | kg/ha | 7.07E-02 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.53E-12 | kg/ha | 4.56E-10 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 2.22E-05 | kg/ha | 6.61E-03 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 3.20E-11 | kg/ha | 4.57E-08 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 1.41E-09 | kg/ha | 2.01E-06 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eg | 3.80E-07 | kg/ha | 5.44E-04 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eg | 1.19E-11 | kg/ha | 7.29E-08 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | ka | 124 | kg CO2-Eq | 9.62E-10 | kg/ha | 1.19E-07 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eg | | kg/ha | 0.00E+00 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eg | 2.70E-08 | kg/ha | 2.70E-04 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | ka | 609 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eg | 8.43E-10 | kg/ha | 1.03E-05 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 3.53E-07 | kg/ha | 4.31E-03 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 5.62E-06 | kg/ha | 1.40E-04 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.87E-05 | kg/ha | 4.69E-04 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eg | 1.05E-05 | kg/ha | 2.64E-04 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 3.74E-16 | kg/ha | 1.87E-15 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 1.32E-08 | kg/ha | 2.50E-05 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 9.44E-13 | kg/ha | 6.74E-09 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.07E-07 | kg/ha | 7.64E-04 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | ka | 1810 | kg CO2-Eq | 6.45E-10 | kg/ha | 1.17E-06 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 5.10E-08 | kg/ha | 9.23E-05 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | ka | 14400 | kg CO2-Eq | 0.102 00 | kg/ha | 0.00E+00 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 6.38E-11 | kg/ha | 5.55E-10 | Econvent V2, application of plant protection products, by field sprayer, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 1.41E-10 | kg/ha | 1.23E-09 | Econvent V2, application of plant protection products, by field sprayer, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 4.08E-11 | kg/ha | 4.45E-07 | Econvent V2, application of plant protection products, by field sprayer, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | ka | 10900 | kg CO2-Eq | 4.76E-11 | kg/ha | 5.19E-07 | Econvent V2, application of plant protection products, by field sprayer, CH |
| Methane, dichlorodifluoro-, CFC-12 | oir | unspecified | kg | 10900 | kg CO2-Eq | 2.49E-16 | kg/ha | 2.71E-12 | Econvent V2, application of plant protection products, by field sprayer, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | · | ka | 210 | kg CO2-Eq | 9.09E-14 | kg/ha | 1.91E-11 | Econvent V2, application of plant protection products, by field sprayer, C11 Econvent V2, application of plant protection products, by field sprayer, C11 |
| | all | high population density | ka | 25 | kg CO2-Eq | 9.73E-04 | kg/ha | 2.43E-02 | |
| Methane, fossil Methane, fossil | all | high population density | 3 | 25 | | 9.73E-04 1.51E-02 | kg/na kg/ha | 3.79E-01 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, fossil | all | low population density | kg ka | 25 | kg CO2-Eq | 2.55E-12 | | | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| | all | lower stratosphere + upper troposphere | 3 | | kg CO2-Eq | | kg/ha | 6.38E-11 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 2.99E-05 | kg/ha | 7.48E-04 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 6.28E-09 | kg/ha | 8.79E-06 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 1.11E-13 | kg/ha | 1.56E-10 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 4.95E-11 | kg/ha | 3.65E-07 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 3.18E-06 | kg/ha | 2.35E-02 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.48E-13 | kg/ha | 7.01E-10 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 2.89E-11 | kg/ha | 4.28E-07 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |

| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 5.48E-10 | kg/ha | 1.25E-05 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
|--|--|--|----------|------------------------|-------------------------|----------------------------------|---------------------------|--|--|
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.48E-07 | kg/ha | 3.37E-03 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 1.02E-12 | kg/ha | 1.33E-11 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 2.58E-10 | kg/ha | 3.35E-09 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eg | 8.02E-05 | kg/ha | 8.02E-05 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| 9 | | g., p - p - 2 - 1 - 1 - 1 | 9 | | 9 1 | | | 1.11E+01 | |
| Ammonia | air | high population density | ka | 1.88 | kg SO2-Eq | 1.52E-05 | kg/ha | 2.86E-05 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ammonia | air | low population density | ka | 1.88 | kg SO2-Eg | 5.87E-05 | kg/ha | 1.10E-04 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Ammonia | air | unspecified | ka | 1.88 | kg SO2-Eq | 1.68E-04 | kg/ha | 3.16E-04 | Econivent V2, application of plant protection products, by field sprayer, CH |
| Hydrogen chloride | oir | high population density | kg | 0.88 | kg SO2-Eq | 8.52E-05 | kg/ha | 7.50E-05 | Econvent V2, application of plant protection products, by field sprayer, CH |
| | dii | | kg ka | 0.88 | kg SO2-Eq | 4.47E-05 | kg/ha | 3.93E-05 | |
| Hydrogen chloride | all -:- | low population density | kg | 0.88 | | | | | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Hydrogen chloride | air | unspecified | кg | | kg SO2-Eq | 5.48E-05 | kg/ha | 4.82E-05 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 3.03E-06 | kg/ha | 4.86E-06 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 1.06E-05 | kg/ha | 1.70E-05 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 1.69E-05 | kg/ha | 2.70E-05 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 3.17E-07 | kg/ha | 5.96E-07 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 2.36E-05 | kg/ha | 4.43E-05 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 9.54E-06 | kg/ha | 1.79E-05 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 2.08E-03 | kg/ha | 1.46E-03 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 8.47E-02 | kg/ha | 5.93E-02 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eg | 4.35E-03 | kg/ha | 3.05E-03 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eq | 4.05E-03 | kg/ha | 4.05E-03 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Sulfur dioxide | air | low population density | ka | 1 | kg SO2-Eg | 1.10E-02 | kg/ha | 1.10E-02 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Sulfur dioxide | air | unspecified | ka | 1 | kg SO2-Eg | 1.63E-03 | kg/ha | 1.63E-03 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Hydrogen sulfide | water | river | ka | 1.88 | kg SO2-Eq | 1.00E-06 | kg/ha | 1.89E-06 | Econivent V2, application of plant protection products, by field sprayer, CH |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 3.25E-13 | kg/ha | 2.11E-13 | Econvent V2, application of plant protection products, by field sprayer, CH |
| Phosphoric acid | air | | kg ka | 0.98 | kg SO2-Eq | 3.25E-13 | kg/ha | 0.00E+00 | |
| Sulfuric acid | all | high population density | kg | 0.96 | kg SO2-Eq | 9.56E-13 | kg/ha | 6.22E-13 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Sullulic acid | dii | low population density | kg | 0.00 | ky 302-Eq | 9.30E-13 | култа | 8.12E-02 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Dhaaabaasa | | hink manufation density | l | 0.00 | les DO4 Es | 0.545.07 | L = /l= = | 7.69E-07 | Facility and VO and lighting of all and analysis and death by field and your CII |
| Phosphorus | all | high population density | kg | 3.06 | kg PO4-Eq | 2.51E-07 | kg/ha | | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Phosphorus | air | low population density | кg | 3.06 | kg PO4-Eq | 4.36E-08 | kg/ha | 1.34E-07 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 4.55E-08 | kg/ha | 1.39E-07 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 1.01E-09 | kg/ha | 3.08E-09 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 2.60E-07 | kg/ha | 7.95E-07 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 2.87E-06 | kg/ha | 8.79E-06 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.93E-02 | kg/ha | 4.25E-04 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 1.39E-04 | kg/ha | 3.06E-06 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.96E-02 | kg/ha | 4.32E-04 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 1.40E-04 | kg/ha | 3.08E-06 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 4.72E-06 | kg/ha | 4.72E-06 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eg | 2.63E-06 | kg/ha | 8.04E-06 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Phosphorus | water | unspecified | ka | 3.06 | kg PO4-Eg | 2.88E-08 | kg/ha | 8.81E-08 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| and the state of t | | high population density | ka | 0.97 | kg PO4-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Phosphoric acid | air | | 9 | 0.0. | g . 0q | | ga | 8.87E-04 | |
| Phosphoric acid | air | g p-p-a-a-ay | | | | | | | |
| · | | | ka | 9.9 | M I-Fa | 2 75F-01 | kg/ha | | Economy V2 application of plant protection products, by field sprayer CH |
| Coal, brown, in ground | resource | in ground | kg ka | 9.9 19.1 | MJ-Eq | 2.75E-01 | kg/ha | 2.72E+00 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Coal, brown, in ground Coal, hard, unspecified, in ground | resource resource | in ground in ground | kg kg | 19.1 | MJ-Eq | 1.13E+00 | kg/ha | 2.72E+00 2.16E+01 | Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | resource resource resource | in ground in ground in ground | Nm3 | 19.1 39.8 | MJ-Eq MJ-Eq | 1.13E+00 1.10E-02 | kg/ha Nm3/ha | 2.72E+00 2.16E+01 4.38E-01 | Ecoinvent V2, application of plant protection products, by field sprayer, CH Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | resource resource resource resource | in ground in ground in ground in ground | | 19.1 39.8 38.293 | MJ-Eq MJ-Eq MJ-Eq | 1.13E+00 1.10E-02 4.48E-01 | kg/ha Nm3/ha Nm3/ha | 2.72E+00 2.16E+01 4.38E-01 1.71E+01 | Ecoinvent V2, application of plant protection products, by field sprayer, CH Ecoinvent V2, application of plant protection products, by field sprayer, CH Ecoinvent V2, application of plant protection products, by field sprayer, CH |
| Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | resource resource resource | in ground in ground in ground | Nm3 | 19.1 39.8 | MJ-Eq MJ-Eq | 1.13E+00 1.10E-02 | kg/ha Nm3/ha | 2.72E+00 2.16E+01 4.38E-01 | Ecoinvent V2, application of plant protection products, by field sprayer, CH Ecoinvent V2, application of plant protection products, by field sprayer, CH |

CC7 Apply mechanical Ecoinvent V2, tillage, currying, by weeder, CH treatment

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The inventory takes into account the diesel fuel consumption and the amount of agricultural machinery and of the shed, which has to be attributed to the currying. Also taken into consideration is the amount of emissions to the air from combustion and the emission to the soil from tyre abrasion during the work process. The following activities where considered part of the work process: preliminary work at the farm, like attaching the adequate machine to the tractor; transfer to field (with an assumed distance of 1 km); field work (for a parcel of land of 1 ha surface); transfer to farm and concluding work, like uncoupling the machine. The overlapping during the field work is considered. Not included are dust other than from

| | | during the field work is considered. Not included are dust other than from | | | | | | | |
|--|-----|--|----|--------|-----------|----------|-------|----------|--|
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 2.29E+00 | kg/ha | 2.29E+00 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 6.17E+00 | kg/ha | 6.17E+00 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 1.36E-07 | kg/ha | 1.36E-07 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.91E+00 | kg/ha | 1.91E+00 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 9.78E-04 | kg/ha | 1.54E-03 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 1.03E-02 | kg/ha | 1.62E-02 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 1.59E-10 | kg/ha | 2.50E-10 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 3.56E-02 | kg/ha | 5.59E-02 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 1.21E-09 | kg/ha | 3.64E-08 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 4.54E-11 | kg/ha | 1.36E-09 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 1.08E-16 | kg/ha | 3.23E-15 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 4.73E-05 | kg/ha | 1.41E-02 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 2.17E-04 | kg/ha | 6.46E-02 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.29E-12 | kg/ha | 3.85E-10 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 2.41E-05 | kg/ha | 7.18E-03 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 2.75E-11 | kg/ha | 3.93E-08 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 1.49E-09 | kg/ha | 2.13E-06 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 4.31E-07 | kg/ha | 6.16E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 9.78E-12 | kg/ha | 5.99E-08 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 1.03E-09 | kg/ha | 1.28E-07 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 2.86E-08 | kg/ha | 2.86E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 6.99E-10 | kg/ha | 8.53E-06 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 2.62E-07 | kg/ha | 3.20E-03 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 5.11E-06 | kg/ha | 1.28E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.98E-05 | kg/ha | 4.96E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 1.13E-05 | kg/ha | 2.82E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| . 5 | | | 3 | | 5 | | 3 | | |

Ecoinvent V2, combine harvesting, CH

APPENDIX C EMISSION FACTOR DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| M (I I I I I I I I I I I I I I I I I I I | <u> </u> | · · · · · · · · · · · · · · · · · · · | | | 1 00== | 0.55= 15 | | 4 405 15 | F : |
|---|---|--|--|--|--|--|--|--|---|
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 2.92E-16 | kg/ha | 1.46E-15 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 1.44E-08 | kg/ha | 2.72E-05 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eg | 6.77E-13 | kg/ha | 4.84E-09 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | | | | | | | |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 9.89E-08 | kg/ha | 7.06E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 6.28E-10 | kg/ha | 1.14E-06 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 5.55E-08 | kg/ha | 1.00E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | S S | | | 3.33L-00 | | | |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 6.09E-11 | kg/ha | 5.29E-10 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | ka CO2-Ea | 1.34E-10 | kg/ha | 1.17E-09 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | | | | | | | |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 3.64E-11 | kg/ha | 3.97E-07 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eg | 5.12E-11 | kg/ha | 5.58E-07 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 1.94E-16 | kg/ha | 2.11E-12 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | | | | | | | |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 7.82E-14 | kg/ha | 1.64E-11 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 7.38E-04 | kg/ha | 1.84E-02 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 1.57E-02 | kg/ha | 3.94E-01 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | | | | | | | |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 2.15E-12 | kg/ha | 5.38E-11 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 3.54E-05 | kg/ha | 8.84E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eg | 6.79E-09 | kg/ha | 9.51E-06 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | | | | | | | |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 8.67E-14 | kg/ha | 1.21E-10 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 5.29E-11 | kg/ha | 3.91E-07 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 2.36E-06 | kg/ha | 1.74E-02 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | | | | | | | |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.27E-13 | kg/ha | 6.03E-10 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 2.49E-11 | kg/ha | 3.68E-07 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Sulfur hexafluoride | | | | | | 9 COF 10 | | 2.05E-05 | |
| | air | low population density | kg | 22800 | kg CO2-Eq | 8.99E-10 | kg/ha | | Ecoinvent V2, tillage, currying, by weeder, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.54E-07 | kg/ha | 3.50E-03 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eg | 1.13E-12 | kg/ha | 1.46E-11 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | air | | | | | | | 3.19E-09 | |
| Methane, monochloro-, R-40 | | low population density | kg | 13 | kg CO2-Eq | 2.45E-10 | kg/ha | | Ecoinvent V2, tillage, currying, by weeder, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 8.33E-05 | kg/ha | 8.33E-05 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Nitrogen fluoride | air | high population density | ka | 17200 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | 3 1 - 1 | 3 | | 9 1 | | 3 | 1.10E+01 | · · · · · · · · · · · · · · · · · · · |
| | | | | | | | | | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 1.57E-05 | kg/ha | 2.95E-05 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eg | 5.57E-05 | kg/ha | 1.05E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Ammonia | air | unspecified | ka | 1.88 | kg SO2-Eg | 1.90E-04 | kg/ha | 3.56E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | ali | | 9 | | | | | | |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 1.18E-04 | kg/ha | 1.03E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Hydrogen chloride | air | low population density | ka | 0.88 | kg SO2-Eg | 4.66E-05 | kg/ha | 4.10E-05 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Hydrogen chloride | air | unspecified | ka | 0.88 | kg SO2-Eq | 6.38E-05 | kg/ha | 5.62E-05 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | 3 | | | | | | |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 4.03E-06 | kg/ha | 6.45E-06 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 1.10E-05 | kg/ha | 1.75E-05 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 1.63E-05 | kg/ha | 2.60E-05 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | . | 1.88 | | 5.36E-07 | | 1.01E-06 | Econiversity 25, inage, ourlying, by weeder, or |
| Hydrogen sulfide | air | high population density | kg | | kg SO2-Eq | | kg/ha | | Ecoinvent V2, tillage, currying, by weeder, CH |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 2.63E-05 | kg/ha | 4.95E-05 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Hydrogen sulfide | air | unspecified | ka | 1.88 | kg SO2-Eq | 1.08E-05 | kg/ha | 2.02E-05 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | air | | lea . | 0.7 | kg SO2-Eg | 2.25E-03 | | 1.57E-03 | |
| Nitrogen oxides | | high population density | kg | | | | kg/ha | | Ecoinvent V2, tillage, currying, by weeder, CH |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 7.72E-02 | kg/ha | 5.41E-02 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 5.26E-03 | kg/ha | 3.68E-03 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Sulfur dioxide | air | | | 1 | kg SO2-Eq | 4.28E-03 | kg/ha | 4.28E-03 | |
| | u.i. | high population density | kg | | | | | | Ecoinvent V2, tillage, currying, by weeder, CH |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 1.06E-02 | kg/ha | 1.06E-02 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eg | 1.85E-03 | kg/ha | 1.85E-03 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eg | 1.13E-06 | kg/ha | 2.13E-06 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | | | | | | | |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 2.67E-13 | kg/ha | 1.74E-13 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Sulfuric acid | air | low population density | la ka | 0.65 | kg SO2-Eq | 1.02E-12 | kg/ha | 6.65E-13 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Guirante acia | ail | low population density | ky | 0.00 | ky 002-Eq | 1.UZE-1Z | култа | | Louinvent vz., mage, carrying, by weeder, orr |
| | | | | | | | | 7.69E-02 | |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 3.13E-07 | kg/ha | 9.58E-07 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Phosphorus | air | low population density | ka | 3.06 | ka PO4-Ea | 4.90E-08 | kg/ha | 1.50E-07 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | 9 | | | | | | |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 4.82E-08 | kg/ha | 1.48E-07 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 7.48E-10 | kg/ha | 2.29E-09 | Ecoinvent V2, tillage, currying, by weeder, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 2.79E-07 | kg/ha | 8.53E-07 | Ecoinvent V2, tillage, currying, by weeder, CH |
| | | | | 3.06 | | 2.68E-06 | | 8.21E-06 | |
| | soil | industrial | kg | | kg PO4-Eq | | kg/ha | | Ecoinvent V2, tillage, currying, by weeder, CH |
| Phosphorus | | river | kg | 0.022 | kg PO4-Eq | 1.80E-02 | kg/ha | 3.96E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BOD5, Biological Oxygen Demand | water | | kg | 0.022 | kg PO4-Eq | 1.58E-04 | kg/ha | 3.47E-06 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BOD5, Biological Oxygen Demand | | UNSPECIFIED | | | | 1.84E-02 | | 4.04E-04 | |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand | water | unspecified | lea- | 0.022 | kg PO4-Eq | | kg/ha | | Ecoinvent V2, tillage, currying, by weeder, CH |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | water water | river | kg | | | 1.59E-04 | kg/ha | 3.49E-06 | |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand | water | | kg kg | 0.022 | kg PO4-Eq | | | | Ecoinvent V2, tillage, currying, by weeder, CH |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | water water water | river | kg | 0.022 1 | | | | 4.10F-06 | |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | water water water water | river unspecified river | kg kg | 1 | kg PO4-Eq | 4.10E-06 | kg/ha | 4.10E-06 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | water water water water water | river unspecified river river | kg kg kg | 1 3.06 | kg PO4-Eq kg PO4-Eq | 4.10E-06 2.47E-06 | kg/ha kg/ha | 7.55E-06 | Ecoinvent V2, tillage, currying, by weeder, CH Ecoinvent V2, tillage, currying, by weeder, CH |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | water water water water | river unspecified river | kg kg | 1 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 4.10E-06 | kg/ha kg/ha kg/ha | 7.55E-06 8.71E-08 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus | water water water water water water | river unspecified river river unspecified | kg kg kg kg | 1 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 4.10E-06 2.47E-06 | kg/ha kg/ha kg/ha | 7.55E-06 8.71E-08 | Ecoinvent V2, tillage, currying, by weeder, CH Ecoinvent V2, tillage, currying, by weeder, CH Ecoinvent V2, tillage, currying, by weeder, CH |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | water water water water water | river unspecified river river | kg kg kg | 1 3.06 | kg PO4-Eq kg PO4-Eq | 4.10E-06 2.47E-06 | kg/ha kg/ha | 7.55E-06 8.71E-08 0.00E+00 | Ecoinvent V2, tillage, currying, by weeder, CH Ecoinvent V2, tillage, currying, by weeder, CH |
| BODS, Biological Oxygen Demand BODS, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid | water water water water water water air | river unspecified river river unspecified high population density | kg kg kg kg kg | 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 4.10E-06 2.47E-06 2.85E-08 | kg/ha kg/ha kg/ha kg/ha | 7.55E-06 8.71E-08 0.00E+00 8.29E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid | water water water water water water | river unspecified river river unspecified high population density in ground | kg kg kg kg kg | 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq | 4.10E-06 2.47E-06 2.85E-08 | kg/ha kg/ha kg/ha kg/ha kg/ha | 7.55E-06 8.71E-08 0.00E+00 8.29E-04 2.87E+00 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BODS, Biological Oxygen Demand BODS, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid | water water water water water water air | river unspecified river river unspecified high population density | kg kg kg kg kg | 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 4.10E-06 2.47E-06 2.85E-08 | kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha | 7.55E-06 8.71E-08 0.00E+00 8.29E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground | water water water water water water water air resource resource | river unspecified river river unspecified high population density in ground in ground | kg kg kg kg kg kg | 1 3.06 3.06 0.97 9.9 19.1 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq | 4.10E-06 2.47E-06 2.85E-08 2.90E-01 1.29E+00 | kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha | 7.55E-06 8.71E-08 0.00E+00 8.29E-04 2.87E+00 2.47E+01 | Ecoinvent V2, tillage, currying, by weeder, CH Ecoinvent V2, tillage, currying, by weeder, CH Ecoinvent V2, tillage, currying, by weeder, CH |
| BODS, Biological Oxygen Demand BODS, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | water water water water water water air resource resource resource | river unspecified river river unspecified high population density in ground in ground in ground | kg kg kg kg kg kg Nm3 | 1 3.06 3.06 0.97 9.9 19.1 39.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 4.10E-06 2.47E-06 2.85E-08 2.90E-01 1.29E+00 1.27E-02 | kg/ha kg/ha kg/ha kg/ha kg/ha Nm3/ha | 7.55E-06 8.71E-08 0.00E+00 8.29E-04 2.87E+00 2.47E+01 5.04E-01 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BODS, Biological Oxygen Demand BODS, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | water water water water water water water air resource resource resource resource | river unspecified river river unspecified river river unspecified high population density in ground in ground in ground in ground | kg kg kg kg kg kg Nm3 Nm3 | 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 4.10E-06 2.47E-06 2.85E-08 2.90E-01 1.29E+00 1.27E-02 4.49E-01 | kg/ha kg/ha kg/ha kg/ha kg/ha Nm3/ha Nm3/ha | 7.55E-06 8.71E-08 0.00E+00 8.29E-04 2.87E+00 2.47E+01 5.04E-01 1.72E+01 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BODS, Biological Oxygen Demand BODS, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | water water water water water water air resource resource resource | river unspecified river river unspecified high population density in ground in ground in ground | kg kg kg kg kg kg Nm3 | 1 3.06 3.06 0.97 9.9 19.1 39.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 4.10E-06 2.47E-06 2.85E-08 2.90E-01 1.29E+00 1.27E-02 | kg/ha kg/ha kg/ha kg/ha kg/ha Nm3/ha | 7.55E-06 8.71E-08 0.00E+00 8.29E-04 2.87E+00 2.47E+01 5.04E-01 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BODS, Biological Oxygen Demand BODS, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | water water water water water water water air resource resource resource resource resource | river unspecified river river river unspecified high population density in ground in ground in ground in ground in ground | kg kg kg kg kg kg Nm3 Nm3 | 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 4.10E-06 2.47E-06 2.85E-08 2.90E-01 1.29E+00 1.27E-02 4.49E-01 2.36E+00 | kg/ha kg/ha kg/ha kg/ha kg/ha Nm3/ha Nm3/ha kg/ha | 7.55E-06 8.71E-08 0.00E+00 8.29E-04 2.87E+00 2.47E+01 5.04E-01 1.72E+01 1.08E+02 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BODS, Biological Oxygen Demand BODS, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | water water water water water water water air resource resource resource resource | river unspecified river river unspecified river river unspecified high population density in ground in ground in ground in ground | kg kg kg kg kg kg Nm3 Nm3 | 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 4.10E-06 2.47E-06 2.85E-08 2.90E-01 1.29E+00 1.27E-02 4.49E-01 | kg/ha kg/ha kg/ha kg/ha kg/ha Nm3/ha Nm3/ha | 7.55E-06 8.71E-08 0.00E+00 8.29E-04 2.87E+00 2.47E+01 5.04E-01 1.72E+01 1.08E+02 9.52E-04 | Ecoinvent V2, tillage, currying, by weeder, CH |
| BODS, Biological Oxygen Demand BODS, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | water water water water water water water air resource resource resource resource resource | river unspecified river river river unspecified high population density in ground in ground in ground in ground in ground | kg kg kg kg kg kg Nm3 Nm3 | 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 4.10E-06 2.47E-06 2.85E-08 2.90E-01 1.29E+00 1.27E-02 4.49E-01 2.36E+00 | kg/ha kg/ha kg/ha kg/ha kg/ha Nm3/ha Nm3/ha kg/ha | 7.55E-06 8.71E-08 0.00E+00 8.29E-04 2.87E+00 2.47E+01 5.04E-01 1.72E+01 1.08E+02 | Ecoinvent V2, tillage, currying, by weeder, CH |

| | and Straw) | | | | | | | | |
|-------------------------|-------------------------------|--|----|--------|-----------|----------|-------|----------|--------------------------------------|
| back to top | Th agri | e inventory takes into account the diesel fuel consumption and the amount of cultural machinery and of the shed, which has to be attributed to the harvesting ombined harvester. Also taken into consideration is the amount of emissions to | | | | | | | |
| | wo pr trar of 1 T | air from combustion and the emission to the soil from tyre abrasion during the rk process. The following activities where considered part of the work process: eliminary work at the farm, like attaching the adequate machine to the tractor; sfer to field (with an assumed distance of 1 km); field work (for a parcel of land ha surface); transfer to farm and concluding work, like uncoupling the machine he overlapping during the field work is considered. The amount of harvested for is not taken into account. Not included are dust other than form combustion | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 1.92E+01 | kg/ha | 1.92E+01 | Ecoinvent V2, combine harvesting, CH |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 1.17E+02 | kg/ha | 1.17E+02 | Ecoinvent V2, combine harvesting, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 1.24E-06 | kg/ha | 1.24E-06 | Ecoinvent V2, combine harvesting, CH |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.11E+01 | kg/ha | 1.11E+01 | Ecoinvent V2, combine harvesting, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 9.10E-03 | kg/ha | 1.43E-02 | Ecoinvent V2, combine harvesting, CH |

Harvest Crop (Grain

| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 3.44E-01 | kg/ha | 5.40E-01 | Ecoinvent V2, combine harvesting, CH |
|--|--|--|---|--|--|---|---|---|--|
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 1.46E-09 | kg/ha | 2.30E-09 | Ecoinvent V2, combine harvesting, CH |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 2.38E-01 | kg/ha | 3.74E-01 | Ecoinvent V2, combine harvesting, CH |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 9.18E-09 | kg/ha | 2.75E-07 | Ecoinvent V2, combine harvesting, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 4.78E-10 | kg/ha | 1.43E-08 | Ecoinvent V2, combine harvesting, CH |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 1.79E-15 | kg/ha | 5.38E-14 | Ecoinvent V2, combine harvesting, CH |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 3.78E-04 | kg/ha | 1.13E-01 | Ecoinvent V2, combine harvesting, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 4.29E-03 | kg/ha | 1.28E+00 | Ecoinvent V2, combine harvesting, CH |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.19E-11 | kg/ha | 3.53E-09 | Ecoinvent V2, combine harvesting, CH |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 2.02E-04 | kg/ha | 6.03E-02 | Ecoinvent V2, combine harvesting, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 2.20E-10 | kg/ha | 3.14E-07 | Ecoinvent V2, combine harvesting, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 1.17E-08 | kg/ha | 1.67E-05 | Ecoinvent V2, combine harvesting, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 4.16E-06 | kg/ha | 5.95E-03 | Ecoinvent V2, combine harvesting, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 7.87E-11 | kg/ha | 4.83E-07 | Ecoinvent V2, combine harvesting, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, combine harvesting, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 8.05E-09 | kg/ha | 9.98E-07 | Ecoinvent V2, combine harvesting, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, combine harvesting, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 2.21E-07 | kg/ha | 2.21E-03 | Ecoinvent V2, combine harvesting, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, combine harvesting, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 5.63E-09 | kg/ha | 6.86E-05 | Ecoinvent V2, combine harvesting, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 7.26E-06 | kg/ha | 8.86E-02 | Ecoinvent V2, combine harvesting, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 4.04E-05 | kg/ha | 1.01E-03 | Ecoinvent V2, combine harvesting, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.79E-04 | kg/ha | 4.49E-03 | Ecoinvent V2, combine harvesting, CH |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 9.18E-05 | kg/ha | 2.29E-03 | Ecoinvent V2, combine harvesting, CH |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 4.86E-15 | kg/ha | 2.43E-14 | Ecoinvent V2, combine harvesting, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 1.12E-07 | kg/ha | 2.12E-04 | Ecoinvent V2, combine harvesting, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 3.15E-12 | kg/ha | 2.25E-08 | Ecoinvent V2, combine harvesting, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.71E-06 | kg/ha | 1.22E-02 | Ecoinvent V2, combine harvesting, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 4.82E-09 | kg/ha | 8.73E-06 | Ecoinvent V2, combine harvesting, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 4.32E-07 | kg/ha | 7.82E-04 | Ecoinvent V2, combine harvesting, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, combine harvesting, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 5.26E-10 | kg/ha | 4.58E-09 | Ecoinvent V2, combine harvesting, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 1.41E-09 | kg/ha | 1.23E-08 | Ecoinvent V2, combine harvesting, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 2.89E-10 | kg/ha | 3.15E-06 | Ecoinvent V2, combine harvesting, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 4.37E-10 | kg/ha | 4.76E-06 | Ecoinvent V2, combine harvesting, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 3.23E-15 | kg/ha | 3.52E-11 | Ecoinvent V2, combine harvesting, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 6.25E-13 | kg/ha | 1.31E-10 | Ecoinvent V2, combine harvesting, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 9.20E-03 | kg/ha | 2.30E-01 | Ecoinvent V2, combine harvesting, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 1.84E-01 | kg/ha | 4.61E+00 | Ecoinvent V2, combine harvesting, CH |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 1.98E-11 | kg/ha | 4.94E-10 | Ecoinvent V2, combine harvesting, CH |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 2.62E-04 | kg/ha | 6.54E-03 | Ecoinvent V2, combine harvesting, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 5.15E-08 | kg/ha | 7.21E-05 | Ecoinvent V2, combine harvesting, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 1.45E-12 | kg/ha | 2.02E-09 | Ecoinvent V2, combine harvesting, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 4.14E-10 | kg/ha | 3.06E-06 | Ecoinvent V2, combine harvesting, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 6.54E-05 | kg/ha | 4.83E-01 | Ecoinvent V2, combine harvesting, CH |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.02E-12 | kg/ha | 4.82E-09 | Ecoinvent V2, combine harvesting, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 1.99E-10 | kg/ha | 2.94E-06 | Ecoinvent V2, combine harvesting, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, combine harvesting, CH |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 2.71E-09 | kg/ha | 6.19E-05 | Ecoinvent V2, combine harvesting, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.27E-06 | kg/ha | 2.90E-02 | Ecoinvent V2, combine harvesting, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 7.94E-12 | kg/ha | 1.03E-10 | Ecoinvent V2, combine harvesting, CH |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 2.58E-09 | kg/ha | 3.36E-08 | Ecoinvent V2, combine harvesting, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 8.31E-04 | kg/ha | 8.31E-04 | Ecoinvent V2, combine harvesting, CH |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, combine harvesting, CH |
| | | | | | | | | 1.55E+02 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 1.20E-04 | kg/ha | 2.26E-04 | Ecoinvent V2, combine harvesting, CH |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 9.06E-04 | kg/ha | 1.70E-03 | Ecoinvent V2, combine harvesting, CH |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.57E-03 | kg/ha | 2.94E-03 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 6.53E-04 | kg/ha | 5.75E-04 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 4.55E-04 | kg/ha | 4.01E-04 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 4.01E-04 | kg/ha | 3.53E-04 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 2.56E-05 | kg/ha | 4.10E-05 | |
| Hydrogen fluoride | air | | | 1.6 | kg SO2-Eq | 4.405.04 | | | Ecoinvent V2, combine harvesting, CH |
| Hydrogen fluoride | un . | low population density | kg | | | 1.10E-04 | kg/ha | 1.77E-04 | Ecoinvent V2, combine harvesting, CH |
| 11) alogott nachao | air | low population density unspecified | kg kg | 1.6 | kg SO2-Eq | 2.19E-04 | kg/ha kg/ha | | |
| Hydrogen sulfide | air air | unspecified high population density | kg kg kg | 1.6 1.88 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 | kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 | Ecoinvent V2, combine harvesting, CH Ecoinvent V2, combine harvesting, CH Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide | air air air | unspecified high population density low population density | kg kg kg kg | 1.6 1.88 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 | kg/ha kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide | air air air air air | unspecified high population density low population density unspecified | kg | 1.6 1.88 1.88 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 | kg/ha kg/ha kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides | air | unspecified high population density low population density unspecified high population density | kg kg | 1.6 1.88 1.88 1.88 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 | kg/ha kg/ha kg/ha kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides | air air | unspecified high population density low population density unspecified high population density low population density | kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 | kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides | air air air | unspecified high population density low population density unspecified high population density low population density unspecified | kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 | kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide | air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density | kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 | kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide | air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density | kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 | kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide | air air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified | kg kg kg kg kg kg | 1.6 1.88 1.88 0.7 0.7 0.7 1 1 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 | kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-02 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide | air air air air air air water | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river | kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 | kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-02 1.31E-05 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur dioxide Sulfur dioxide | air air air air air water soil | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural | kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 | kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.50E-01 1.30E-02 1.31E-05 1.40E-12 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid | air air air air air air water soil air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density | kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-02 1.31E-05 1.40E-12 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur dioxide Sulfur dioxide | air air air air air water soil | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural | kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 | kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur dioxide Sulfuric acid | air air air air air air water soil air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47T-02 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur cacid Hydrogen sulfide Sulfuric acid Phosphoric acid Phosphorus | air air air air air air water soil air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.36E-01 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Phosphorus Phosphorus | air air air air air air water soil air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuracid Phosphoric acid Phosphorus Phosphorus Phosphorus | air air air air air air water soil air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density low population density low population density high population density low population density low population density low population density low population density | kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Phosphorus Phosphorus Phosphorus Phosphorus | air air air air air water soil air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density low population density low population density high population density low population density | kg kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Hydrogen sulfide Sulfuric acid Phosphoric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air air air air air air air vater soil air air air air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-08 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Phosphoric acid Sulfuric acid Phosphorus | air air air air air air air vater soil air air air air air soil | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-06 4.51E-05 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air air air air air air air water soil air air air air air air soil soil water | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 | kg SO2-Eq kg SO4-Eq kg SO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-06 4.51E-05 3.03E-01 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 6.66E-03 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air air air air air air air water soil air air air air soil soil soil water | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg SO2-Eq kg SO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-08 4.51E-05 3.03E-01 1.00E-03 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 6.66E-03 2.20E-05 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Phosphoric acid Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | air air air air air air vater soil air air air air air air air soil soil water water | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-06 4.51E-05 3.03E-01 1.00E-03 3.06E-01 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 6.66E-03 2.20E-05 6.74E-03 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Cob, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | air air air air air air air water soil air | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population densi | kg kg kg kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 0.022 | kg SO2-Eq kg SO4-Eq kg SO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-06 4.51E-05 3.03E-01 1.00E-03 3.06E-01 1.01E-03 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 6.66E-03 2.20E-05 6.74E-03 2.22E-05 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air air air air air air air water soil air air air air air air air air soil soil water water water water | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low population densi | kg kg kg kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 | kg SO2-Eq kg SO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-06 4.51E-05 3.03E-01 1.00E-03 3.06E-01 1.01E-03 2.22E-05 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 6.66E-03 2.20E-05 6.74E-03 2.22E-05 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus | air air air air air air air water soil air air air air air air air aur aur aur aur soil soil water water water water water water water water | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density river unspecified river unspecified river unspecified river river | kg kg kg kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-06 4.51E-05 3.03E-01 1.00E-03 3.06E-01 1.01E-03 2.22E-05 2.88E-05 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 6.66E-03 2.20E-05 6.74E-03 2.22E-05 2.22E-05 8.82E-05 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus ODS, Biological Oxygen Demand DODS, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus | air air air air air air air water soil air | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population densi | kg kg kg kg kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-06 4.51E-05 3.03E-01 1.00E-03 3.06E-01 1.01E-03 2.22E-05 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 6.66E-03 2.20E-05 6.74E-03 2.22E-05 8.22E-05 8.82E-05 6.05E-07 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus | air air air air air air air water soil air air air air air air air aur aur aur aur soil soil water water water water water water water water | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density river unspecified river unspecified river unspecified river river | kg kg kg kg kg kg kg kg kg kg kg kg | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg SO2-Eq kg SO2-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-06 4.51E-05 3.03E-01 1.00E-03 3.06E-01 1.01E-03 2.22E-05 2.88E-05 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.36E-01 1.30E-02 1.31E-05 1.40E-12 0.00E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 6.66E-03 2.20E-05 6.74E-03 2.22E-05 8.82E-05 6.05E-07 0.00E+00 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur caid Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus | air air air air air air air water soil air air air air air air soil soil water | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified river unspecified river river unspecified high population density | kg k | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-06 4.51E-05 3.03E-01 1.00E-03 3.06E-01 1.01E-03 2.22E-05 2.88E-05 1.98E-07 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.30E-01 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 6.66E-03 2.20E-05 6.74E-03 2.22E-05 8.82E-05 6.05E-07 0.00E+00 1.37E-02 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Phosphorus | air air air air air air air water soil air | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified high population density | kg kg kg kg kg kg kg kg kg kg kg kg kg k | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO4-Eq kg PO4-Eq kg PO4-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07F-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07F-08 2.27E-06 4.51E-05 3.03E-01 1.00E-03 3.06E-01 1.01E-03 2.22E-05 2.88E-05 1.98E-07 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.56E-01 1.30E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 6.66E-03 2.20E-05 6.74E-03 2.22E-05 8.82E-05 6.05E-07 0.00E+00 1.37E-02 2.55E+01 | Ecoinvent V2, combine harvesting, CH |
| Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur caid Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus | air air air air air air air water soil air air air air air air soil soil water | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density river unspecified agricultural industrial river unspecified river unspecified river river unspecified high population density | kg k | 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 2.19E-04 1.43E-06 1.74E-04 6.65E-05 2.07E-02 1.77E+00 3.92E-02 4.47E-02 1.56E-01 1.30E-02 6.98E-06 2.15E-12 8.00E-12 1.62E-06 3.07E-07 3.74E-07 2.07E-08 2.27E-06 4.51E-05 3.03E-01 1.00E-03 3.06E-01 1.01E-03 2.22E-05 2.88E-05 1.98E-07 | kg/ha | 1.77E-04 3.50E-04 2.68E-06 3.26E-04 1.25E-04 1.45E-02 1.24E+00 2.74E-02 4.47E-02 1.30E-01 1.30E-02 1.31E-05 1.40E-12 0.00E+00 5.20E-12 1.50E+00 4.95E-06 9.38E-07 1.14E-06 6.33E-08 6.94E-06 1.38E-04 6.66E-03 2.20E-05 6.74E-03 2.22E-05 8.82E-05 6.05E-07 0.00E+00 1.37E-02 | Ecoinvent V2, combine harvesting, CH |

Gas, natural, in ground resource in ground Nm3 38.293 MJ-Eq 5.03E+00 Nm3/ha 1.93E+02 Ecoinvent V2, combine harvesting, CH
Oil, crude, in ground resource in ground kg 45.8 MJ-Eq 4.04E+01 kg/ha 1.85E+03 Ecoinvent V2, combine harvesting, CH
Peat, in ground resource biotic kg 9.9 MJ-Eq 8.75E-04 kg/ha 8.66E-03 Ecoinvent V2, combine harvesting, CH
2.23E+03

CC9 Transport harvested all included CC9, FL6, FL11
crop (grain)

back to top

| 21 | Cultivate soil (not | | | | | | | | Ecoinvent v2, tillage, cultivating, chiseling, CH |
|--|---------------------|--|----------|--------------|------------------------|----------------------|----------------|----------------------|---|
| ick to top | annually) | The inventory takes into account the diesel fuel consumption and the amount of | | | | | | | |
| ck to top | | agricultural machinery and of the shed, which has to be attributed to the tillage | | | | | | | |
| | | cultivating by chiseling. Also taken into consideration is the amount of emissions to | | | | | | | |
| | | the air from combustion and the emission to the soil from tyre abrasion during the | | | | | | | |
| | | work process. The following activities where considered part of the work process: | | | | | | | |
| | | preliminary work at the farm, like attaching the adequate machine to the tractor; | | | | | | | |
| | | transfer to field (with an assumed distance of 1 km); field work (for a parcel of land | | | | | | | |
| | | of 1 ha surface); transfer to farm and concluding work, like uncoupling the machine. | | | | | | | |
| | | The overlapping during the field work is considered. Not included are dust other | | | | | | | |
| oon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 8.82E+00 | kg/ha | 8.82E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| oon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 5.45E+01 | kg/ha | 5.45E+01 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| oon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 5.79E-07 | kg/ha | 5.79E-07 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| oon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 5.03E+00 | kg/ha | 5.03E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| oon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 3.54E-03 | kg/ha | 5.56E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| bon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 1.41E-01 | kg/ha | 2.22E-01 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| oon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 6.80E-10 | kg/ha | 1.07E-09 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| oon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 9.71E-02 | kg/ha | 1.53E-01 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| oroform | air | high population density | kg | 30 | kg CO2-Eq | 3.81E-09 | kg/ha | 1.14E-07 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| proform | air | low population density | kg | 30 | kg CO2-Eq | 1.47E-10 | kg/ha | 4.41E-09 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| proform | air | unspecified | kg | 30 | kg CO2-Eq | 3.77E-16 | kg/ha | 1.13E-14 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| rogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 1.59E-04 | kg/ha | 4.73E-02 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| trogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 1.98E-03 | kg/ha | 5.89E-01 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| trogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 5.51E-12 | kg/ha | 1.64E-09 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| trogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 8.20E-05 | kg/ha | 2.45E-02 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ne, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 1.01E-10 | kg/ha | 1.45E-07 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ne, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 4.68E-09 | kg/ha | 6.70E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ne, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 1.91E-06 | kg/ha | 2.73E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ne, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 3.67E-11 | kg/ha | 2.25E-07 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 124 | kg CO2-Eq | 2.405.00 | kg/ha | 0.00E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ne, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 3.49E-09 | kg/ha | 4.33E-07 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 10000 | kg CO2-Eq | 0.045.00 | kg/ha | 0.00E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ne, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | | kg CO2-Eq | 8.91E-08 | kg/ha | 8.91E-04 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 12200 | kg CO2-Eq | 2.61E-09 | kg/ha | 0.00E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ne, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | | kg/ha | 3.19E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ne, hexafluoro-, HFC-116 | all | unspecified | kg | 25 | kg CO2-Eq kg CO2-Eq | 9.91E-07 1.45E-05 | kg/ha kg/ha | 1.21E-02 3.64E-04 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| nane, biogenic | all | high population density low population density | kg kg | 25 | kg CO2-Eq | 6.87E-05 | kg/ha | 1.72E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH Ecoinvent v2, tillage, cultivating, chiseling, CH |
| hane, biogenic hane, biogenic | all | unspecified | kg | 25 | kg CO2-Eq | 4.08E-05 | kg/ha | 1.02E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| nane, bromo-, Halon 1001 | all | unspecified | kg | 5 | kg CO2-Eq | 1.02E-15 | kg/ha | 5.11E-15 | Econvent v2, tillage, cultivating, chiseling, CH |
| hane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 4.49E-08 | kg/ha | 8.49E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| thane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 2.61E-12 | kg/ha | 1.87E-08 | Econvent v2, tillage, cultivating, chiseling, CH |
| thane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 8.00E-07 | kg/ha | 5.71E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| thane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 2.27E-09 | kg/ha | 4.11E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| thane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.75E-07 | kg/ha | 3.16E-04 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| thane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | 11102 01 | kg/ha | 0.00E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| thane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.08E-10 | kg/ha | 1.81E-09 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| thane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 4.35E-10 | kg/ha | 3.78E-09 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| thane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.33E-10 | kg/ha | 1.45E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| thane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 1.79E-10 | kg/ha | 1.96E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| hane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 6.79E-16 | kg/ha | 7.40E-12 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| hane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 2.88E-13 | kg/ha | 6.04E-11 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| nane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 3.09E-03 | kg/ha | 7.72E-02 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| nane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 8.37E-02 | kg/ha | 2.09E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| nane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 9.19E-12 | kg/ha | 2.30E-10 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| nane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 1.01E-04 | kg/ha | 2.52E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 2.25E-08 | kg/ha | 3.15E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 3.04E-13 | kg/ha | 4.25E-10 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| nane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.80E-10 | kg/ha | 1.33E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| nane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 8.92E-06 | kg/ha | 6.59E-02 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 4.67E-13 | kg/ha | 2.22E-09 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 9.16E-11 | kg/ha | 1.36E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| r hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.63E-09 | kg/ha | 3.72E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| r hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 5.38E-07 | kg/ha | 1.23E-02 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 3.60E-12 | kg/ha | 4.68E-11 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 7.94E-10 | kg/ha | 1.03E-08 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| on dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 3.79E-04 | kg/ha | 3.79E-04 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| gen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ania . | t | high population describe | le= | 4.00 | ka 600 F- | 4 925 05 | 1 // | 7.16E+01 | Feeingest (2 tillege - tillege - tillege - tillege - tillege |
| onia | air | high population density | kg | 1.88 | kg SO2-Eq | 4.83E-05 | kg/ha | 9.09E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| onia | air | low population density | kg | 1.88 | kg SO2-Eq | 4.11E-04 | kg/ha | 7.72E-04 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| onia | air | unspecified | kg | 1.88 | kg SO2-Eq | 5.41E-04 | kg/ha | 1.02E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 3.29E-04 | kg/ha | 2.89E-04 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 1.84E-04 | kg/ha | 1.62E-04 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 1.78E-04 | kg/ha | 1.56E-04 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 1.25E-05 | kg/ha | 2.00E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 4.21E-05 | kg/ha | 6.74E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 4.98E-05 | kg/ha | 7.96E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 9.17E-07 | kg/ha | 1.72E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 7.29E-05 | kg/ha | 1.37E-04 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| rogen sulfide | air | unspecified | кg | 1.88 | kg SO2-Eq | 2.90E-05 | kg/ha | 5.45E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| ogen oxides ogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 9.19E-03 | kg/ha | 6.43E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| | air | low population density | kg | 0.7 | kg SO2-Eq | 6.41E-01 | kg/ha | 4.49E-01 | Ecoinvent v2, tillage, cultivating, chiseling, CH |

| Nitrogen oxides | air | unspecified | ka | 0.7 | kg SO2-Eq | 1.72E-02 | kg/ha | 1.21E-02 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
|--|--------------|-----------------------------------|-----|--------|-----------|----------|--------|----------|---|
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eq | 2.04E-02 | kg/ha | 2.04E-02 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Sulfur dioxide | air | low population density | ka | 1 | kg SO2-Eq | 6.59E-02 | kg/ha | 6.59E-02 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Sulfur dioxide | air | unspecified | ka | 1 | kg SO2-Eq | 4.93E-03 | kg/ha | 4.93E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Hydrogen sulfide | water | river | ka | 1.88 | kg SO2-Eq | 3.04E-06 | kg/ha | 5.72E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Sulfuric acid | soil | agricultural | ka | 0.65 | kg SO2-Eq | 1.00E-12 | kg/ha | 6.51E-13 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Phosphoric acid | air | high population density | ka | 0.98 | kg SO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Sulfuric acid | air | low population density | ka | 0.65 | kg SO2-Eq | 3.47E-12 | kg/ha | 2.26E-12 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| | - | ion population, containing | | | 9 | ***** | | 5.61E-01 | |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 8.92E-07 | kg/ha | 2.73E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 1.33E-07 | kg/ha | 4.07E-07 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 1.52E-07 | kg/ha | 4.65E-07 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 2.83E-09 | kg/ha | 8.67E-09 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 1.01E-06 | kg/ha | 3.09E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 2.12E-05 | kg/ha | 6.49E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.43E-01 | kg/ha | 3.14E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 4.29E-04 | kg/ha | 9.44E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.45E-01 | kg/ha | 3.18E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 4.32E-04 | kg/ha | 9.51E-06 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.44E-05 | kg/ha | 1.44E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 9.38E-06 | kg/ha | 2.87E-05 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 8.56E-08 | kg/ha | 2.62E-07 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/ha | 0.00E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| | | | | | | | | 6.46E-03 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 1.10E+00 | kg/ha | 1.09E+01 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 3.63E+00 | kg/ha | 6.93E+01 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 3.54E-02 | Nm3/ha | 1.41E+00 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 2.15E+00 | Nm3/ha | 8.21E+01 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.88E+01 | kg/ha | 8.63E+02 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 2.92E-04 | kg/ha | 2.89E-03 | Ecoinvent v2, tillage, cultivating, chiseling, CH |
| | | | | | | | | 1.03E+03 | |

| FC2 Mark to top Iteritizing, by broadcaster will demission to the solit from combustion and the amount of agricultural machinery and of the shed, which has to be attributed to the fertilizing. Also taken into consideration is the amount of emissions to the air from combustion and the emission to the solit from tyre abression during the work process; The following activities where considered part of the work process: preliminary work at the farm, like attaching lead edequate machine to the tractor; transfer to field (with an assumed distance of 1 km); field work (for a parcel of land of 1 ha surface); transfer to farm and conding work, like uncoupling the machine. The overlapping during the field work is considered. The amount of spread fertilizer is not taken into account. Not included are rules other than from combustion and noise. Carbon dioxide, fossil air low population density kg 1 kg CO2-Eq 3.75E+00 kg/ha 3.75E+00 carbon dioxide, fossil air low population density kg 1 kg CO2-Eq 2.99E-07 kg/ha 2.99E-07 Carbon dioxide, fossil air unspecified kg 1 kg CO2-Eq 1.69E+00 kg/ha 1.69E+00 carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.99E-07 Carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.99E-07 Carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.99E-07 Carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.99E-07 Carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.99E-07 Carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.99E-02 Carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.99E-02 Carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.99E-02 Carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.99E-02 Carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3 | Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH |
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| an assumed distance of 1 km); field work (for a parcel of land of 1 ha surface); transfer to farm and concluding work, like uncoupling the machine. The overlapping during the field work is considered. The amount of spread fertilizer is not taken into surface). Carbon dioxide, fossil air lower stratosphere + upper troposphere kg 1 kg CO2-Eq 2.99E-07 kg/ha 1.88E+01 Carbon dioxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 1.69E+00 kg/ha 2.91E-03 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 1.85E-03 kg/ha 2.91E-03 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 1.85E-03 kg/ha 2.91E-03 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 1.85E-03 kg/ha 3.90E-02 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 5.52E-10 | Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH |
| transfer to farm and concluding work, like uncoupling the machine. The overlapping during the field work is considered. The amount of spread fertilizer is not taken into account. Not included are dust other than from combustion and noise. Carbon dioxide, fossil air low oppulation density kg 1 kg CO2-Eq 3.75E+00 kg/ha 3.75E+00 Carbon dioxide, fossil air low estratosphere + upper troposphere kg 1 kg CO2-Eq 1.88E+01 kg/ha 1.89E+01 Carbon dioxide, fossil air unspecified kg 1 kg CO2-Eq 1.69E+00 kg/ha 1.69E+00 Carbon monoxide, fossil air unspecified kg 1.5714 kg CO2-Eq 1.69E+00 kg/ha 1.69E+00 Carbon monoxide, fossil air low estratosphere + upper troposphere kg 1.5714 kg CO2-Eq 1.85E-03 kg/ha 2.91E-03 Carbon monoxide, fossil air low estratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 3.90E-02 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 5.52E-10 | Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH |
| Carbon dioxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 1.88E-02 kg/ha 2.99E-07 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 2.88E-02 kg/ha 2.99E-07 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.5714 kg CO2-Eq 3.5716 kg/ha 2.99E-07 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.5716 kg/ha 2.99E-07 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-03 kg/ha 2.99E-03 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 3.90E-02 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 5.52E-10 | Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH |
| Carbon dioxide, fossil air low population density kg 1 kg CO2-Eq 3.75E+00 kg/ha 3.75E+00 Carbon dioxide, fossil air low population density kg 1 kg CO2-Eq 1.88E+01 kg/ha 1.88E+01 Carbon dioxide, fossil air lower stratosphere + upper troposphere kg 1 kg CO2-Eq 2.99E-07 kg/ha 2.99E-07 Carbon dioxide, fossil air unspecified kg 1 kg CO2-Eq 1.89E+00 kg/ha 1.69E+00 Carbon monoxide, fossil air high population density kg 1.5714 kg CO2-Eq 1.85E-03 kg/ha 2.91E-03 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 1.85E-03 kg/ha 3.90E-02 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 5.52E-10 | Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH |
| Carbon dioxide, fossil air high population density kg 1 kg CO2-Eq 3.75E+00 kg/ha 3.75E+00 Carbon dioxide, fossil air lower stratosphere + upper troposphere kg 1 kg CO2-Eq 2.99E-07 kg/ha 2.99E-07 Carbon dioxide, fossil air unspecified kg 1 kg CO2-Eq 2.99E-07 kg/ha 2.99E-07 Carbon monoxide, fossil air high population density kg 1.5714 kg CO2-Eq 1.69E+00 kg/ha 1.69E+00 Carbon monoxide, fossil air high population density kg 1.5714 kg CO2-Eq 1.85E-03 kg/ha 2.91E-03 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 5.52E-10 | Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH |
| Carbon dioxide, fossil air low population density kg 1 kg CO2-Eq 1.88E+01 kg/ha 1.88E+01 Carbon dioxide, fossil air lower stratosphere + upper troposphere kg 1 kg CO2-Eq 2.99E-07 kg/ha 1.99E-07 Carbon dioxide, fossil air unspecified kg 1 kg CO2-Eq 1.69E+00 kg/ha 1.69E+00 Carbon monoxide, fossil air high population density kg 1.5714 kg CO2-Eq 1.85E-03 kg/ha 2.91E-03 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-02 kg/ha 3.90E-02 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 5.52E-10 | Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH |
| Carbon dioxide, fossil air lower stratosphere + upper troposphere kg 1 kg CO2-Eq 2.99E-07 kg/ha 2.99E-07 Carbon dioxide, fossil air unspecified kg 1 kg CO2-Eq 1.69E+00 kg/ha 1.69E+00 Carbon monoxide, fossil air high population density kg 1.5714 kg CO2-Eq 1.85E-03 kg/ha 2.91E-03 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.90E-02 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 5.52E-10 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Carbon monoxide, fossil air high population density kg 1.5714 kg CO2-Eq 1.85E-03 kg/ha 2.91E-03 Carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.90E-02 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 5.52E-10 | |
| Carbon monoxide, fossil air low population density kg 1.5714 kg CO2-Eq 2.48E-02 kg/ha 3.90E-02 Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 5.52E-10 | |
| Carbon monoxide, fossil air lower stratosphere + upper troposphere kg 1.5714 kg CO2-Eq 3.51E-10 kg/ha 5.52E-10 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Carbon monoxide, fossil air unspecified kg 1.5714 kg CO2-Eq 3.33E-02 kg/ha 5.24E-02 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Chloroform air high population density kg 30 kg CO2-Eq 1.66E-09 kg/ha 4.98E-08 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Chloroform air low population density kg 30 kg CO2-Eq 7.35E-11 kg/ha 2.21E-09 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Chloroform air unspecified kg 30 kg CO2-Eq 2.56E-16 kg/ha 7.68E-15 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Dinitrogen monoxide air high population density kg 298 kg CO2-Eq 7.07E-05 kg/ha 2.11E-02 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Dinitrogen monoxide air low population density kg 298 kg CO2-Eq 6.81E-04 kg/ha 2.03E-01 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Dinitrogen monoxide air lower stratosphere + upper troposphere kg 298 kg CO2-Eq 2.85E-12 kg/ha 8.48E-10 Dinitrogen monoxide air unspecified kg 298 kg CO2-Eq 3.27E-05 kg/ha 9.74E-03 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a air high population density kg 1430 kg CO2-Eq 5.50E-11 kg/ha 7.87E-08 Ethane, 1,1,1,2-tetrafluoro-, HFC-134a air low population density kg 1430 kg CO2-Eq 1.92E-09 kg/ha 2.74E-06 | Econvent V2, fertilizing, by broadcaster, CH Econvent V2, fertilizing, by broadcaster, CH |
| Ethane, 1,1,1,2-tetralluoro, HFC-134a air unspecified kg 1430 kg CO2-Eq 6.84E-07 kg/ha 9.79E-04 | Econivent V2, fertilizing, by broadcaster, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-1, CFC-113 air high population density kg 6130 kg CO2-Eq 2.11E-11 kg/ha 1.29E-07 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 air unspecified kg 6130 kg CO2-Eq kg/ha 0.00E+00 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Ethane, 1,1-diffuoro-, HFC-152a air high population density kg 124 kg CO2-Eg 1.38E-09 kg/ha 1.71E-07 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Ethane, 1,1-diffuoro-, HFC-152a air low population density kg 124 kg CO2-Eq kg/ha 0.00E+00 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 air low population density kg 10000 kg CO2-Eq 3.63E-08 kg/ha 3.63E-04 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 air unspecified kg 609 kg CO2-Eq kg/ha 0.00E+00 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Ethane, hexafluoro-, HFC-116 air high population density kg 12200 kg CO2-Eq 1.49E-09 kg/ha 1.81E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Ethane, hexafluoro-, HFC-116 air unspecified kg 12200 kg CO2-Eq 7.39E-07 kg/ha 9.01E-03 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, biogenic air high population density kg 25 kg CO2-Eq 9.15E-06 kg/ha 2.29E-04 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, biogenic air low population density kg 25 kg CO2-Eq 2.92E-05 kg/ha 7.31E-04 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, biogenic air unspecified kg 25 kg CO2-Eq 1.59E-05 kg/ha 3.98E-04 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, bromo-, Halon 1001 air unspecified kg 5 kg CO2-Eq 6.93E-16 kg/ha 3.47E-15 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, bromochlorodiffluoro-, Halon 1211 air low population density kg 1890 kg CO2-Eq 1.76E-08 kg/ha 3.33E-05 Methane, bromotriffluoro-, Halon 1301 air high population density kg 7140 kg CO2-Eq 2.02E-12 kg/ha 1.44E-08 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| 5 11 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 1 2 3 1 2 | Ecoinvent V2, fertilizing, by broadcaster, CH Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, bromotrifluoro-, Halon 1301 air low population density kg 7140 kg CO2-Eq 2.86E-07 kg/ha 2.04E-03 Methane, chlorodifluoro-, HCFC-22 air high population density kg 1810 kg CO2-Eq 1.08E-09 kg/ha 1.95E-06 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, chlorodifluoro-, HCFC-22 air lloy population density kg 1810 kg CO2-Eq 6.86E-08 kg/ha 1.32E-04 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, chlorotrifluoro-, CFC-13 air unspecified kg 14400 kg CO2-Eq kg/ha 0.00E-00 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, dichloro-, HCC-30 air high population density kg 8.7 kg CO2-Eq 9.92E-11 kg/ha 8.63E-10 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, dichloro-, HCC-30 air low population density kg 8.7 kg CO2-Eq 2.18E-10 kg/ha 1.89E-09 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, dichlorodifluoro-, CFC-12 air high population density kg 10900 kg CO2-Eq 6.94E-11 kg/ha 7.57E-07 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, dichlorodifluoro-, CFC-12 air low population density kg 1090 kg CO2-Eq 6.93E-11 kg/ha 7.55E-07 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, dichlorodifluoro-, CFC-12 air unspecified kg 1090 kg CO2-Eq 4.61E-16 kg/ha 5.03E-12 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, dichlorofluoro-, HCFC-21 air high population density kg 210 kg CO2-Eq 1.57E-13 kg/ha 3.29E-11 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, fossil air high population density kg 25 kg CO2-Eq 1.84E-03 kg/ha 4.61E-02 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, fossil air low population density kg 25 kg CO2-Eq 2.93E-02 kg/ha 7.33E-01 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, fossil air lower stratosphere + upper troposphere kg 25 kg CO2-Eq 4.74E-12 kg/ha 1.19E-10 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, fossil air unspecified kg 25 kg CO2-Eq 4.48E-05 kg/ha 1.12E-03 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, tetrachloro-, R-10 air high population density kg 1400 kg CO2-Eq 8.72E-09 kg/ha 1.22E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, tetrachloro-, R-10 air unspecified kg 1400 kg CO2-Eq 2,06E-13 kg/ha 2,89E-10 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, tetrafluoro-, R-14 air high population density kg 7390 kg CO2-Eq 7.09E-11 kg/ha 5.24E-07 Methane, tetrafluoro-, R-14 air unspecified kg 7390 kg CO2-Eq 6.65E-06 kg/ha 4.91E-02 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, tetrafluoro-, R-14 air unspecified kg 7390 kg CO2-Eq 6.65E-06 kg/ha 4.91E-02 | Ecoinvent V2, fertilizing, by broadcaster, CH |

| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 2.54E-13 | kg/ha | 1.21E-09 | Ecoinvent V2, fertilizing, by broadcaster, CH |
|--|----------|---|------------|--------|-----------|----------|--------|----------|--|
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eg | 4.98E-11 | kg/ha | 7.37E-07 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | | | | | 4.30L-11 | | | |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 5.31E-10 | kg/ha | 1.21E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 2.19E-07 | kg/ha | 4.98E-03 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, monochloro-, R-40 | air | | kg | 13 | kg CO2-Eq | 1.48E-12 | kg/ha | 1.92E-11 | |
| | | high population density | | | | | | | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 3.97E-10 | kg/ha | 5.16E-09 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.46E-04 | kg/ha | 1.46E-04 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Nitrogen fluoride | air | high population density | ka | 17200 | kg CO2-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Millogeri ildoride | dii | riigii population density | ĸy | 17200 | ky CO2-Eq | | култа | | Econivent vz., letinizing, by broadcaster, Cri |
| | | | | | | | | 2.54E+01 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 2.39E-05 | kg/ha | 4.49E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eg | 1.43E-04 | kg/ha | 2.69E-04 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Ammonia | oir. | • | g | 1.88 | kg SO2-Eg | 2.17E-04 | kg/ha | 4.09E-04 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | all | unspecified | kg | | | | | | |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 9.96E-05 | kg/ha | 8.76E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Hydrogen chloride | air | low population density | ka | 0.88 | kg SO2-Eq | 7.43E-05 | kg/ha | 6.54E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Hydrogen chloride | air | unspecified | ka | 0.88 | kg SO2-Eg | 5.99E-05 | kg/ha | 5.27E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | air | | ka | | | | | | |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 3.98E-06 | kg/ha | 6.36E-06 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 1.75E-05 | kg/ha | 2.80E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Hydrogen fluoride | air | unspecified | ka | 1.6 | kg SO2-Eg | 2.51E-05 | kg/ha | 4.01E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Hydrogen sulfide | oir | high population density | ka | 1.88 | kg SO2-Eq | 3.00E-07 | kg/ha | 5.64E-07 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | all | | kg | | | | | | |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 2.54E-05 | kg/ha | 4.78E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Hydrogen sulfide | air | unspecified | ka | 1.88 | kg SO2-Eg | 9.58E-06 | kg/ha | 1.80E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eg | 3.57E-03 | kg/ha | 2.50E-03 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | | , kg | | | | | | |
| Nitrogen oxides | air | low population density | кд | 0.7 | kg SO2-Eq | 2.43E-01 | kg/ha | 1.70E-01 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 6.13E-03 | kg/ha | 4.29E-03 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eg | 7.73E-03 | kg/ha | 7.73E-03 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Sulfur dioxide | air | low population density | ka | 1 | kg SO2-Eg | 2.46E-02 | kg/ha | 2.46E-02 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | | , ky | | | | | | |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 1.79E-03 | kg/ha | 1.79E-03 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 1.00E-06 | kg/ha | 1.89E-06 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Sulfuric acid | soil | agricultural | kn | 0.65 | kg SO2-Eg | 5.76E-13 | kg/ha | 3.74E-13 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Phosphoric acid | air | high population density | ka | 0.98 | kg SO2-Eq | 0.702 10 | kg/ha | 0.00E+00 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | | kg | | | | | | |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 1.37E-12 | kg/ha | 8.91E-13 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | | | | | | | 2.12E-01 | |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eg | 3.41E-07 | kg/ha | 1.04E-06 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | | | 3.06 | | | | | |
| Phosphorus | air | low population density | kg | | kg PO4-Eq | 4.45E-08 | kg/ha | 1.36E-07 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 6.17E-08 | kg/ha | 1.89E-07 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Phosphorus | air | unspecified | ka | 3.06 | kg PO4-Eg | 2.11E-09 | kg/ha | 6.44E-09 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Phosphorus | soil | agricultural | ka | 3.06 | ka PO4-Ea | 3.96E-07 | kg/ha | 1.21E-06 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | | , vg | | | | | | |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 7.58E-06 | kg/ha | 2.32E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 5.12E-02 | kg/ha | 1.13E-03 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | ka | 0.022 | kg PO4-Eg | 1.43E-04 | kg/ha | 3.15E-06 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | water | | lvg lva | 0.022 | ka PO4-Ea | 5.18E-02 | kg/ha | 1.14E-03 | |
| COD, Chemical Oxygen Demand | | river | kg | | | | | | Ecoinvent V2, fertilizing, by broadcaster, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 1.45E-04 | kg/ha | 3.19E-06 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Phosphate | water | river | ka | 1 | kg PO4-Eg | 8.17E-06 | kg/ha | 8.17E-06 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Phosphorus | water | river | ka | 3.06 | kg PO4-Eg | 4.32E-06 | kg/ha | 1.32E-05 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | | ng I | | | | | | |
| Phosphorus | water | unspecified | кд | 3.06 | kg PO4-Eq | 4.25E-08 | kg/ha | 1.30E-07 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/ha | 0.00E+00 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | <u> </u> | - | | - | | | 2.32E-03 | |
| Coal, brown, in ground | resource | in ground | ka | 9.9 | MJ-Eq | 4.40E-01 | kg/ha | 4.35E+00 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | in ground | kg | | | | | | |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 1.25E+00 | kg/ha | 2.38E+01 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 1.21E-02 | Nm3/ha | 4.82E-01 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Ea | 8.28E-01 | Nm3/ha | 3.17E+01 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | | | | | | | | |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 6.79E+00 | kg/ha | 3.11E+02 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 1.92E-04 | kg/ha | 1.90E-03 | Ecoinvent V2, fertilizing, by broadcaster, CH |
| | | | | | | | - | 3.71E+02 | |
| | | | | | | | | 0.712102 | |

| FC3 | Plant crop (not | See Plant crop | | | |
|-------------|-----------------|----------------|--|--|--|
| | | | | | |
| | annually) | | | | |
| back to ton | | | | | |
| back to top | | | | | |

FC4 back to top Irrigate crops_FC See Irrigate crop

FC5 See Apply chemical treatment

Apply chemical treatment_FC Plant protection back to top Ecoinvent V2, application of plant protection products, by field sprayer

Harvest crop (multiple times per vear) see CC8 FC6 See Harvest crop back to top

FC7 Transport harvested crop (feed) See Transport lorry>16t

back to top Treat harvested crop (feed) FC8

back to top FL1 back to top Deposit Manure

FL2 back to top Collect manure Included in total energy used on beef farms

FL7 Included in total energy used on beef farms Transfer manure

back to top

| Part | FL12 | | | Manure Management | | | | | | |
|--|------------------------------------|------------|---|---------------------------|--------|-----------|----------|----------------|--------------|--|
| Part | | | | _ | | 2.065+01 | oir | | ka/hood/voor | Environment Canada, 2009, NATIONAL INIVENTADIV DEDADT: CREENHOLISE CAS SOLIDOES AND SINKS IN CANADA, 4000, 2006 Table A2 |
| Part | | | | ŕ | | | | | , | 23, http://www.ec.gc.ca/pdb/ghg/inventory_report/2006_report/tdm-toc_eng.cfm. |
| Second | | | | Methane - Dairy Heifers | | 1.54E+01 | air | | kg/head/year | |
| Marie Ballet | | | | Methane - Bulls | | 3.60E+00 | air | | kg/head/year | Environment Canada. 2008. NATIONAL INVENTORY REPORT: GREENHOUSE GAS SOURCES AND SINKS IN CANADA, 1990-2006, Table A3- |
| Part | | | | Methane - Beef Cows | | 3.30E+00 | air | | kg/head/year | Environment Canada. 2008. NATIONAL INVENTORY REPORT: GREENHOUSE GAS SOURCES AND SINKS IN CANADA, 1990-2006, Table A3- |
| Mail And Part Mail And Par | | | | Methane - Beef Heifers | | 2.70E+00 | air | | kg/head/year | |
| Part | | | | Methane - Heifers for | | 2 105+00 | air | | ka/head/year | |
| The content of the | | | | Slaughter | | | | | | http://www.ec.gc.ca/pdb/ghg/inventory_report/2006_report/tdm-toc_eng.cfm. |
| Part | | | | Methane - Steers | | 1.90E+00 | air | | kg/head/year | |
| Part | | | | Methane - Calves | | 2.10E+00 | air | | kg/head/year | |
| Part | | | | Manura N Excretion Pate - | | 1.06E±02 | air | | ka/head/year | |
| Part | | | | Dairy Cows | | | | | | 23, http://www.ec.gc.ca/pdb/ghg/inventory_report/2006_report/tdm-toc_eng.cfm. |
| Part | | | | | | 6.79E+01 | air | | kg/head/year | |
| Part | | | | Manure N Excretion Rate - | | 7.93E+01 | air | | kg/head/year | Environment Canada. 2008. NATIONAL INVENTORY REPORT: GREENHOUSE GAS SOURCES AND SINKS IN CANADA, 1990-2006, Table A3- |
| Part | | | | Manure N Excretion Rate - | | 5.14E+01 | air | | kg/head/year | Environment Canada. 2008. NATIONAL INVENTORY REPORT: GREENHOUSE GAS SOURCES AND SINKS IN CANADA, 1990-2006, Table A3- |
| | | | | | | 6.53E+01 | air | | kg/head/vear | |
| Part | | | | Steers | | | -1- | | | 23, http://www.ec.gc.ca/pdb/ghg/inventory_report/2006_report/tdm-toc_eng.cfm. |
| Part | | | | | | 3.19E+01 | air | | kg/nead/year | |
| Part | | | | | | | | | | |
| Part | | | | | | | | | | Ecoinvent V2, slurry store and processing, operation, CH |
| March Marc | | , | Not taken into account were the direct emission of the animal husbandry, fodder | | | | | | | |
| Color decide, South 1 | | | | | | | | | | |
| Carlon contacts Carlon Con | | | | kg kg | 1 1 | | | kg/m3 kg/m3 | | |
| Control controls, Gold 41 | | | | kg | 1 | | | | | |
| Control contact field September Sept | | | | kg kg | 1.5714 | | | | | |
| Cathon responds, Sept | | | low population density | S . | | kg CO2-Eq | | kg/m3 | | Ecoinvent V2, slurry store and processing, operation, CH |
| Common | | | | kg | | | | | | |
| Clastons | | | | kg ka | | | | | | |
| Delingen monosis of the proposition seems of t | | | | kg | | | | | | |
| Delining moreasis April 200 Comment | | | | S . | | | | | | |
| Delining minimismost September 1967 200 | | | | S . | | | | | | |
| Debody movaces of unspecified of unspecified | | | | . • | | | | | | |
| Final 1,13 - Januarian - Jeff-1548 at largopialistic drawy 140 1400 1200-264 2,46-10 1978 3,066-7 Feciment V, 2 uny star and processing operation, CH | Dinitrogen monoxide | | unspecified | S . | 298 | kg CO2-Eq | | kg/m3 | | Ecoinvent V2, slurry store and processing, operation, CH |
| Exame 1, 12-derailloure - INFO-1548 at simple content of the proposal processing of the proposal process of the proposal proce | | | | S . | | | | | | |
| Extract 1.2 Extrac | | | | . • | | | | | | |
| Elania, 1-fallature, HE-152a of high population density is a 124 wg CO2-Eq 1.11E-10 kg/m3 d 1.35E-03 Economet V2, slury store and possible, operation, CH Elania, 2-fallation, CCC1-14 of composition, CH Elania, 2-fallation, CCC1-14 of composition, CH Elania, 2-fallation, CCC1-14 of composition, CH Elania, 2-fallation, HE-150 of composition, HE | | | | S . | | | | | | |
| Elbrans, 1.2-defaulture, PEC-1129 Elbrans, 1.2-defaulture, CFC-114 air los population derawly in lo | | | | S . | | | = | | | |
| Etherna, 2-Calchorous 1, 1, 2-Zetherlaugon-, CPC-114 air unspecified light GOD-Fine Seption CPC-124 light GOD-Fine CPC-124 light GOD-Fine Seption | | | | . • | | | 1.11E-10 | | | |
| Eltrame, Pacalloco, HEC-124 air Sunspecified is in jungecelled air Sunspecified is unspecified in unspecified is unspecified in unspecified is unspecified in unspecified in unspecified is unspecified by Sunspecified is unspecified in unspecified in unspecified is unspecified by Sunspecified is unspecified in unspecified in unspecified in unspecified is unspecified by Sunspecified is sunspecified by Sunspecified is unspecified by Sunspecified is sunspecified by Sunspecified is sunspecified by Sunspecified is sunspecified by Sunspecified is sunspecified by Sunspecified by Sunspecified by Sunspecified is sunspecified by Sun | | | | S . | | | 4.27E-09 | | | |
| Etham, Nachlaron, HPC-196 | | air | | kg | 609 | | | | | Ecoinvent V2, slurry store and processing, operation, CH |
| Methane, biogenic air high population dematy kg 25 kg COZ-Eq 1.07E-68 kg/m3 2.68E-67 Econwert V2, stury store and processing, operation, CH Methane, biogenic air in w population dematy kg 25 kg COZ-Eq 1.48E-66 kg/m3 3.7E-67 Econwert V2, stury store and processing, operation, CH Methane, brown, blant 1011 air in w population dematy kg 1.89 kg COZ-Eq 2.68E-10 kg/m3 2.19E-18 Econwert V2, stury store and processing, operation, CH Methane, brown, blant 10211 air high population dematy kg 7.740 kg COZ-Eq 2.68E-10 kg/m3 4.73E-12 Econwert V2, stury store and processing, operation, CH Methane, brown, blant 10211 air high population dematy kg 7.740 kg COZ-Eq 2.68E-10 kg/m3 4.73E-12 Econwert V2, stury store and processing, operation, CH Methane, brown, blant 10211 air low population dematy kg 7.740 kg COZ-Eq 6.68E-10 kg/m3 4.73E-12 Econwert V2, stury store and processing, operation, CH Methane, brown, blant 10211 air low population dematy kg 7.740 kg COZ-Eq 7.67E-11 kg/m3 4.73E-12 Econwert V2, stury store and processing, operation, CH Methane, brown, blant 10211 air low population dematy kg 7.740 kg COZ-Eq 7.67E-11 kg/m3 4.73E-12 Econwert V2, stury store and processing, operation, CH Methane, chlorofillutoro, kFC-22 air low population dematy kg 1.810 kg COZ-Eq 7.67E-11 kg/m3 2.56E-66 Econwert V2, stury store and processing, operation, CH Methane, chlorofillutoro, kFC-23 air low population dematy kg 1.810 kg COZ-Eq 8.83E-12 kg/m3 2.56E-66 Econwert V2, stury store and processing, operation, CH Methane, chlorofillutoro, kFC-24 air low population dematy kg 1.82E-14 kg/m3 3.5E-15 Econwert V2, stury store and processing, operation, CH Methane, chlorofillutoro, kFC-12 air low population dematy kg 1.82E-14 kg/m3 3.5E-15 kg/m3 3.5E-15 Econwert V2, stury store and processing, operation, CH Methane, chlorofillutoro, kFC-12 air low population dematy kg 1.82E-14 kg/m3 3.5E-15 kg/m3 3 | | air | | kg | | | | | | |
| Methane, biogenic ar | | air air | | кд ka | | | | | | |
| Methane, bromo-filation 101 air umpselfield kg 5 kg CO2-Eq 4.88E-19 kg/m3 2.19E-18 Econwert V2, slury store and processing, operation, CH Methane, bromorbiloutifuour-, Haiton 1301 air high population density kg 7.140 kg CO2-Eq 6.68E-16 kg/m3 5.48E-07 Econwert V2, slury store and processing, operation, CH Methane, bromorbiliurour-, Haiton 1301 air high population density kg 7.140 kg CO2-Eq 7.67E-11 kg/m3 5.48E-07 Econwert V2, slury store and processing, operation, CH Methane, Childron-High CP2-22 air high population density kg 1.910 kg CO2-Eq 8.8E-12 kg/m3 1.8E-02 Econwert V2, slury store and processing, operation, CH Methane, Childron-High CP2-23 air high population density kg 8.71 kg CO2-Eq 8.8E-12 kg/m3 1.8E-02 Econwert V2, slury store and processing, operation, CH Methane, Childron-High CP2-23 air high population density kg 8.77 kg CO2-Eq 8.8E-12 kg/m3 8.8E-12 kg/m3 Econwert V2, slury store and processing, operation, CH Methane, Childron-High-CP3-23 air high population density kg 8.77 kg CO2-Eq 8.3E-12 kg/m3 8.4SE-04 Econwert V2, slury store and processing, operation, CH Methane, Childron-High-CP3-23 air high population density kg 1.0900 kg CO2-Eq 1.37E-11 kg/m3 8.4SE-04 Econwert V2, slury store and processing, operation, CH Methane, Childron-High-CP3-23 air high population density kg 1.0900 kg CO2-Eq 5.78E-13 kg/m3 8.4SE-04 Econwert V2, slury store and processing, operation, CH Methane, Childron-High-CP3-24 air high population density kg 1.0900 kg CO2-Eq 5.78E-13 kg/m3 8.4SE-04 Econwert V2, slury store and processing, operation, CH Methane, Childron-High-CP3-24 air high-population density kg 2.00 kg 2.00 kg 2.00 kg/m3 8.4SE-04 Econwert V2, slury store and processing, operation, CH Methane, Childron-High-CP3-24 air high-population density kg 2.00 kg 2.00 kg/m3 8.4SE-04 Econwert V2, slury store and processing, operation, CH Methane, Child | | air | | kg | | | | J . | | |
| Methane, bromochrocodilutors, - Halon 1211 air low population density kg 1800 kg C02-Eq 6.86-16 kg/m3 5.02-6-17 Ecoivent V2, stury ster and processing, operation, CH Methane, bromothrouser, Halon 1301 air low population density kg 7140 kg C02-Eq 6.86-16 kg/m3 5.48-607 Ecoivent V2, stury ster and processing, operation, CH Methane, bromothrouser, Halon 1301 air low population density kg 7140 kg C02-Eq 8.86-12 kg/m3 5.48-607 Ecoivent V2, stury ster and processing, operation, CH Methane, bromothrouser, CFC-13 air low population density kg 7140 kg C02-Eq 8.86-12 kg/m3 0.08-60 Ecoivent V2, stury ster and processing, operation, CH Methane, chlorothrouser, CFC-13 air low population density kg 8.7 kg C02-Eq 8.86-12 kg/m3 0.08-60 Ecoivent V2, stury ster and processing, operation, CH Methane, chlorothrouser, CFC-13 air low population density kg 8.7 kg C02-Eq 8.86-12 kg/m3 0.08-60 Ecoivent V2, stury ster and processing, operation, CH Methane, chlorothrouser, CFC-13 air low population density kg 8.7 kg C02-Eq 7.76-11 kg/m3 1.20-E-10 Ecoivent V2, stury ster and processing, operation, CH Methane, chlorothrouser, CFC-12 air low population density kg 8.7 kg C02-Eq 7.76-11 kg/m3 1.20-E-10 Ecoivent V2, stury ster and processing, operation, CH kg/m3 | | | | | | | | | | |
| Methane, bromoffiliuror, Halon 1301 air high population density kg 7140 kg CO2-Eq 6.581-16 kg/m3 5.48E-17 Ecoinvent V2, slurry store and processing, operation, CH whethane, bromoffiliuror, HCFC-22 air high population density kg 1810 kg CO2-Eq 8.38E-12 kg/m3 1.62E-08 Ecoinvent V2, slurry store and processing, operation, CH whethane, chlorofiliuror, HCFC-22 air high population density kg 1810 kg CO2-Eq 8.38E-12 kg/m3 2.56E-08 Ecoinvent V2, slurry store and processing, operation, CH whethane, chlorofiliuror, HCFC-23 air high population density kg 1810 kg CO2-Eq 4.8E-08 kg/m3 2.56E-08 Ecoinvent V2, slurry store and processing, operation, CH Halon V2, slurry store and processing, operati | | | | | | | | | | |
| Methane, bromorfilluror, Haben 1301 air low population density kg 7140 kg CO2-Eq 7.67E-11 kg/m3 5.48E-07 Ecoinvert V2, slury store and processing, operation, CH Methane, chlorodifluor-in, HCFC-22 air high population density kg 1810 kg CO2-Eq 1.42E-09 kg/m3 2.56E-06 Ecoinvert V2, slury store and processing, operation, CH Methane, chlorodifluor-in, HCFC-30 air unspecified kg 1.4400 kg CO2-Eq 4.78E-09 8.38E-12 kg/m3 0.00E-00 Ecoinvert V2, slury store and processing, operation, CH Methane, dichloror, HCC-30 air high population density kg 8.7 kg CO2-Eq 9.38E-12 kg/m3 6.85E-11 Ecoinvert V2, slury store and processing, operation, CH Methane, dichloror, HCC-30 air low population density kg 8.7 kg CO2-Eq 9.38E-12 kg/m3 6.85E-11 Ecoinvert V2, slury store and processing, operation, CH Methane, dichlorodifluor-in, CFC-12 air low population density kg 6.7 kg 6.7 kg/m3 1.29E-10 Ecoinvert V2, slury store and processing, operation, CH Methane, dichlorodifluor-in, CFC-12 air low population density kg 0.02-Eq 5.78E-13 kg/m3 6.30E-09 Ecoinvert V2, slury store and processing, operation, CH kg/m3 6.30E-09 Ecoinvert V2, slury store and processing, operation, CH kg/m3 6.30E-09 Ecoinvert V2, slury store and processing, operation, CH kg/m3 6.30E-09 Ecoinvert V2, slury store and processing, operation, CH kg/m3 6.30E-09 Ecoinvert V2, slury store and processing, operation, CH kg/m3 6.30E-09 Ecoinvert V2, slury store and processing, operation, CH kg/m3 6.30E-09 Ecoinvert V2, slury store and processing, operation, CH kg/m3 6.30E-09 Ecoinvert V2, slury store and processing, operation, CH kg/m3 6.30E-09 Ecoinvert V2, slury store and processing, operation, CH kg/m3 6.30E-09 Ecoinvert V2, slury store and processing, operation, CH kg/m3 6.30E-09 Ecoinvert V2, slury store and processing, operation, CH kg/m3 6.30E-09 Ecoinvert V2, slur | | | | | | | | | | |
| Methane, chlorodifluoro, HCF-C-13 air unspacified mensity kg 1410 kg CO2-Eq kg/m3 2.56E-06 Ecoinvert V2, slurys store and processing, operation, CH whether, chloror-, HCC-30 air high population density kg 8.7 kg CO2-Eq 9.83E-12 kg/m3 8.56E-11 Ecoinvert V2, slurys store and processing, operation, CH whether, clichlorior-, HCC-30 air low population density kg 8.7 kg CO2-Eq 9.83E-12 kg/m3 8.56E-11 Ecoinvert V2, slurys store and processing, operation, CH whether, clichloridifluoror, CFC-12 air high population density kg 1990 kg CO2-Eq 7.75E-13 kg/m3 8.48E-09 Ecoinvert V2, slurys store and processing, operation, CH whether, clichloridifluoror, CFC-12 air high population density kg 1990 kg CO2-Eq 7.75E-13 kg/m3 8.48E-09 Ecoinvert V2, slurys store and processing, operation, CH whether, clichloridifluoror, CFC-12 air high population density kg 1990 kg CO2-Eq 7.75E-13 kg/m3 8.48E-09 Ecoinvert V2, slurys store and processing, operation, CH whether, clichloridifluoror, HCC-01 kg/m3 8.48E-09 Ecoinvert V2, slurys store and processing, operation, CH whether, clichloridifluoror, HCC-01 kg/m3 8.48E-09 Ecoinvert V2, slurys store and processing, operation, CH kg/m3 kg | | | low population density | | | kg CO2-Eq | | | | |
| Methane, chlorotrifluoro-, CFC-13 air Unyonepecified with pospelation density kg 1,4400 kg' CO2-Eq kg'm3 0.00E+00 Ecoinvert V2, slurry store and processing, operation, CH Methane, dichloro-, HCC-30 air high population density kg 8.7 kg CO2-Eq 1,37E-11 kg/m3 1,20E-10 Ecoinvert V2, slurry store and processing, operation, CH Methane, dichlorocifiluoro-, CFC-12 air low population density kg 1,900 kg CO2-Eq 5.78E-13 kg/m3 8.5E-91 Ecoinvert V2, slurry store and processing, operation, CH Methane, dichlorocifiluoro-, CFC-12 air low population density kg 1,900 kg CO2-Eq 5.78E-13 kg/m3 3.5BE-13 Ecoinvert V2, slurry store and processing, operation, CH Methane, dischlorofluoro-, CFC-12 air low population density kg 2.9 2.9 2.9E-13 kg/m3 3.5BE-13 Ecoinvert V2, slurry store and processing, operation, CH Methane, dischlorofluoro-, CFC-12 air high population density kg 2.7 kg CO2-Eq 5.78E-13 kg/m3 3.5BE-13 Ecoinvert V2, slurry store and process | | | | | | | | | | |
| Methane, dichloror, HCC-30 air high population density kg 8.7 kg CO2-Eq 9.88E-12 kg/m3 8.55E-11 Ecoinvent V2, slurry store and processing, operation. CH Methane, dichlorodillutoror, CFC-12 air high population density kg 1.78E-13 kg/m3 8.45E-09 Ecoinvent V2, slurry store and processing, operation. CH Methane, dichlorodillutoror, CFC-12 air high population density kg 1.990 kg CO2-Eq 7.78E-13 kg/m3 8.45E-09 Ecoinvent V2, slurry store and processing, operation. CH Methane, dichlorodillutoror, CFC-12 air unspecified kg 1.990 kg CO2-Eq 2.91E-19 kg/m3 3.18E-15 Ecoinvent V2, slurry store and processing, operation, CH Methane, dischlorodillutoror, CFC-12 air high population density kg 2.5 kg CO2-Eq 4.91E-19 kg/m3 3.18E-15 Ecoinvent V2, slurry store and processing, operation, CH Methane, fossil air high population density kg 2.5 kg CO2-Eq 4.12E-06 kg/m3 3.5E-13 Ecoinvent V2, slurry store and processing, operation, CH Me | | | | | | | 1.426-09 | | | |
| Methane, dichlorodiffutoro, CFC-12 air high population density kg 10900 kg CO2-Eq 7.5E-13 kg/m3 8.45E-09 Ecoinvent V2, slurry store and processing, operation, CH Methane, dichlorodiffutoro, CFC-12 air unspecified kg 10900 kg CO2-Eq 2.1E-19 kg/m3 3.18E-15 Ecoinvent V2, slurry store and processing, operation, CH Methane, dichlorodiffutoro, CFC-12 air high population density kg 2.1 kg/m3 3.18E-15 Ecoinvent V2, slurry store and processing, operation, CH Methane, dichlorofitionor, CFC-12 air high population density kg 2.1 kg/m3 3.18E-15 Ecoinvent V2, slurry store and processing, operation, CH Methane, fossil air loy population density kg 2.5 kg CO2-Eq 1.05E-04 kg/m3 2.5BE-03 Ecoinvent V2, slurry store and processing, operation, CH Methane, fossil air lowest strategories + upper troposphere kg 2.5 kg CO2-Eq 1.05E-04 kg/m3 2.2BE-03 Ecoinvent V2, slurry store and processing, operation, CH Methane, fossil deriman, fossil < | Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | | kg/m3 | 8.55E-11 | Ecoinvent V2, slurry store and processing, operation, CH |
| Methane, dichlorodiffluoro-, CFC-12 air low population density kg 1990 kg CO2-Eq 5.78E-13 kg/ms 6.30E-09 Ecoinvent V2, slury store and processing, operation, CH Methane, dichloroffluoro-, CFC-12 air unspecified kg 1990 kg CO2-Eq 1.67E-15 kg/ms 3.51E-13 Ecoinvent V2, slury store and processing, operation, CH Methane, fossil air high population density kg 2.5 kg CO2-Eq 1.67E-15 kg/ms 3.51E-13 Ecoinvent V2, slury store and processing, operation, CH Methane, fossil air low population density kg 2.5 kg CO2-Eq 1.03E-04 kg/ms 2.58E-03 Ecoinvent V2, slury store and processing, operation, CH Methane, fossil air low restratosphere + upper troposphere kg 2.5 kg CO2-Eq 1.51E-14 kg/ms 3.78E-13 Ecoinvent V2, slury store and processing, operation, CH Methane, fossil air low restratosphere + upper troposphere kg 2.5 kg CO2-Eq 1.51E-14 kg/ms 3.78E-13 Ecoinvent V2, slury store and processing, operation, CH | | | | | | | | | | |
| Methane, dichlorordilutor-, CFC-12 air ninspecified kg 1990 kg CO2-Eq 2.91E-19 kg/m3 3.18E-15 Ecoinvent V2, slurry store and processing, operation, CH Methane, dichloroflutor-, HCFC-21 air high population density kg 210 kg CO2-Eq 1.67E-15 kg/m3 3.18E-15 kg/m3 3 | | | | | | | | | | |
| Methane, fossil air high population density kg 25 kg CO2-Eq 4.12E-06 kg/m3 1.03E-04 grocessing, operation, CH Methane, fossil air lower stratosphere + upper troposphere kg 25 kg CO2-Eq 1.03E-04 kg/m3 2.58E-03 Ecoivent V2, slurry store and processing, operation, CH Methane, fossil air lower stratosphere + upper troposphere kg 25 kg CO2-Eq 1.51E-14 kg/m3 3.78E-13 Ecoivent V2, slurry store and processing, operation, CH Methane, fossil unspecified kg 25 kg CO2-Eq 9.43E-08 kg/m3 2.56E-06 Ecoivent V2, slurry store and processing, operation, CH Methane, fossil unspecified kg 1400 kg CO2-Eq 3.78E-11 kg/m3 5.29E-08 Ecoivent V2, slurry store and processing, operation, CH Methane, tetraflutoro, R-10 air high population density kg 7390 kg CO2-Eq 1.30E-16 kg/m3 4.28E-08 Ecoivent V2, slurry store and processing, operation, CH Methane, tetraflutoro, R-14 air high population density kg 7390 kg CO2-Eq 5.72E-12 kg/m3 4.28E-08 Ecoivent V2, slurry store and processing, operation, CH Methane, tetraflutoro, R-14 air unspecified kg 7390 kg CO2-Eq 5.72E-12 kg/m3 4.28E-08 Ecoivent V2, slurry store and processing, operation, CH Methane, tetraflutoro, R-14 air unspecified kg 7390 kg CO2-Eq 5.72E-12 kg/m3 3.86E-03 Ecoivent V2, slurry store and processing, operation, CH Methane, triflutoro, R-14 Ecoivent V2, slurry store and processing, operation, CH Methane, triflutoro, HFC-23 air high population density kg 14800 kg CO2-Eq 5.32E-13 kg/m3 7.88E-09 Ecoivent V2, slurry store and processing, operation, CH Sulfur hexallucide air high population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.51E-07 Ecoivent V2, slurry store and processing, operation, CH Sulfur hexallucide air low population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.51E-07 Ecoivent V2, slurry store and processing, operation, CH | Methane, dichlorodifluoro-, CFC-12 | air | unspecified | | 10900 | kg CO2-Eq | 2.91E-19 | kg/m3 | 3.18E-15 | Ecoinvent V2, slurry store and processing, operation, CH |
| Methane, fossil air low population density kg 25 kg CO2-Eq 1.03E-04 kg/m3 2.58E-03 Ecoinvent V2, slurry store and processing, operation, CH Methane, fossil air lower stratosphere + upper troposphere kg 25 kg CO2-Eq 1.51E-14 kg/m3 3.78E-13 Ecoinvent V2, slurry store and processing, operation, CH Methane, fossil air unspecified kg 25 kg CO2-Eq 9.43E-08 kg/m3 2.36E-06 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrachloro-, R-10 air unspecified kg 1400 kg CO2-Eq 3.78E-11 kg/m3 5.28E-13 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrachloro-, R-10 air unspecified kg 7390 kg CO2-Eq 1.30E-16 kg/m3 4.23E-08 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrafluoro-, R-14 air high population density kg 7390 kg CO2-Eq 5.72E-12 kg/m3 4.23E-08 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrafluoro-, R-14 air unspecified kg 7390 kg CO2-Eq 5.72E-12 kg/m3 4.23E-08 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrafluoro-, R-14 air high population density kg 4750 kg CO2-Eq 5.22E-09 kg/m3 3.8E-15 Ecoinvent V2, slurry store and processing, operation, CH Methane, titrillorof-(p-CFC-11 air high population density kg 4750 kg CO2-Eq 5.22E-10 kg/m3 3.8E-15 Ecoinvent V2, slurry store and processing, operation, CH Methane, titrilluoro-, HFC-23 air high population density kg 4750 kg CO2-Eq 5.32E-13 kg/m3 7.88E-09 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride air low population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.5E-07 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride air low population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.5E-07 Ecoinvent V2, slurry store and processing, operation, CH | | | | | | | | | | |
| Methane, fossil air lower stratosphere + upper troposphere kg 25 kg CO2-Eq 1.51E-14 kg/m3 3.78E-13 Ecoinvent V2, slurry store and processing, operation, CH Methane, fossil air unspecified kg 0.25 kg CO2-Eq 9.43E-08 kg/m3 2.36E-08 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrachloro-, R-10 air high population density kg 1400 kg CO2-Eq 3.78E-11 kg/m3 5.29E-08 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrachloro-, R-10 air unspecified kg 1400 kg CO2-Eq 1.30E-16 kg/m3 1.82E-13 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrafluoro-, R-14 air high population density kg 7390 kg CO2-Eq 5.72E-12 kg/m3 4.23E-08 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrafluoro-, R-14 air unspecified kg 7390 kg CO2-Eq 5.72E-12 kg/m3 4.23E-08 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrifluoro-, CFC-11 air high population density kg 4750 kg CO2-Eq 2.72E-15 kg/m3 1.29E-11 Ecoinvent V2, slurry store and processing, operation, CH Methane, trifluoro-, HFC-23 air high population density kg 14800 kg CO2-Eq 5.32E-13 kg/m3 7.88E-09 Ecoinvent V2, slurry store and processing, operation, CH Methane, trifluoro-, HFC-23 air high population density kg 22800 kg CO2-Eq 5.32E-13 kg/m3 0.00E+00 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride air low population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.51E-07 Ecoinvent V2, slurry store and processing, operation, CH | | | | S . | | | | | | |
| Methane, fossil air unspecified kg 25 kg CO2-Eq 9.43E-08 kg/m3 2.3E-06 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrachloro-, R-10 air sunspecified kg 1400 kg CO2-Eq 3.78E-11 kg/m3 5.29E-08 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrachloro-, R-10 air unspecified kg 1400 kg CO2-Eq 1.30E-16 kg/m3 1.82E-13 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrafluoro-, R-14 air high population density kg 7390 kg CO2-Eq 5.72E-12 kg/m3 4.23E-08 Ecoinvent V2, slurry store and processing, operation, CH Methane, trichlorofluoro-, CFC-11 air high population density kg 4750 kg CO2-Eq 2.72E-15 kg/m3 1.29E-11 Ecoinvent V2, slurry store and processing, operation, CH Methane, trifluoro-, HFC-23 air high population density kg 14800 kg CO2-Eq 5.32E-13 kg/m3 7.88E-09 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride air low population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.51E-07 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride air low population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.51E-07 Ecoinvent V2, slurry store and processing, operation, CH Ecoinvent | | | | | 25 | | 1.51E-14 | | 3.78E-13 | Ecoinvent V2, slurry store and processing, operation, CH |
| Methane, tetrachloro-, R-10 air unspecified kg 1400 kg CO2-Eq 1.30E-16 kg/m3 1.82E-13 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrafluoro-, R-14 air high population density kg 7390 kg CO2-Eq 5.72E-12 kg/m3 4.23E-08 Ecoinvent V2, slurry store and processing, operation, CH Methane, trichlorofluoro-, R-14 air high population density kg 4750 kg CO2-Eq 2.72E-15 kg/m3 1.82E-13 Ecoinvent V2, slurry store and processing, operation, CH Methane, trichlorofluoro-, CFC-11 air Ecoinvent V2, slurry store and processing, operation, CH Methane, trifluoro-, HFC-23 air high population density kg 14800 kg CO2-Eq 5.32E-13 kg/m3 7.88E-09 Ecoinvent V2, slurry store and processing, operation, CH Methane, trifluoro-, HFC-23 air high population density kg 22800 kg CO2-Eq 5.32E-13 kg/m3 0.00E+00 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride air low population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 0.151E-07 Ecoinvent V2, slurry store and processing, operation, CH Ecoinven | Methane, fossil | | unspecified | kg | | kg CO2-Eq | 9.43E-08 | kg/m3 | 2.36E-06 | Ecoinvent V2, slurry store and processing, operation, CH |
| Methane, tetrafluoro-, R-14 air high population density kg 7390 kg CO2-Eq 5.72E-12 kg/m3 4.23E-08 Ecoinvent V2, slurry store and processing, operation, CH Methane, tetrafluoro-, R-14 air unspecified kg 7390 kg CO2-Eq 5.22E-09 kg/m3 3.86E-05 Ecoinvent V2, slurry store and processing, operation, CH Methane, tritholorofluoro-, CFC-11 air Ecoinvent V2, slurry store and processing, operation, CH Methane, trifluoro-, HFC-23 air high population density kg 14800 kg CO2-Eq 5.32E-13 kg/m3 7.88E-09 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride air high population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 0.00E+00 Ecoinvent V2, slurry store and processing, operation, CH Sulfur ptocessing, operation | | | | | | | | | | |
| Methane, tetrafluoro-, R-14 air unspecified kg 7390 kg CO2-Eq 5.22E-09 kg/m3 3.86E-05 Ecoinvent V2, slurry store and processing, operation, CH Methane, trifhlorofluoro-, CFC-11 air Ecoinvent V2, slurry store and processing, operation, CH Methane, trifluoro-, HFC-23 air high population density kg 14800 kg CO2-Eq 5.32E-13 kg/m3 7.88E-09 Ecoinvent V2, slurry store and processing, operation, CH Methane, trifluoro-, HFC-23 air high population density kg 22800 kg CO2-Eq 6.32E-13 kg/m3 7.88E-09 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride air low population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.51E-07 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride high population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.51E-07 Ecoinvent V2, slurry store and processing, operation, CH | | | | | | | | | | |
| Methane, trifluoro-, HFC-23 air high population density kg 14800 kg CO2-Eq 5.32E-13 kg/m3 7.88E-09 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride air high population density kg 22800 kg CO2-Eq kg/m3 0.00E+00 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride air low population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.51E-07 Ecoinvent V2, slurry store and processing, operation, CH | Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 5.22E-09 | kg/m3 | 3.86E-05 | Ecoinvent V2, slurry store and processing, operation, CH |
| Sulfur hexafluoride air high population density kg 22800 kg CO2-Eq kg/m3 0.00E+00 Ecoinvent V2, slurry store and processing, operation, CH Sulfur hexafluoride air low population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.51E-07 Ecoinvent V2, slurry store and processing, operation, CH | | | | . • | | | | | | |
| Sulfur hexafluoride air low population density kg 22800 kg CO2-Eq 6.63E-12 kg/m3 1.51E-07 Ecoinvent V2, sturry store and processing, operation, CH | | | | S . | | | 5.32E-13 | | | |
| Sulfur hexafluoride air unspecified kg 22800 kg CO2-Eq 1.82E-08 kg/m3 4.16E-04 Ecoinvent V2, slurry store and processing, operation, CH | Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | | kg/m3 | 1.51E-07 | Ecoinvent V2, slurry store and processing, operation, CH |
| | Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.82E-08 | kg/m3 | 4.16E-04 | Ecoinvent V2, slurry store and processing, operation, CH |

| Methane, monochloro-, R-40 | oir | high population density | lea. | 13 | kg CO2-Eg | 7.31E-14 | ka/m2 | 9.50E-13 | Facility and V/2 alumn atom and processing approxime CH |
|--|------------|-----------------------------------|----------|--------------|------------------------|----------------------|----------------|----------------------|--|
| Methane, monochloro-, R-40 | air air | high population density | kg kg | 13 | kg CO2-Eq | 2.51E-14 2.51E-11 | kg/m3 kg/m3 | 9.50E-13 3.26E-10 | Ecoinvent V2, slurry store and processing, operation, CH |
| | | low population density | | 13 | | 2.51E-11 3.14E-06 | | | Ecoinvent V2, slurry store and processing, operation, CH |
| Carbon dioxide, land transformation | air air | low population density | kg | 17200 | kg CO2-Eq | 3.14E-06 | kg/m3 kg/m3 | 3.14E-06 0.00E+00 | Ecoinvent V2, slurry store and processing, operation, CH |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/m3 | | Ecoinvent V2, slurry store and processing, operation, CH |
| Ammonia | o ir | high population density | ka | 1.88 | kg SO2-Eg | 1.25E-07 | lea/m2 | 5.60E-02 2.36E-07 | Facinity 1/2 alumn sters and processing apprecian CII |
| | air | high population density | kg | | | | kg/m3 | | Ecoinvent V2, slurry store and processing, operation, CH |
| Ammonia | air | low population density | kg | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 2.32E-07 1.59E-06 | kg/m3 | 4.35E-07 2.99E-06 | Ecoinvent V2, slurry store and processing, operation, CH |
| Ammonia | air | unspecified | kg | | | | kg/m3 | | Ecoinvent V2, slurry store and processing, operation, CH |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 1.53E-07 | kg/m3 | 1.34E-07 | Ecoinvent V2, slurry store and processing, operation, CH |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 1.43E-06 | kg/m3 | 1.26E-06 | Ecoinvent V2, slurry store and processing, operation, CH |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 1.07E-07 | kg/m3 | 9.43E-08 | Ecoinvent V2, slurry store and processing, operation, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 6.36E-09 | kg/m3 | 1.02E-08 | Ecoinvent V2, slurry store and processing, operation, CH |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 4.52E-07 | kg/m3 | 7.24E-07 | Ecoinvent V2, slurry store and processing, operation, CH |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 2.62E-08 | kg/m3 | 4.19E-08 | Ecoinvent V2, slurry store and processing, operation, CH |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 8.19E-11 | kg/m3 | 1.54E-10 | Ecoinvent V2, slurry store and processing, operation, CH |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 1.44E-07 | kg/m3 | 2.72E-07 | Ecoinvent V2, slurry store and processing, operation, CH |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.17E-08 | kg/m3 | 4.08E-08 | Ecoinvent V2, slurry store and processing, operation, CH |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 2.12E-05 | kg/m3 | 1.49E-05 | Ecoinvent V2, slurry store and processing, operation, CH |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 4.38E-05 | kg/m3 | 3.07E-05 | Ecoinvent V2, slurry store and processing, operation, CH |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 2.74E-05 | kg/m3 | 1.91E-05 | Ecoinvent V2, slurry store and processing, operation, CH |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 1.94E-05 | kg/m3 | 1.94E-05 | Ecoinvent V2, slurry store and processing, operation, CH |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 8.44E-05 | kg/m3 | 8.44E-05 | Ecoinvent V2, slurry store and processing, operation, CH |
| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 3.55E-06 | kg/m3 | 3.55E-06 | Ecoinvent V2, slurry store and processing, operation, CH |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 1.67E-09 | kg/m3 | 3.13E-09 | Ecoinvent V2, slurry store and processing, operation, CH |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 6.23E-16 | kg/m3 | 4.05E-16 | Ecoinvent V2, slurry store and processing, operation, CH |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eg | | kg/m3 | 0.00E+00 | Ecoinvent V2, slurry store and processing, operation, CH |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 1.11E-13 | ů, | 7.20E-14 | Ecoinvent V2, slurry store and processing, operation, CH |
| | | · · | - C | | - | | | 1.78E-04 | . , |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 4.64E-09 | kg/m3 | 1.42E-08 | Ecoinvent V2, slurry store and processing, operation, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 4.44E-10 | kg/m3 | 1.36E-09 | Ecoinvent V2, slurry store and processing, operation, CH |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 6.93E-09 | kg/m3 | 2.12E-08 | Ecoinvent V2, slurry store and processing, operation, CH |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 1.63E-12 | kg/m3 | 4.98E-12 | Ecoinvent V2, slurry store and processing, operation, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 1.89E-08 | kg/m3 | 5.78E-08 | Ecoinvent V2, slurry store and processing, operation, CH |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 3.68E-09 | kg/m3 | 1.12E-08 | Ecoinvent V2, slurry store and processing, operation, CH |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eg | 1.94E-05 | kg/m3 | 4.28E-07 | Ecoinvent V2, slurry store and processing, operation, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 2.05E-07 | kg/m3 | 4.50E-09 | Ecoinvent V2, slurry store and processing, operation, CH |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eg | 2.00E-05 | kg/m3 | 4.40E-07 | Ecoinvent V2, slurry store and processing, operation, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eg | 2.06E-07 | kg/m3 | 4.53E-09 | Ecoinvent V2, slurry store and processing, operation, CH |
| Phosphate | water | river | ka | 1 | kg PO4-Eg | 8.24E-09 | kg/m3 | 8.24E-09 | Ecoinvent V2, slurry store and processing, operation, CH |
| Phosphorus | water | river | ka | 3.06 | kg PO4-Eq | 4.53E-09 | kg/m3 | 1.38E-08 | Ecoinvert V2, slurry store and processing, operation, CH |
| Phosphorus | water | unspecified | ka | 3.06 | kg PO4-Eq | 3.77E-11 | kg/m3 | 1.15E-10 | Ecoinvent V2, slurry store and processing, operation, CH |
| Phosphoric acid | air | high population density | ka | 0.97 | kg PO4-Eq | 0 | kg/m3 | 0.00E+00 | Ecoinvent V2, slurry store and processing, operation, CH |
| | 2 | g p - p - 2.341011 dollotty | ··9 | 0.07 | | | Ng/1110 | 1.00E-06 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 1.41E-02 | kg/m3 | 1.39E-01 | Ecoinvent V2, slurry store and processing, operation, CH |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 1.17E-02 | kg/m3 | 2.24E-01 | Ecoinvent V2, slurry store and processing, operation, CH |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Ea | 1.17E-02 1.18E-04 | Nm3/m3 | 4.69E-03 | Ecoinvent V2, slurry store and processing, operation, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 4.65E-03 | Nm3/m3 | 1.78E-01 | Econivent V2, slurry store and processing, operation, CH |
| Oil, crude, in ground | resource | | ka | 45.8 | MJ-Eq | 2.05E-03 | kg/m3 | 9.38E-02 | Econivent V2, slurry store and processing, operation, Cn Ecoinvent V2, slurry store and processing, operation, CH |
| Peat, in ground | resource | in ground biotic | kg ka | 45.6 9.9 | MJ-Eq | 1.37E-07 | kg/m3 | 9.36E-02 1.35E-06 | |
| reat, in ground | resource | DIOLIC | kg | 9.9 | IVIJ-⊏Y | 1.37 E-U/ | kg/ms | | Ecoinvent V2, slurry store and processing, operation, CH |
| | | | | | | | | 6.40E-01 | |

| FL24 | Dispose of Manure |
|------|----------------------|
| | (Transport Off-Site) |

back to top transport, lorry >16t See Transport lorry>16t

Slurry spreading

The inventory takes into account the diesel fuel consumption and the amount of agricultural machinery and of the shed, which has to be attributed to the slurry spreading. Also taken into consideration is the amount of emissions to the air from combustion and the emission to the soil from tyre abrasion during the work process. The following activities where considered part of the work process: preliminary work at the farm, like attaching the adequate machine to the tractor; transfer to field (with an assumed distance of 1 km); field work (for a parcel of land of 1 ha surface); transfer to farm and concluding work, like uncoupling the machine. The overlapping during the field work is considered. The amount of spread slurry is not taken into account. Not included are dust other than from combustion and noise.

| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 2.10E-01 | kg/m3 | 2.10E-01 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
|--|-----|--|------|--------|-------------|----------|--------|----------|--|
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 7.97E-01 | kg/m3 | 7.97E-01 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 1.60E-08 | kg/m3 | 1.60E-08 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.45E-01 | kg/m3 | 1.45E-01 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 1.05E-04 | kg/m3 | 1.66E-04 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 1.80E-03 | kg/m3 | 2.83E-03 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 1.87E-11 | kg/m3 | 2.95E-11 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 2.88E-03 | kg/m3 | 4.53E-03 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 1.11E-10 | kg/m3 | 3.34E-09 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eg | 7.27E-12 | kg/m3 | 2.18E-10 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 3.41E-17 | kg/m3 | 1.02E-15 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eg | 4.45E-06 | kg/m3 | 1.33E-03 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eg | 2.86E-05 | kg/m3 | 8.52E-03 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.52E-13 | kg/m3 | 4.53E-11 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 2.15E-06 | kg/m3 | 6.42E-04 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eg | 3.10E-12 | kg/m3 | 4.44E-09 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 1.32E-10 | kg/m3 | 1.89E-07 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 4.03E-08 | kg/m3 | 5.76E-05 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eg | 1.16E-12 | kg/m3 | 7.10E-09 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ethane, 1.1.2-trichloro-1.2.2-trifluoro-, CFC-113 | air | unspecified | ka | 6130 | kg CO2-Eq | | kg/m3 | 0.00E+00 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ethane, 1.1-difluoro-, HFC-152a | air | high population density | ka | 124 | kg CO2-Eq | 9.15E-11 | kg/m3 | 1.13E-08 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ethane, 1.1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/m3 | 0.00E+00 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 2.52E-09 | kg/m3 | 2.52E-05 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/m3 | 0.00E+00 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 8.21E-11 | kg/m3 | 1.00E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | ka | 12200 | kg CO2-Eg | 3.05E-08 | kg/m3 | 3.73E-04 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 5.44E-07 | kg/m3 | 1.36E-05 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, biogenic | air | low population density | ka | 25 | kg CO2-Eq | 1.79E-06 | kg/m3 | 4.49E-05 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | | ···g | 20 | 2 2 2 2 2 4 | 22 00 | .tg/mo | 2 00 | |

Ecoinvent V2, slurry spreading, by vacuum tanker, CH

| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 1.02E-06 | kg/m3 | 2.55E-05 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
|---|-------------|---|------------|--------|-----------|----------|---------|----------|--|
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 9.25E-17 | kg/m3 | 4.62E-16 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | | 1890 | kg CO2-Eq | 1.29E-09 | kg/m3 | 2.43E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | air | | kg | | | | | | |
| Methane, bromotrifluoro-, Halon 1301 | an an | high population density | kg | 7140 | kg CO2-Eq | 8.10E-14 | kg/m3 | 5.78E-10 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.23E-08 | kg/m3 | 8.81E-05 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 6.33E-11 | kg/m3 | 1.15E-07 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 4.95E-09 | kg/m3 | 8.96E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/m3 | 0.00E+00 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, dichloro-, HCC-30 | | | | 8.7 | | 6.17E-12 | | 5.37E-11 | |
| | air | high population density | kg | | kg CO2-Eq | | kg/m3 | | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 2.15E-11 | kg/m3 | 1.87E-10 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eg | 3.97E-12 | kg/m3 | 4.33E-08 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | ka | 10900 | kg CO2-Eq | 4.71E-12 | kg/m3 | 5.14E-08 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 6.15E-17 | kg/m3 | 6.70E-13 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | | , Ng | | | | | | |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | кg | 210 | kg CO2-Eq | 8.83E-15 | kg/m3 | 1.85E-12 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 9.60E-05 | kg/m3 | 2.40E-03 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 1.59E-03 | kg/m3 | 3.98E-02 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 2.53E-13 | kg/m3 | 6.33E-12 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, fossil | air | unspecified | ka | 25 | kg CO2-Eq | 4.19E-06 | kg/m3 | 1.05E-04 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | | , Ng | | | | | | |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 6.06E-10 | kg/m3 | 8.48E-07 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 2.75E-14 | kg/m3 | 3.85E-11 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 4.70E-12 | kg/m3 | 3.48E-08 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | , - | 7390 | kg CO2-Eq | 2.75E-07 | kg/m3 | 2.03E-03 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | | kg | | | | | | |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.43E-14 | kg/m3 | 6.81E-11 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 2.81E-12 | kg/m3 | 4.16E-08 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Sulfur hexafluoride | air | high population density | ka | 22800 | kg CO2-Eq | | kg/m3 | 0.00E+00 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | air | | ka | 22800 | | 5.33E-11 | | | |
| Sulfur hexafluoride | | low population density | kg | | kg CO2-Eq | | kg/m3 | 1.21E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.41E-08 | kg/m3 | 3.22E-04 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 9.88E-14 | kg/m3 | 1.28E-12 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Methane, monochloro-, R-40 | air | low population density | ka | 13 | kg CO2-Eq | 3.93E-11 | kg/m3 | 5.11E-10 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Carbon dioxide, land transformation | oir | low population density | ka | 1 | kg CO2-Eq | 8.10E-06 | kg/m3 | 8.10E-06 | |
| | all | | kg | | | 0.10E-00 | | | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/m3 | 0.00E+00 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | | | | | | | 1.21E+00 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 1.50E-06 | kg/m3 | 2.82E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ammonia | oir | | ka | 1.88 | kg SO2-Eq | 6.64E-06 | kg/m3 | 1.25E-05 | |
| | all | low population density | kg | | | | | | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.75E-05 | kg/m3 | 3.28E-05 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eg | 8.41E-06 | kg/m3 | 7.40E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Hydrogen chloride | air | low population density | ka | 0.88 | kg SO2-Eg | 4.47E-06 | kg/m3 | 3.94E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | oir. | | leg leg | 0.88 | | 5.06E-06 | | 4.45E-06 | |
| Hydrogen chloride | all | unspecified | kg | | kg SO2-Eq | | kg/m3 | | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 3.02E-07 | kg/m3 | 4.83E-07 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 1.05E-06 | kg/m3 | 1.69E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Hydrogen fluoride | air | unspecified | ka | 1.6 | kg SO2-Eq | 1.50E-06 | kg/m3 | 2.40E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | oir | high population density | ka | 1.88 | kg SO2-Eq | 3.02E-08 | kg/m3 | 5.69E-08 | |
| Hydrogen sulfide | all | | kg | | | | | | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Hydrogen sulfide | aır | low population density | kg | 1.88 | kg SO2-Eq | 2.17E-06 | kg/m3 | 4.08E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 8.64E-07 | kg/m3 | 1.62E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eg | 2.07E-04 | kg/m3 | 1.45E-04 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Nitrogen oxides | oir | low population density | ka | 0.7 | kg SO2-Eq | 9.96E-03 | kg/m3 | 6.97E-03 | Ecoinvert V2, slurry spreading, by vacuum tanker, CH |
| | all . | | , vg | | | | | | |
| Nitrogen oxides | aır | unspecified | kg | 0.7 | kg SO2-Eq | 4.40E-04 | kg/m3 | 3.08E-04 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 4.15E-04 | kg/m3 | 4.15E-04 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Sulfur dioxide | air | low population density | ka | 1 | ka SO2-Ea | 1.20E-03 | kg/m3 | 1.20E-03 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Sulfur dioxide | air | unspecified | ka | 4 | kg SO2-Eg | 1.50E-04 | kg/m3 | 1.50E-04 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | | , vg | | | | | | |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 9.08E-08 | kg/m3 | 1.71E-07 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 3.17E-14 | kg/m3 | 2.06E-14 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Phosphoric acid | air | high population density | ka | 0.98 | kg SO2-Eq | | kg/m3 | 0.00E+00 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Sulfuric acid | air | low population density | ka | 0.65 | kg SO2-Eq | 9.09E-14 | J | 5.91E-14 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| doid | <u></u> | ion population density | ''y | 3.00 | g 002 Lq | 0.002 17 | | 9.27E-03 | 200. Total 12, oranj optodaling, by vacatin talinos, ori |
| DI I | | | | | 1 00:5 | 0.405.55 | | | F : |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 2.40E-08 | kg/m3 | 7.35E-08 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 3.96E-09 | kg/m3 | 1.21E-08 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Phosphorus | air | low population density, long-term | ka | 3.06 | kg PO4-Eg | 4.26E-09 | kg/m3 | 1.30E-08 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Phosphorus | air | unspecified | ka | 3.06 | kg PO4-Eq | 8.71E-11 | kg/m3 | 2.67E-10 | |
| | | | , vy | | | | | | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 2.52E-08 | kg/m3 | 7.70E-08 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 3.29E-07 | kg/m3 | 1.01E-06 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | ka PO4-Ea | 2.21E-03 | kg/m3 | 4.86E-05 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| BOD5, Biological Oxygen Demand | water | unspecified | . • | 0.022 | kg PO4-Eq | 1.27E-05 | kg/m3 | 2.79E-07 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | | kg | | | | | | |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 2.24E-03 | kg/m3 | 4.93E-05 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 1.28E-05 | kg/m3 | 2.82E-07 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Phosphate | water | river | ka | 1 | kg PO4-Eg | 4.24E-07 | kg/m3 | 4.24E-07 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Phosphorus | water | river | ka | 3.06 | kg PO4-Eq | 2.50F-07 | kg/m3 | 7.64E-07 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | 11101 | Ny L | | | 2.002 0. | | | |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 2.81E-09 | kg/m3 | 8.61E-09 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/m3 | 0.00E+00 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | - · · · · · · · · · · · · · · · · · · · | | | - | | | 1.01E-04 | |
| Coal, brown, in ground | resource | in ground | ka | 9.9 | MJ-Eq | 2.70E-02 | kg/m3 | 2.67E-01 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | | Ny L- | | | | kg/1113 | | |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 1.05E-01 | kg/m3 | 2.00E+00 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 1.02E-03 | Nm3/m3 | 4.06E-02 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 4.66E-02 | Nm3/m3 | 1.78E+00 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 2.94E-01 | kg/m3 | 1.35E+01 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | | ky | | | | | | |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 1.11E-05 | kg/m3 | 1.09E-04 | Ecoinvent V2, slurry spreading, by vacuum tanker, CH |
| | | | | | | | | 1.76E+01 | |
| | | | | | | | | 1.702701 | |

| FL3 | Collect Garbage (On- | See information on "Combust/Produce/Deliver Diesel" and | |
|-------------|----------------------|--|--|
| | Site) | "Combust/Produce/Deliver Gasoline" for on-site equipment usage | |
| back to top | | | |

| FL8 | Store Garbage | No emissions involved in this activity |
|-------------|---------------|--|
| back to top | | |

| FL25 | Dispose of Garbage | Emissions from Burning Plastic |
|-------------|--------------------|--------------------------------|
| back to top | | |

Hidden cells : process of garbage disposal, as municipal (landfill, incineration) or plastics (landfill, incineration)

3.13E-01

Because agricultural films often come in contact with the ground or most farm products, many recyclers currently reject this material due to contamination plastic garbage from livestock industry is burned

| Burning of Municipal Refuse (Table 2.5-1 of | | | | | | | | |
|--|-------|----------|--------|-----|----------|-------|----------|--|
| www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.p | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| ulate | air | kg/Mg | 8 | | | | | Open Burning of Municipal Refuse (Table 2.5-1 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| r oxides | air | kg/Mg | 0.5 | | | | | Open Burning of Municipal Refuse (Table 2.5-1 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| | air | kg/Mg | 42 | | | | | Open Burning of Municipal Refuse (Table 2.5-1 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| | air | kg/Mg | 6.5 | | | | | Open Burning of Municipal Refuse (Table 2.5-1 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| C | air | kg/Mg | 15 | | | | | Open Burning of Municipal Refuse (Table 2.5-1 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| gen Oxides | air | kg/Mg | 3 | | | | | Open Burning of Municipal Refuse (Table 2.5-1 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| | | | | | | | | |
| ultural Plastic Film - used for ground moisture and | | | | | | | | |
| ic films gathered together and burned in a pile - Ta | | | | | | | | |
| umes it has been exposed to vegetation and pestici | ides) | | | | | | | |
| tene | air | mg/kg | 0.0123 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| ene | air | mg/kg | 0.0033 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| l benzene | air | mg/kg | 0.0012 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| xane | air | mg/kg | 0.0043 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| racene | air | ug/kg | 1.32 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| zo(A)pyrene | air | ug/kg | 7.53 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| zo(B)fluoranthene | air | ug/kg | 9.25 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| zo(e)pyrene | air | ug/kg | 9.65 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| zo(G,H,I)perylene | air | ug/kg | 14.93 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| zon(K)fluoranthene | air | ug/kg | 2.51 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| zo(A)anthracene | air | ug/kg | 14.41 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| ysene | air | ug/kg | 17.18 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| pranthene | air | ug/kg | 107.05 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| eno(1,2,3-CD)pyrene | air | ug/kg | 10.7 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| nanthrene | air | ug/kg | 24.05 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| ene | air | ug/kg | 58.81 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/c/02/final/c/2s/05.pdf) |
| ene | air | ug/kg | 18.77 | | | | | Used Plastic Burned in a Pile (Tables 2.5-7 and 2.5-8 of http://www.epa.gov/ttn/chief/ap42/ch02/final/c02s05.pdf) |
| | can | ug/kg | 10.77 | | | | | Used 1 lastic buffed in a 1 life (Tables 2.5-7 and 2.5-0 of http://www.spa.gov/til/icitie/ap-2/citi/2/inta/c02505.pdf) |
| emission factor for open burning of MSW | air | g/tonne | 6500 | | | | | 2006 IPCC Guidelines, Emissions for open burning of MSW based on plastics (http://www.ipcc- |
| emission factor for open burning or MSW | dii | g/torine | 0300 | | | | | nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_5_Ch5_IOB.pdf) |
| emission factor for open burning of MSW | air | g/tonne | 150 | | | | | 2006 IPCC Guidelines, Emissions for open burning of MSW based on plastics (http://www.ipcc- |
| emission factor for open burning or wow | all | g/torine | 130 | | | | | nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_5_Ch5_IOB.pdf) |
| amigaian factor for open burning of MCW | air | lea/lea | 1.595 | | | | | 2006 IPCC Guidelines, Emissions for open burning of MSW based on plastics composition, Equation 5.2 (http://www.ip |
| emission factor for open burning of MSW | all | kg/kg | 1.595 | | | | | |
| | | | | | | | | nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_5_Ch5_IOB.pdf) |
| | | | | 0.5 | 0.505.00 | | | |
| emission factor for open burning of MSW | | | | 25 | 6.50E-03 | kg/kg | 1.63E-01 | |
| 2 emission factor for open burning of MSW | | | | 1 | 1.595 | kg/kg | 1.60E+00 | |
| emission factor for open burning of MSW | | | | 298 | 1.50E-04 | kg/kg | 4.47E-02 | |
| | | | | | | | 1.80E+00 | |
| | | | | | | | | |
| ur oxides | | | | | 5.00E-04 | kg/kg | 5.00E-04 | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| CO2 Emission Factor = su | m j (WF j * dm j * CF j * FCF j * OF j) * 44/12 | | | |
|--------------------------|---|--|---|---------------------------|
| WFi | j in the MSW (as wet weight incinerated or open-burned) - All plastic | | | |
| dm j | y matter content of plastic | 100 | % | 5, Section 2.3, Table 2.4 |
| CF | of carbon in dry matter - plastic | 75 | % | 5, Section 2.3, Table 2.4 |
| FCF j | on fraction of total carbon for plastic | 100 | % | 5, Section 2.3, Table 2.4 |
| OF j | ion factor in % of carbon input | 58 | % | for MSW |
| 44/12 | rersion factor from C to CO2 | | | |
| with: | sum j WF j = 1 | | | |
| j | , wood, garden (yard) and park waste, disposable nappies, rubber and leather, pla | astics, metal, glass, other inert waste. | | |

FL4 Collect Mortalities (On-Site) Included in total energy used on beef farms

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FL14 back to top

FL26 Dispose of Mortalities Rendering and on-farm disposal

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| FL5 | Producing bedding | | | | | | | | |
|-------------------------|-------------------|--|----|--------|-----------|----------|-------|----------|---|
| | material | | | | | | | | |
| | Straw Bed for | The inventories include the cultivation of straw on a straw area. Included steps are | | | | | | | Ecoinvent V2, straw, from straw areas, at field, CH |
| | Livestock | harvest and loading for transport. | | | | | | | |
| back to top | | | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 8.27E-03 | kg/kg | 8.27E-03 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 2.99E-02 | kg/kg | 2.99E-02 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 5.43E-10 | kg/kg | 5.43E-10 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 6.22E-03 | kg/kg | 6.22E-03 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 3.66E-06 | kg/kg | 5.75E-06 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 4.40E-05 | kg/kg | 6.92E-05 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 6.38E-13 | kg/kg | 1.00E-12 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Carbon monoxide, fossil | air | unspecified | ka | 1.5714 | ka CO2-Ea | 1.32E-04 | ka/ka | 2.08E-04 | Ecoinvent V2, straw, from straw areas, at field, CH |

| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 4.45E-12 | kg/kg | 1.33E-10 | Ecoinvent V2, straw, from straw areas, at field, CH |
|--|--|---|--|--|--|--|---|---|--|
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 1.66E-13 | kg/kg | 4.97E-12 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Chloroform | air | | kq | 30 | kg CO2-Eq | 3.99E-19 | kg/kg | 1.20E-17 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Dinitrogen monoxide | air | unspecified high population density | kg kg | 298 | | 1.63E-07 | | 4.86E-05 | Ecoinvent V2, straw, from straw areas, at field, CH |
| | | | S . | | kg CO2-Eq | | kg/kg | | |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 1.66E-04 | kg/kg | 4.95E-02 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 5.17E-15 | kg/kg | 1.54E-12 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 8.48E-08 | kg/kg | 2.53E-05 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 1.06E-13 | kg/kg | 1.52E-10 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 5.40E-12 | kg/kg | 7.72E-09 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 1.53E-09 | kg/kg | 2.18E-06 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 3.84E-14 | kg/kg | 2.35E-10 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | | S . | 124 | kg CO2-Eq | 3.74E-12 | | 4.63E-10 | |
| | | high population density | kg | | | 3.74E-12 | kg/kg | | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | 4.045.40 | kg/kg | 0.00E+00 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 1.04E-10 | kg/kg | 1.04E-06 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 2.74E-12 | kg/kg | 3.34E-08 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 8.91E-10 | kg/kg | 1.09E-05 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 1.70E-08 | kg/kg | 4.25E-07 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 6.89E-08 | kg/kg | 1.72E-06 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, biogenic | air | | kq | 25 | kg CO2-Eq | 4.10E-08 | kg/kg | 1.03E-06 | Ecoinvent V2, straw, from straw areas, at field, CH |
| | | unspecified | S . | 20 | | | | | |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 3 | kg CO2-Eq | 1.08E-18 | kg/kg | 5.41E-18 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 5.14E-11 | kg/kg | 9.71E-08 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 2.32E-15 | kg/kg | 1.65E-11 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 4.62E-10 | kg/kg | 3.30E-06 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 2.25E-12 | kg/kg | 4.07E-09 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.98E-10 | kg/kg | 3.59E-07 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | ka | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.28E-13 | kg/kg | 1.98E-12 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, dichloro-, HCC-30 | air | | S . | 8.7 | kg CO2-Eq | 4.91E-13 | | 4.27E-12 | |
| | | low population density | kg | | | | kg/kg | | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.38E-13 | kg/kg | 1.50E-09 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 1.87E-13 | kg/kg | 2.04E-09 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 7.19E-19 | kg/kg | 7.83E-15 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 3.02E-16 | kg/kg | 6.35E-14 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 3.07E-06 | kg/kg | 7.67E-05 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 6.43E-05 | kg/kg | 1.61E-03 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 8.62E-15 | kg/kg | 2.15E-13 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, fossil | air | | . • | 25 25 | | 1.01E-07 | | 2.13E-13 2.53E-06 | |
| | | unspecified | kg | | kg CO2-Eq | | kg/kg | | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 2.46E-11 | kg/kg | 3.44E-08 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 3.21E-16 | kg/kg | 4.50E-13 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.92E-13 | kg/kg | 1.42E-09 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 8.02E-09 | kg/kg | 5.93E-05 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eg | 4.91E-16 | kg/kg | 2.33E-12 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 9.62E-14 | kg/kg | 1.42E-09 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | 0.022 11 | kg/kg | 0.00E+00 | Ecoinvent V2, straw, from straw areas, at field, CH |
| | air | | S . | | | 1 005 10 | | | |
| Sulfur hexafluoride | | low population density | kg | 22800 | kg CO2-Eq | 1.88E-12 | kg/kg | 4.28E-08 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 5.69E-10 | kg/kg | 1.30E-05 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 3.82E-15 | kg/kg | 4.96E-14 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 8.96E-13 | kg/kg | 1.16E-11 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 3.14E-07 | kg/kg | 3.14E-07 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Nitrogen fluoride | air | high population density | ka | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, straw, from straw areas, at field, CH |
| | | 3 1 1 1 2 2 2 3 | 3 | | 3 1 | | 3 3 | | |
| Ammonia | | | | | | | | 9 60 ⊢-02 | |
| | air | high population density | ka | 1 88 | ka SO2-Ea | 5.00F-08 | ka/ka | 9.60E-02 | Ecoinvent V2 straw from straw gross at field CH |
| | air | high population density | kg | 1.88 | kg SO2-Eq | 5.09E-08 | kg/kg | 9.57E-08 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia | air air | low population density | kg kg | 1.88 | kg SO2-Eq | 2.59E-07 | kg/kg | 9.57E-08 4.86E-07 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia | | low population density unspecified | kg kg kg | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 | kg/kg kg/kg | 9.57E-08 4.86E-07 1.19E-06 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride | | low population density unspecified high population density | kg kg kg kg | 1.88 1.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 | kg/kg kg/kg kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia | | low population density unspecified | kg kg kg kg kg | 1.88 1.88 | kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 | kg/kg kg/kg | 9.57E-08 4.86E-07 1.19E-06 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride | | low population density unspecified high population density | kg kg kg kg kg | 1.88 1.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 | kg/kg kg/kg kg/kg kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride | | low population density unspecified high population density low population density unspecified | kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride | | low population density unspecified high population density low population density unspecified high population density | kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride | | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride | | low population density unspecified high population density low population density unspecified high population density low population density unspecified unspecified | kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide | | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density | kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide | | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density low population density | kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, straw, from straw areas, at field, CH |
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| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density unspecified river agricultural high population density | Kg g g kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 1 1 1.88 0.65 0.98 | kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density unspecified river agricultural high population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 1.1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.6.1E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur cacid Phosphoris acid Phosphorus Phosphorus | air | low population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density high population density | K9 | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur i exide Sulfur dioxide Sulfur i exide Phydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 5.35E-10 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Phosphorus Phosphorus Phosphorus Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density unspecified river agricultural high population density low population density long-term unspecified | K9 | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 5.35E-10 5.35E-10 5.79E-12 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density unspecified river agricultural high population density unspecified river agricultural high population density low population density long-term unspecified agricultural | K9 | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 5.35E-10 7.79E-12 3.08E-09 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified river agricultural high population density low population density | KG G G G G G G G G G G G G G G G G G G | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 9.27E-10 1.84E-10 1.75E-10 2.55E-12 1.01E-09 1.24E-08 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 7.79E-12 3.08E-09 3.78E-08 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density unspecified river agricultural high population density unspecified river agricultural high population density low population density long-term unspecified agricultural | K9 | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg PO4-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 9.27E-10 1.84E-10 1.75E-10 2.55E-12 1.01E-09 1.24E-08 8.29E-05 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 5.35E-10 5.79E-12 3.08E-09 3.78E-08 1.82E-06 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density unspecified river agricultural high population density low population density | KG G G G G G G G G G G G G G G G G G G | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 9.27E-10 1.84E-10 1.75E-10 2.55E-12 1.01E-09 1.24E-08 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 5.35E-10 7.79E-12 3.08E-09 3.78E-08 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | K 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg PO4-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 9.27E-10 1.84E-10 1.75E-10 2.55E-12 1.01E-09 1.24E-08 8.29E-05 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 5.35E-10 5.79E-12 3.08E-09 3.78E-08 1.82E-06 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur idoxide Sulfur idoxide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | K 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO4-Eq kg PO4-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 4.49E-05 4.25E-09 1.05E-15 9.27E-10 1.84E-10 1.75E-10 2.55E-12 1.01E-09 1.24E-08 8.29E-05 5.85E-07 8.41E-05 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 7.79E-12 3.08E-09 3.78E-08 1.82E-06 1.29E-08 1.85E-06 | Ecoinvent V2, straw, from straw areas, at field, CH |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg SO2-Eq kg PO4-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 9.27E-10 1.84E-10 1.75E-10 2.55E-12 1.01E-09 1.24E-08 8.29E-05 5.85E-07 8.41E-05 5.89E-07 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 5.35E-10 7.79E-12 3.08E-09 3.78E-08 1.82E-06 1.29E-08 1.85E-06 1.30E-08 | Ecoinvent V2, straw, from straw areas, at field, CH |
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| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur idoxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | air | low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density | K 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.8 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 9.27E-10 1.84E-10 1.75E-10 2.55E-12 1.01E-09 1.24E-08 8.29E-05 5.85E-07 8.41E-05 5.89E-07 1.72E-04 2.31E-06 9.98E-11 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 7.79E-12 3.08E-09 3.78E-08 1.82E-06 1.29E-08 1.85E-06 1.30E-08 1.72E-04 7.08E-06 3.05E-10 0.00E+00 1.83E-04 1.04E-02 8.90E-02 1.81E-03 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, stra |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density in ground in ground in ground in ground in ground in ground | KG K | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.0 | kg SO2-Eq kg PO4-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 1.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 9.27E-10 1.84E-10 1.75E-10 2.55E-12 1.01E-09 1.24E-08 8.29E-05 5.85E-07 8.41E-05 5.89E-07 1.72E-04 2.31E-06 9.98E-11 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 7.79E-12 3.08E-09 3.78E-08 1.82E-06 1.30E-08 1.82E-06 1.30E-08 1.85E-06 1.30E-08 1.85E-06 1.30E-08 1.72E-04 7.08E-06 3.05E-10 0.00E+00 1.30E-01 0.00E+00 1.30E-01 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, stra |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oll, crude, in ground | air | low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density in ground | K 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 1.88 | kg SO2-Eq kg SO2 | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 2.27E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 1.60E-05 4.49E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 9.27E-10 1.84E-10 1.75E-10 2.55E-12 1.01E-09 1.24E-08 8.29E-05 5.85E-07 8.41E-05 5.89E-07 1.72E-04 2.31E-06 9.98E-11 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 5.35E-10 7.79E-12 3.08E-09 3.78E-08 1.82E-06 1.30E-08 1.72E-04 7.08E-06 3.05E-10 0.00E+00 1.83E-04 1.83E-04 1.04E-02 8.90E-02 1.81E-03 6.81E-02 5.03E-01 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, stra |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density in ground in ground in ground in ground in ground in ground | KG K | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.0 | kg SO2-Eq kg PO4-Eq | 2.59E-07 6.35E-07 3.46E-07 1.70E-07 1.70E-07 1.23E-08 3.97E-08 5.87E-08 1.05E-09 9.77E-08 4.05E-08 8.01E-06 3.82E-04 1.71E-05 6.55E-06 4.25E-09 1.05E-15 3.72E-15 9.27E-10 1.84E-10 1.75E-10 2.55E-12 1.01E-09 1.24E-08 8.29E-05 5.85E-07 8.41E-05 5.85E-07 1.72E-04 2.31E-06 9.98E-11 | kg/kg | 9.57E-08 4.86E-07 1.19E-06 3.05E-07 1.49E-07 2.00E-07 1.97E-08 6.36E-08 9.39E-08 1.98E-09 1.84E-07 7.61E-08 5.61E-06 2.67E-04 1.20E-05 1.60E-05 4.49E-05 6.55E-06 8.00E-09 6.81E-16 0.00E+00 2.42E-15 3.55E-04 2.84E-09 5.63E-10 7.79E-12 3.08E-09 3.78E-08 1.82E-06 1.30E-08 1.82E-06 1.30E-08 1.85E-06 1.30E-08 1.85E-06 1.30E-08 1.72E-04 7.08E-06 3.05E-10 0.00E+00 1.30E-01 0.00E+00 1.30E-01 | Ecoinvent V2, straw, from straw areas, at field, CH Ecoinvent V2, stra |

6.72E-01

FL10 Transport bedding See Transport lorry>16t back to top

FL15 Store Bedding No emissions involved in this activity back to top

FL27 Bed livestock Included in total energy used on beef farms back to top

FL6 Process (roll) grains, See FL 11
mix feed
back to top

FL11 Store feed

back to top includes CC9, FL6,
FL11 The inventory includes the transport of the raw materials to the feed processing centre, processing feedstuff (crushing or milling, heat treatment, dosing, mixing squeezing and pelleting) and the storage of the feed mixes. It also includes water use and wastewater treatment, the transformation and use of land related to the storage buildings. No process emissions were included except heat waste from the

use of electricity. Packaging is not included.

Barley Ecoinvent V2, barley IP, at feed mill, CH back to top Carbon dioxide, fossi ka CO2-Ea 7.49E-02 7.49E-02 Ecoinvent V2, barley IP, at feed mill, CH high population density 9.46E-02 4.41E-08 low population density kg CO2-Eq 9.46E-02 Ecoinvent V2, barley IP, at feed mill, CH Carbon dioxide, fossi kg/kg kg CO2-Eq Ecoinvent V2, barley IP, at feed mill, CH Ecoinvent V2, barley IP, at feed mill, CH Carbon dioxide, fossi lower stratosphere + upper troposphere kg/kg kg/kg 4.41E-08 kg CO2-Eq 3.81E-02 Carbon dioxide, fossil 3.81E-02 unspecified Carbon monoxide, fossil high population density 1.5714 kg CO2-Ed 2.55E-05 kg/kg kg/kg 4.01E-05 Ecoinvent V2, barley IP, at feed mill, CH 1.5714 1.78E-04 kg CO2-Eq 2.79E-04 Ecoinvent V2, barley IP, at feed mill, CH Carbon monoxide, fossil low population density 1.5714 1.5714 kg CO2-Eq kg CO2-Eq kg/kg kg/kg kg/kg Carbon monoxide, fossil lower stratosphere + upper troposphere 5.19E-11 8.15E-11 Ecoinvent V2, barley IP, at feed mill, CH 2.86E-04 Carbon monoxide, fossil unspecified 4.49E-04 Ecoinvent V2, barley IP, at feed mill, CH Chloroform nigh population density 9.90E-11 2.97E-09 Ecoinvent V2, barley IP, at feed mill, CH ka CO2-Ea 1.15E-12 kg/kg kg/kg Chloroform low population density 3.44E-11 Ecoinvent V2, barley IP, at feed mill, CH Chloroform unspecified kg CO2-Eq 1.27E-18 3.82E-17 Ecoinvent V2, barley IP, at feed mill, CH Dinitrogen monoxide Dinitrogen monoxide high population density 298 ka CO2-Ea 2.01E-04 kg/kg kg/kg 6.00E-02 Ecoinvent V2, barley IP, at feed mill, CH Ecoinvent V2, barley IP, at feed mill, CH low population density Dinitrogen monoxide lower stratosphere + upper troposphere 298 ka CO2-Fa 4 20F-13 kg/kg kg/kg 1.25F-10 Ecoinvent V2, barley IP, at feed mill, CH kg CO2-Eq 1.19E-06 Ecoinvent V2, barley IP, at feed mill, CH Dinitrogen monoxide unspecified Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a high population density 1430 ka CO2-Ea 8.89E-12 kg/kg kg/kg 1 27F-08 Ecoinvent V2, barley IP, at feed mill, CH 1430 4.43E-11 kg CO2-Eq 6.34E-08 low population density Ecoinvent V2, barley IP, at feed mill, CH Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 kg CO2-Eq kg CO2-Eq kg/kg kg/kg kg/kg unspecified 1430 7.16E-08 1.02E-04 Ecoinvent V2, barley IP, at feed mill, CH 6130 3.82E-12 2.34E-08 Ecoinvent V2, barley IP, at feed mill, CH high population density Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 unspecified 6130 kg CO2-Eq 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Ethane, 1,1-difluoro-, HFC-152a ka CO2-Ea 3.02E-11 kg/kg kg/kg 3.74E-09 high population density 124 Ecoinvent V2, barley IP, at feed mill, CH Ethane, 1,1-difluoro-, HFC-152a kg CO2-Eq 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH low population density Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 8.55F-10 low population density 10000 ka CO2-Ea kg/kg kg/kg 8.55F-06 Ecoinvent V2, barley IP, at feed mill, CH 609 kg CO2-Eq 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH unspecified Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 high population density unspecified 12200 12200 kg CO2-Eq kg CO2-Eq Ecoinvent V2, barley IP, at feed mill, CH Ecoinvent V2, barley IP, at feed mill, CH 2.64E-10 kg/kg kg/kg 3.22E-06 Methane, biogenic high population density kg CO2-Eq 6.97E-08 kg/kg kg/kg 1.74E-06 Ecoinvent V2, barley IP, at feed mill, CH Ecoinvent V2, barley IP, at feed mill, CH kg CO2-Eq 8.71E-07 2.18E-05 Methane, biogenic low population density kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg CO2-Eq kg CO2-Eq 8.19E-06 1.73E-17 Methane, biogenic unspecified 3.28E-07 Ecoinvent V2, barley IP, at feed mill, CH 3.45E-18 Methane, bromo-, Halon 1001 Ecoinvent V2, barley IP, at feed mill, CH unspecified 2.25E-06 3.74E-11 Methane, bromochlorodifluoro-, Halon 1211 low population density 1890 1.19E-09 Ecoinvent V2, barley IP, at feed mill, CH 7140 ka CO2-Ea 5.24E-15 Methane, bromotrifluoro-, Halon 1301 high population density Ecoinvent V2, barley IP, at feed mill, CH Methane, bromotrifluoro-, Halon 1301 1.82E-09 1.30E-05 Ecoinvent V2, barley IP, at feed mill, CH low population density Methane, chlorodifluoro-, HCFC-22 high population density 1810 kg CO2-Eg 1.35E-10 2.44E-07 Ecoinvent V2, barley IP, at feed mill, CH Methane, chlorodifluoro-, HCFC-22 low population density 1810 kg CO2-Eq 7.72E-06 Ecoinvent V2, barley IP, at feed mill, CH kg/kg kg/kg kg/kg kg/kg Methane, chlorotrifluoro-, CFC-13 Methane, dichloro-, HCC-30 unspecified 14400 kg CO2-Eq kg CO2-Eq 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Ecoinvent V2, barley IP, at feed mill, CH 4.25E-11 4.88E-12 high population density 3.39E-12 1.76E-11 Methane, dichloro-, HCC-30 low population density 87 ka CO2-Ea 2 95F-11 Ecoinvent V2, barley IP, at feed mill, CH Methane, dichlorodifluoro-, CFC-12 kg CO2-Eq 1.92E-07 10900 Ecoinvent V2, barley IP, at feed mill, CH high population density Methane, dichlorodifluoro-, CFC-12 Methane, dichlorodifluoro-, CFC-12 low population density 10900 kg CO2-Eq kg CO2-Eq 4.09E-12 kg/kg kg/kg 4.46E-08 Ecoinvent V2, barley IP, at feed mill, CH 10900 2.50E-14 2.30E-18 unspecified Ecoinvent V2, barley IP, at feed mill, CH 2.53E-14 1.48E-05 Methane, dichlorofluoro-, HCFC-21 high population density 210 kg CO2-Eq kg/kg 5.31E-12 Ecoinvent V2, barley IP, at feed mill, CH ka CO2-Ea 3.71E-04 Methane, fossil high population density kg/kg kg/kg Ecoinvent V2, barley IP, at feed mill, CH kg CO2-Eq 3.13E-04 7.82E-03 Ecoinvent V2, barley IP, at feed mill, CH Methane, fossil low population density Methane, fossil lower stratosphere + upper troposphere ka CO2-Ea 7.01E-13 kg/kg kg/kg 1.75E-11 Ecoinvent V2, barley IP, at feed mill, CH kg CO2-Eq 1.51E-06 Methane, fossil Ecoinvent V2, barley IP, at feed mill, CH unspecified Methane, tetrachloro-, R-10 Methane, tetrachloro-, R-10 kg CO2-Eq kg CO2-Eq Ecoinvent V2, barley IP, at feed mill, CH Ecoinvent V2, barley IP, at feed mill, CH high population density 1400 1400 1.31E-10 kg/kg kg/kg 1.83F-07 1.03E-15 1.44E-12 unspecified kg CO2-Eq kg CO2-Eq kg/kg kg/kg kg/kg Methane, tetrafluoro-, R-14 high population density 7390 1.55E-12 1.15E-08 Ecoinvent V2, barley IP, at feed mill, CH 6.19E-08 4.11E-14 7390 4750 14800 Methane, tetrafluoro-, R-14 4.57E-04 Ecoinvent V2, barley IP, at feed mill, CH unspecified kg CO2-Eq kg CO2-Eq Methane, trichlorofluoro-, CFC-11 high population density 1.95E-10 Ecoinvent V2, barley IP, at feed mill, CH 1.19E-07 Methane, trifluoro-, HFC-23 8.05E-12 kg/kg kg/kg kg/kg kg/kg high population density Ecoinvent V2, barley IP, at feed mill, CH Sulfur hexafluoride 22800 kg CO2-Eq 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH 22800 kg CO2-Eq 8.98E-12 2.05E-07 Sulfur hexafluoride low population density Ecoinvent V2, barley IP, at feed mill, CH Sulfur hexafluoride kg CO2-Eq 4.97E-09 1.13E-04 Ecoinvent V2, barley IP, at feed mill, CH Methane, monochloro-, R-40 high population density ka CO2-Ea 8.42E-14 kg/kg kg/kg 1.10E-12 Ecoinvent V2, barley IP, at feed mill, CH low population density 8.05E-11 Ecoinvent V2, barley IP, at feed mill, CH Methane, monochloro-, R-40 kg CO2-Eq kg CO2-Eq kg CO2-Eq Ecoinvent V2, barley IP, at feed mill, CH Ecoinvent V2, barley IP, at feed mill, CH Carbon dioxide, land transformation low population density 2.16E-05 kg/kg 2.16E-05 Nitrogen fluoride high population density 17200 0.00E+00 kg kg/kg 4.83E-01 kg SO2-Eq 8.50E-05 Ecoinvent V2, barley IP, at feed mill, CH high population density kg/kg 1.60E-04 low population density 1.88 kg SO2-Eq 1.38E-03 2.59E-03 Ecoinvent V2, barley IP, at feed mill, CH

| y storgent chronies at Management of Managem | Ammonia | air | unspecified | ka | 1.88 | kg SO2-Eq | 2.83E-06 | kg/kg | 5.31E-06 | Ecoinvent V2, barley IP, at feed mill, CH |
|--|--|----------|-----------------------------------|-----|--------|-----------|----------|-------|----------|---|
| ystogen folioties | Hydrogen chloride | air | high population density | ka | | | | | | |
| yludgen harbories | | air | | ka | | | | | | |
| yludgen fluoride | | air | | ka | | | | | | |
| ykydogen fluoride | Hydrogen fluoride | air | high population density | ka | | | 4.34E-07 | | 6.94E-07 | |
| y-designe fluoride | Hydrogen fluoride | air | | ka | 1.6 | | | | 1.16E-06 | |
| ylargosin autikle | | air | | ka | 1.6 | | | | | |
| ydrogen sulfule | Hydrogen sulfide | air | | ka | 1.88 | | | | | |
| yurogen sallufe | Hydrogen sulfide | air | | ka | | | | | 1.27E-06 | |
| introgen oxides infrogen oxides infrog | Hydrogen sulfide | air | | ka | | | 6.48E-08 | | 1.22E-07 | |
| littogen coides | Nitrogen oxides | air | | ka | 0.7 | | | | | |
| litrogen coisides air unspecified | Nitrogen oxides | air | | ka | | | 1.15E-03 | | 8.04E-04 | |
| Juliur doxide air high population density kg 1 kg 502-Eq 2.40E-04 kg/kg 2.46E-04 Econivert V2, barley IP, at feed mill, CH included air low population density kg 1 kg 502-Eq 2.46E-04 kg/kg 2.46E-04 Econivert V2, barley IP, at feed mill, CH included air unspecified kg 1 kg 502-Eq 1.46E-05 kg/kg 1.46E-05 Econivert V2, barley IP, at feed mill, CH included air unspecified kg 1 kg 502-Eq 1.46E-05 kg/kg 1.46E-05 Econivert V2, barley IP, at feed mill, CH included air unspecified kg 0 0.65 kg 502-Eq 1.46E-05 kg/kg 1.46E-06 Econivert V2, barley IP, at feed mill, CH included air high population density kg 0.89 kg 502-Eq 1.46E-13 kg/kg 6.78E-14 Econivert V2, barley IP, at feed mill, CH included air low population density kg 0.89 kg 502-Eq 3.00E-10 kg/kg 1.48E-06 Econivert V2, barley IP, at feed mill, CH included air low population density kg 0.89 kg 502-Eq 3.00E-10 kg/kg 1.48E-06 Econivert V2, barley IP, at feed mill, CH included air low population density kg 0.80 kg 502-Eq 3.00E-10 kg/kg 1.48E-06 Econivert V2, barley IP, at feed mill, CH included air low population density kg 0.80 kg 502-Eq 3.00E-10 kg/kg 1.48E-08 Econivert V2, barley IP, at feed mill, CH included air low population density kg 0.80 kg 502-Eq 3.49E-10 kg/kg 1.48E-08 Econivert V2, barley IP, at feed mill, CH included kg 0.80 kg 502-Eq 3.49E-10 kg/kg 1.48E-08 Econivert V2, barley IP, at feed mill, CH included kg 0.80 kg 502-Eq 1.48E-08 kg/kg 1.48E-08 Econivert V2, barley IP, at feed mill, CH included kg 0.80 kg 502-Eq 1.98E-11 kg/kg 2.38E-11 Econivert V2, barley IP, at feed mill, CH included kg 0.80 kg 502-Eq 1.98E-11 kg/kg 2.38E-11 Econivert V2, barley IP, at feed mill, CH included kg 0.80 kg 502-Eq 1.98E-11 kg/kg 2.38E-11 Econivert V2, barley IP, at feed mill, CH included kg 0.80 kg 502-Eq 1.98E-11 kg/kg 2.38E-00 Econivert V2, barley IP, at feed mill, CH included kg 0.80 kg 502-Eq 1.98E-11 kg/kg 2.38E-00 Econivert V2, barley IP, at feed mill, CH included kg 0.80 kg 0.80E-00 Econivert V2, barley IP, at feed mill, CH included kg 0.80 kg 0.80E-00 Econivert V | Nitrogen oxides | air | | ka | | | | | 2.21E-04 | |
| sultur doxide air low population density kg 1 kg SQ2-Eq 2.68E-04 kg/kg 2.68E-04 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen sulfide water nver kg 1.88 kg SQ2-Eq 6.65E-09 kg/kg 1.48E-05 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen sulfide water nver kg 0.58 kg SQ2-Eq 6.65E-09 kg/kg 6.78E-14 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen sulfide water nver kg 0.58 kg SQ2-Eq 6.65E-09 kg/kg 6.78E-14 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.98 kg SQ2-Eq kg/kg 0.00E-00 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.98 kg SQ2-Eq kg/kg 0.00E-00 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.85 kg SQ2-Eq 3.00E-14 kg/kg 0.00E-00 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.85 kg SQ2-Eq 3.00E-14 kg/kg 1.98E-14 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.85 kg PQ4-Eq 3.49E-10 kg/kg 1.28E-08 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.85 kg PQ4-Eq 3.49E-10 kg/kg 4.49E-09 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.85 kg PQ4-Eq 3.49E-10 kg/kg 4.49E-09 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.85 kg PQ4-Eq 1.44E-09 kg/kg 4.49E-09 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.85 kg PQ4-Eq 1.44E-09 kg/kg 2.95E-11 kg/kg 2.95E-11 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.85 kg PQ4-Eq 1.44E-09 kg/kg 2.95E-11 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.85 kg PQ4-Eq 1.45E-11 kg/kg 2.25E-08 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of the population density kg 0.85 kg PQ4-Eq 1.45E-09 kg/kg 2.25E-08 lecoinvent V2, Darfeyt P, A refeed mill, CH lydrogen consists of th | Sulfur dioxide | air | | ka | 1 | | | | | |
| Sulfur dioxide air | Sulfur dioxide | air | | kg | 1 | | | | | |
| ykydrogen sulfide water river kg 1.88 kg SOZ-Eq 1.68E-09 kg/kg 1.28E-08 Ecoinvent VZ, barley IP, at feed mill, CH with Uniter acid agricultural kg 0.65 kg SOZ-Eq 1.06E-13 kg/kg 6.78E-14 Ecoinvent VZ, barley IP, at feed mill, CH hosphoria caid air high population density kg 0.98 kg SOZ-Eq 3.00E-14 kg/kg 0.00E+00 Ecoinvent VZ, barley IP, at feed mill, CH ecoinvent V | Sulfur dioxide | air | | ka | 1 | | | | | |
| Sulfuric acid soil agricultural kg 0.65 kg SQ2-Eq 1.04E-13 kg/ng 6.78E-14 Econivent V2, barley IP, at feed mill, CH hospshoric acid air high population density kg 0.98 kg SQ2-Eq 3.00E-14 kg/ng 1.95E-14 Econivent V2, barley IP, at feed mill, CH hospshoric acid air low population density kg 0.98 kg SQ2-Eq 3.00E-14 kg/ng 1.95E-14 Econivent V2, barley IP, at feed mill, CH hospshorus hospshorus air low population density kg 3.06 kg PO4-Eq 3.49E-10 kg/ng 1.24E-08 Econivent V2, barley IP, at feed mill, CH hospshorus air low population density kg 3.06 kg PO4-Eq 3.49E-10 kg/ng 1.24E-08 Econivent V2, barley IP, at feed mill, CH hospshorus air low population density kg 3.06 kg PO4-Eq 3.49E-10 kg/ng 4.40E-09 Econivent V2, barley IP, at feed mill, CH hospshorus air unspecified kg 3.06 kg PO4-Eq 1.45E-01 kg/ng 4.40E-09 kg/ng 4.40E-09 Econivent V2, barley IP, at feed mill, CH hospshorus air and agricultural kg 3.06 kg PO4-Eq 1.95E-11 kg/ng 2.93E-08 Econivent V2, barley IP, at feed mill, CH hospshorus soil industrial kg 3.06 kg PO4-Eq 5.72E-08 kg/ng 2.93E-08 Econivent V2, barley IP, at feed mill, CH hospshorus water inver kg 9.022 kg PO4-Eq 5.72E-08 kg/ng 2.93E-08 Econivent V2, barley IP, at feed mill, CH hospshorus water unspecified kg 0.022 kg PO4-Eq 3.86E-04 kg/ng 8.09E-06 Econivent V2, barley IP, at feed mill, CH hospshorus water inver kg 9.022 kg PO4-Eq 3.73E-04 kg/ng 8.09E-06 Econivent V2, barley IP, at feed mill, CH hospshorus water inver kg 9.022 kg PO4-Eq 3.73E-04 kg/ng 8.20E-06 Econivent V2, barley IP, at feed mill, CH hospshorus water inver kg 9.022 kg PO4-Eq 1.30E-04 kg/ng 8.20E-06 Econivent V2, barley IP, at feed mill, CH hospshorus water inver kg 9.022 kg PO4-Eq 1.30E-04 kg/ng 8.20E-06 Econivent V2, barley IP, at feed mill, CH hospshorus water inver kg 9.022 kg PO4-Eq 1.30E-04 kg/ng 8.20E-06 Econivent V2, barley IP, at feed mill, CH hospshorus water inver kg 9.022 kg PO4-Eq 1.30E-04 kg/ng 8.06E-10 kg/ng 8.06E-10 Econivent V2, barley IP, at feed mill, CH hospshorus kg/ng 9.06E-10 kg/ng 8.06E-10 kg/ng 8.06E-10 Econ | Hydrogen sulfide | water | | kg | 1.88 | | 6.65E-09 | | 1.25E-08 | |
| Phosphoric aid air high population density kg 0.98 kg SQ2-Eq kg/kg 0.06+00 Ecoinvent V2, barley IP, at feed mill, CH solution air low population density kg 0.65 kg SQ2-Eq 3.00E-14 kg/kg 1.95E-14 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 0.65 kg SQ2-Eq 4.04E-03 solution density kg 1.24E-08 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 3.06 kg PO4-Eq 4.04E-09 kg/kg 1.24E-08 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 3.06 kg PO4-Eq 3.49E-10 kg/kg 1.24E-08 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 3.06 kg PO4-Eq 3.49E-10 kg/kg 1.07E-09 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 4.00E-09 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 3.06 kg PO4-Eq 1.95E-11 kg/kg 5.98E-11 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 3.06 kg PO4-Eq 1.95E-11 kg/kg 5.98E-11 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 3.06 kg PO4-Eq 9.56E-09 kg/kg 2.93E-08 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 3.06 kg PO4-Eq 9.56E-09 kg/kg 1.75E-07 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 3.06 kg PO4-Eq 9.56E-09 kg/kg 1.75E-07 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 4.00E-09 kg/kg 1.75E-07 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 4.00E-09 kg/kg 1.75E-07 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 4.00E-09 kg/kg 2.25E-08 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 4.00E-09 kg/kg 2.25E-08 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 4.00E-09 kg/kg 2.25E-08 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 4.00E-09 kg/kg 2.25E-08 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 4.00E-09 kg/kg 1.39E-04 kg/kg 1.39E-04 kg/kg 1.39E-04 kg/kg 1.39E-04 Ecoinvent V2, barley IP, at feed mill, CH solution density kg 4.00E-09 kg/kg 1.39E-04 kg/kg 1.39E-04 Ecoinvent V2, barley IP, at feed mill, CH solution density kg/kg 1.39E-04 kg/kg 1.39E-04 kg/kg 1.39E-04 Ecoin | Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eg | 1.04E-13 | | 6.78E-14 | |
| Sulfuric acid air low population density kg 0.65 kg SQ2-Eq 3.00E-14 kg/kg 1.95E-14 Ecoinvent V2, barley IP, at feed mill, CH 4.4E-03 4 | Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eg | | | 0.00E+00 | Ecoinvent V2, barley IP, at feed mill, CH |
| A44E-03 A44E-03 A45E-08 A57E-08 A57E-0 | Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eg | 3.00E-14 | | 1.95E-14 | Ecoinvent V2, barley IP, at feed mill, CH |
| Phosphorus air low population density kg 3.06 kg PO4-Eq 3.49E-10 kg/kg 1.07E-09 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus air low population density, long-term kg 3.06 kg PO4-Eq 1.95E-11 kg/kg 5.98E-11 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus air unspecified kg 3.06 kg PO4-Eq 1.95E-11 kg/kg 5.98E-11 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus soil agricultural kg 3.06 kg PO4-Eq 9.56E-09 kg/kg 2.93E-08 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus Soil industrial kg 3.06 kg PO4-Eq 9.56E-09 kg/kg 1.75E-07 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus Soil industrial kg 3.06 kg PO4-Eq 9.57E-08 kg/kg 1.75E-07 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus Soil industrial kg 3.06 kg PO4-Eq 3.08E-04 kg/kg 1.75E-07 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus Soil industrial kg 3.06 kg PO4-Eq 3.08E-04 kg/kg 8.09E-06 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus Water river kg 0.022 kg PO4-Eq 3.73E-04 kg/kg 8.09E-06 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus Water river kg 0.022 kg PO4-Eq 3.73E-04 kg/kg 8.0E-06 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus Water river kg 0.022 kg PO4-Eq 1.03E-06 kg/kg 2.27E-08 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus Water river kg 1.9 Ecoinvent V2, barley IP, at feed mill, CH Prosphorus Water river kg 3.06 kg PO4-Eq 1.03E-06 kg/kg 1.91E-05 kg/ | | | ' ' | · · | | | | 0 0 | 4.44E-03 | i î i |
| Phosphorus air low population density, long-term kg 3.06 kg PO4-Eq 1.44E-09 kg/kg 4.9E-01 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus air unspecified kg 3.06 kg PO4-Eq 1.95E-11 kg/kg 5.98E-11 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus soil agricultural kg 3.06 kg PO4-Eq 9.56E-09 kg/kg 2.98E-08 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus soil industrial kg 3.06 kg PO4-Eq 5.7E-08 kg/kg 1.95E-109 kg/kg 1.95E-09 k | Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 4.04E-09 | kg/kg | 1.24E-08 | Ecoinvent V2, barley IP, at feed mill, CH |
| Phosphorus air unspecified kg 3.06 kg PO4-Eq 1.95E-11 kg/kg 5.98E-11 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus soil industrial kg 3.06 kg PO4-Eq 9.56E-09 kg/kg 2.93E-08 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus soil industrial kg 3.06 kg PO4-Eq 5.72E-08 kg/kg 1.73E-07 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus soil industrial kg 0.022 kg PO4-Eq 3.68E-04 kg/kg 8.09E-06 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus water unspecified kg 0.022 kg PO4-Eq 3.68E-04 kg/kg 8.09E-06 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus water unspecified kg 0.022 kg PO4-Eq 3.73E-04 kg/kg 8.09E-06 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus water unspecified kg 0.022 kg PO4-Eq 3.73E-04 kg/kg 8.09E-06 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus water in river kg 0.022 kg PO4-Eq 1.03E-06 kg/kg 2.75E-08 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus water in river kg 0.022 kg PO4-Eq 1.03E-06 kg/kg 2.75E-08 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus water in river kg 1.03E-06 kg/kg 2.75E-08 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus water in river kg 1.03E-06 kg/kg 2.75E-08 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus water in river kg 3.06 kg PO4-Eq 1.91E-05 kg/kg 5.83E-04 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus water unspecified kg 3.06 kg PO4-Eq 1.91E-05 kg/kg 8.06E-10 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus water high population density kg 0.97 kg PO4-Eq 1.96E-01 kg/kg 8.06E-10 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus kg/kg 8.06E-10 kg/kg 8.06E-10 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus kg/kg 8.06E-10 kg/kg 8.06E-10 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus kg/kg 8.06E-10 kg/kg 8.06E-10 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus kg/kg 8.06E-10 kg/kg 8.06E-10 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus kg/kg 8.06E-10 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus kg/kg 8.06E-10 Ecoinvent V2, barley iP, at feed mill, CH Phosphorus kg/kg 8.06E-10 Ecoin | Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 3.49E-10 | kg/kg | 1.07E-09 | Ecoinvent V2, barley IP, at feed mill, CH |
| Phosphorus soil agricultural kg 3.06 kg PO4-Eq 9.56E-09 kg/kg 2.93E-08 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus soil industrial kg 3.06 kg PO4-Eq 5.72E-08 kg/kg 1.75E-07 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus soil industrial kg 0.022 kg PO4-Eq 3.68E-04 kg/kg 1.75E-07 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water unspecified kg 0.022 kg PO4-Eq 1.02E-06 kg/kg 2.25E-08 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water unspecified kg 0.022 kg PO4-Eq 1.02E-06 kg/kg 2.25E-08 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water unspecified kg 0.022 kg PO4-Eq 1.03E-06 kg/kg 2.27E-08 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water river kg 0.022 kg PO4-Eq 1.03E-06 kg/kg 2.27E-08 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water river kg 1.08E-04 kg/kg 1.39E-04 kg/kg 1.39E-04 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water river kg 3.06 kg PO4-Eq 1.39E-04 kg/kg 5.83E-05 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water unspecified kg 3.06 kg PO4-Eq 1.91E-05 kg/kg 5.83E-05 Ecoinvent V2, barley IP, at feed mill, CH Phosphoric acid air high population density kg 0.97 kg PO4-Eq 1.91E-05 kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg 0.97 kg PO4-Eq 1.91E-05 kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus kg/kg 0.00E+00 Ecoi | Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 1.44E-09 | kg/kg | 4.40E-09 | Ecoinvent V2, barley IP, at feed mill, CH |
| Phosphorus soil industrial kg 3.06 kg PO4-Eq 5.72E-08 kg/kg 1.75E-07 Ecoinvent V2, barley iP, at feed mill, CH 9.0D5, Biological Oxygen Demand water river kg 0.022 kg PO4-Eq 3.68E-04 kg/kg 8.09E-06 Ecoinvent V2, barley iP, at feed mill, CH 9.0D5, Biological Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 3.68E-04 kg/kg 8.25E-08 Ecoinvent V2, barley iP, at feed mill, CH 9.0D5, Demical Oxygen Demand water river kg 0.022 kg PO4-Eq 3.73E-04 kg/kg 8.20E-06 Ecoinvent V2, barley iP, at feed mill, CH 9.0D5, Demical Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.03E-06 kg/kg 8.20E-06 Ecoinvent V2, barley iP, at feed mill, CH 9.0D5, Demical Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.03E-06 kg/kg 1.39E-04 kg/ | Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 1.95E-11 | kg/kg | 5.98E-11 | Ecoinvent V2, barley IP, at feed mill, CH |
| 805, Biological Oxygen Demand water river kg 0.022 kg PO4-Eq 3.68E-04 kg/kg 8.09E-06 Ecoinvent V2, barley IP, at feed mill, CH 30D5, Biological Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.02E-06 kg/kg 2.25E-08 Ecoinvent V2, barley IP, at feed mill, CH 50D, Chemical Oxygen Demand water river kg 0.022 kg PO4-Eq 3.73E-04 kg/kg 2.25E-08 Ecoinvent V2, barley IP, at feed mill, CH 50D, Chemical Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.03E-06 kg/kg 2.27E-08 Ecoinvent V2, barley IP, at feed mill, CH 50D, Chemical Oxygen Demand water river kg 1.09E-04 kg/kg 1.39E-04 kg/kg 5.83E-05 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos water unspecified kg 3.06 kg PO4-Eq 1.91E-05 kg/kg 5.83E-05 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg 0.97 kg PO4-Eq 2.63E-10 kg/kg 5.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.97 kg PO4-Eq 5.63E-10 kg/kg 5.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.97 kg PO4-Eq 5.63E-10 kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.97 kg PO4-Eq 5.63E-10 kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0.00E+10 Ecoinvent V2, barley IP, at feed mill, CH 50D5Photos 6kg/kg 0. | Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 9.56E-09 | kg/kg | 2.93E-08 | Ecoinvent V2, barley IP, at feed mill, CH |
| 80D5, Biological Oxygen Demand water river kg 0.022 kg PO4-Eq 3.68E-04 kg/kg 8.09E-06 Ecoinvent V2, barley IP, at feed mill, CH OD5, Biological Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.02E-06 kg/kg 2.25E-08 Ecoinvent V2, barley IP, at feed mill, CH CDD, Chemical Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.03E-06 kg/kg 2.27E-08 Ecoinvent V2, barley IP, at feed mill, CH Chosphate water river kg 1 kg PO4-Eq 1.39E-04 kg/kg 1.50E-04 kg/kg 1.50E-04 kg/kg 1.50E-04 kg/kg 1.50E-04 kg/kg | Phosphorus | | industrial | kg | 3.06 | kg PO4-Eg | 5.72E-08 | | 1.75E-07 | Ecoinvent V2, barley IP, at feed mill, CH |
| COD, Chemical Oxygen Demand water river kg 0.022 kg PO4-Eq 3.73E-04 kg/kg 8.20E-06 Ecoinvent V2, barley IP, at feed mill, CH COD, Chemical Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.03E-06 kg/kg 2.27E-08 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water river kg 1 kg PO4-Eq 1.39E-04 kg/kg 1.39E-04 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water river kg 3.06 kg PO4-Eq 1.91E-05 kg/kg 5.83E-05 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water unspecified kg 3.06 kg PO4-Eq 1.91E-05 kg/kg 5.83E-05 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water unspecified kg 0.97 kg PO4-Eq 2.63E-10 kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus air high population density kg 0.97 kg PO4-Eq 6.63E-10 kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH | BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 3.68E-04 | kg/kg | 8.09E-06 | Ecoinvent V2, barley IP, at feed mill, CH |
| COD, Chemical Oxygen Demand water unspecified kg 0.022 kg PO4-Eq 1.03E-06 kg/kg 2.27E-08 Ecoinvent V2, barley IP, at feed mill, CH Phosphate water river kg 1.39E-04 kg/kg 1.39E-04 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water river kg 3.06 kg PO4-Eq 1.91E-05 kg/kg 5.83E-05 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water unspecified kg 3.06 kg PO4-Eq 2.63E-10 kg/kg 5.06E-10 Ecoinvent V2, barley IP, at feed mill, CH Phosphoric acid air high population density kg 0.97 kg PO4-Eq 6.63E-10 kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH | BOD5, Biological Oxygen Demand | water | unspecified | kg | | kg PO4-Eq | 1.02E-06 | kg/kg | | Ecoinvent V2, barley IP, at feed mill, CH |
| Phosphate water river kg 1 kg PO4-Eq 1.39E-04 kg/kg 1.39E-04 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water river kg 3.06 kg PO4-Eq 1.91E-05 kg/kg 5.83E-05 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water unspecified kg 3.06 kg PO4-Eq 2.63E-10 kg/kg 5.06E-10 Ecoinvent V2, barley IP, at feed mill, CH Phosphoric acid air high population density kg 0.97 kg PO4-Eq 6.06E-10 Ecoinvent V2, barley IP, at feed mill, CH | COD, Chemical Oxygen Demand | water | river | kg | | kg PO4-Eq | 3.73E-04 | kg/kg | | Ecoinvent V2, barley IP, at feed mill, CH |
| Phosphorus water river kg 3.06 kg PO4-Eq 1.91E-05 kg/kg 5.83E-05 Ecoinvent V2, barley IP, at feed mill, CH Phosphorus water unspecified kg 3.06 kg PO4-Eq 2.63E-10 kg/kg 8.06E-10 Ecoinvent V2, barley IP, at feed mill, CH Phosphoric acid air high population density kg 0.97 kg PO4-Eq kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH | COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | | kg/kg | | Ecoinvent V2, barley IP, at feed mill, CH |
| Phosphorus water unspecified kg 3.06 kg PO4-Eq 2.63E-10 kg/kg 8.06E-10 Ecoinvent V2, barley IP, at feed mill, CH Phosphoric acid air high population density kg 0.97 kg PO4-Eq kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH | Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.39E-04 | kg/kg | 1.39E-04 | Ecoinvent V2, barley IP, at feed mill, CH |
| Phosphoric acid air high population density kg 0.97 kg PO4-Eq kg/kg 0.00E+00 Ecoinvent V2, barley IP, at feed mill, CH | Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 1.91E-05 | kg/kg | 5.83E-05 | Ecoinvent V2, barley IP, at feed mill, CH |
| | Phosphorus | water | unspecified | kg | | | 2.63E-10 | kg/kg | | Ecoinvent V2, barley IP, at feed mill, CH |
| 2.14F-04 | Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, barley IP, at feed mill, CH |
| | | | | | | | | | 2.14E-04 | |
| Coal, brown, in ground resource in ground kg 9.9 MJ-Eq 8.29E-03 kg/kg 8.21E-02 Ecoinvent V2, barley IP, at feed mill, CH | Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 8.29E-03 | kg/kg | 8.21E-02 | Ecoinvent V2, barley IP, at feed mill, CH |
| Coal, hard, unspecified, in ground resource in ground kg 19.1 MJ-Eq 1.18E-02 kg/kg 2.26E-01 Ecoinvent V2, barley IP, at feed mill, CH | Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | | | | Ecoinvent V2, barley IP, at feed mill, CH |
| | Gas, mine, off-gas, process, coal mining | resource | | Nm3 | 39.8 | MJ-Eq | 1.16E-04 | | 4.61E-03 | |
| Sas, natural, in ground resource in ground Nm3 38.293 MJ-Eq 2.60E-02 kg/kg 9.97E-01 Ecoinvent V2, barley IP, at feed mill, CH | Gas, natural, in ground | resource | | Nm3 | 38.293 | MJ-Eq | 2.60E-02 | | | Ecoinvent V2, barley IP, at feed mill, CH |
| Dil, crude, in ground resource in ground kg 45.8 MJ-Eq 4.44E-02 kg/kg 2.03E+00 Ecoinvent V2, barley IP, at feed mill, CH | Oil, crude, in ground | resource | | kg | | | | | | Ecoinvent V2, barley IP, at feed mill, CH |
| Peat, in ground resource biotic kg 9.9 MJ-Eq 1.51E-06 kg/kg 1.50E-05 Ecoinvent V2, barley IP, at feed mill, CH | Peat, in ground | | biotic | kg | 9.9 | MJ-Eq | 1.51E-06 | | | |
| 3.34E+00 | | | | | | | | | 3.34E+00 | |

FL16 Transport feed See transport back to top

FL28 Feed livestock Included in total energy used on beef farms
back to top

| FL17 | Produce Mineral | | | | | | | | |
|--|---------------------|--|------|--------|-----------|-----------|----------------|----------|--|
| . = | lime, from | | | | | | | | |
| | carbonation, at | | | | | | | | |
| | regional storehouse | | | | | | | | |
| back to top | | | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 1.05E-03 | kg/kg | 1.05E-03 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 1.10E-03 | kg/kg | 1.10E-03 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 1.50E-09 | kg/kg | 1.50E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 9.00E-03 | kg/kg | 9.00E-03 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 5.79E-07 | kg/kg | 9.09E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 1.57E-06 | kg/kg | 2.47E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 1.76E-12 | kg/kg | 2.77E-12 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 2.78E-05 | kg/kg | 4.36E-05 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 2.81E-12 | kg/kg | 8.42E-11 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 2.18E-14 | kg/kg | 6.53E-13 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 3.35E-20 | kg/kg | 1.00E-18 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 1.97E-08 | kg/kg | 5.88E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 1.99E-08 | kg/kg | 5.93E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.43E-14 | kg/kg | 4.26E-12 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 1.24E-07 | kg/kg | 3.70E-05 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 2.99E-13 | kg/kg | 4.28E-10 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 7.61E-13 | kg/kg | 1.09E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eg | 2.41E-08 | kg/kg | 3.45E-05 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eg | 1.29E-13 | kg/kg | 7.92E-10 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eg | | kg/kg | 0.00E+00 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eg | 5.97E-13 | kg/kg | 7.40E-11 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ethane, 1.2-dichloro-1.1.2.2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eg | 1.44E-11 | kg/kg | 1.44E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ethane, 2-chloro-1.1.1.2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eg | | kg/kg | 0.00E+00 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 8.92E-12 | kg/kg | 1.09E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eg | 1.44E-10 | kg/kg | 1.76E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, biogenic | air | high population density | kø | 25 | kg CO2-Eg | 3.03E-09 | kg/kg | 7.59E-08 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eg | 1.15E-08 | kg/kg | 2.88E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, biogenic | air | unspecified | kø | 25 | kg CO2-Eq | 7.19E-09 | kg/kg | 1.80E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 9.07E-20 | kg/kg | 4.53E-19 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 5.79E-12 | kg/kg | 1.09E-08 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 3.73E-16 | kg/kg | 2.66E-12 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | ka | 7140 | kg CO2-Eq | 1.52E-10 | kg/kg | 1.09E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 4.60E-12 | kg/kg | 8.33E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | ka | 1810 | kg CO2-Eq | 2.35E-11 | kg/kg | 4.25E-08 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, chlorotrifluoro-, CFC-13 | an | unspecified | le o | 14400 | kg CO2-Eq | 2.3312-11 | kg/kg ka/ka | 0.00E+00 | Ecoinvent V2, lime, from carbonation, at regional storehouse |

APPENDIX C EMISSION FACTOR DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Methane, dichloro-, HCC-30 | | 19.4 1.0 1 | 1 | 0.7 | I 000 F | 1.00F 10 | 1// | 0.70F 10 | Facility of the form of the first of the fir |
|--|--|--|--|---|--|--|---|---|--|
| ,, , | air | high population density | kg | 8.7 8.7 | kg CO2-Eq | 1.00E-13 | kg/kg | 8.72E-13 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, dichloro-, HCC-30 | air | low population density | kg | | kg CO2-Eq | 6.44E-14 | kg/kg | 5.60E-13 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 3.34E-13 | kg/kg | 3.65E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 2.43E-14 | kg/kg | 2.64E-10 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 6.03E-20 | kg/kg | 6.57E-16 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 8.51E-16 | kg/kg | 1.79E-13 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 6.31E-07 | kg/kg | 1.58E-05 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 1.42E-05 | kg/kg | 3.56E-04 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 2.38E-14 | kg/kg | 5.96E-13 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 1.42E-07 | kg/kg | 3.54E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 5.88E-12 | kg/kg | 8.23E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 2.70E-17 | kg/kg | 3.77E-14 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 3.07E-14 | kg/kg | 2.27E-10 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 1.30E-09 | kg/kg | 9.58E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, trichlorofluoro-, CFC-11 | air | • | kg | 4750 | kg CO2-Eq | 1.38E-15 | kg/kg | 6.56E-12 | |
| | air | high population density | | 14800 | | | | | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, trifluoro-, HFC-23 | | high population density | kg | | kg CO2-Eq | 2.71E-13 | kg/kg | 4.01E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | 4 70F 40 | kg/kg | 0.00E+00 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.70E-13 | kg/kg | 3.88E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 9.77E-11 | kg/kg | 2.23E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 2.48E-15 | kg/kg | 3.22E-14 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 1.18E-13 | kg/kg | 1.53E-12 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.16E-07 | kg/kg | 1.16E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| | | | | | | | | 1.17E-02 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 6.62E-09 | kg/kg | 1.24E-08 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 1.60E-08 | kg/kg | 3.00E-08 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.33E-07 | kg/kg | 2.50E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 1.28E-08 | kg/kg | 1.13E-08 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 3.29E-08 | kg/kg | 2.90E-08 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 3.08E-08 | kg/kg | 2.71E-08 | Econivent V2, inite, from carbonation, at regional storehouse Econivent V2, lime, from carbonation, at regional storehouse |
| | air | | kg | 1.6 | kg SO2-Eq | 8.26E-10 | | 2.71E-08 1.32E-09 | |
| Hydrogen fluoride | | high population density | kg | | | | kg/kg | | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Hydrogen fluoride | air | low population density | кg | 1.6 | kg SO2-Eq | 7.45E-09 | kg/kg | 1.19E-08 1.01E-08 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 6.29E-09 | kg/kg | | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eq | 5.03E-11 | kg/kg | 9.46E-11 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 7.79E-09 | kg/kg | 1.47E-08 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 2.93E-09 | kg/kg | 5.51E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Nitrogen oxides | air | high population density | kg | 0.7 | kg SO2-Eq | 1.28E-06 | kg/kg | 8.98E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 5.67E-06 | kg/kg | 3.97E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Nitrogen oxides | air | unspecified | kg | 0.7 | kg SO2-Eq | 9.12E-05 | kg/kg | 6.39E-05 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eq | 2.90E-06 | kg/kg | 2.90E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 8.05E-06 | kg/kg | 8.05E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Sulfur dioxide | air | unspecified | ko | 1 | kg SO2-Eq | 9.06E-07 | kg/kg | 9.06E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Hydrogen sulfide | water | river | ka | 1.88 | kg SO2-Eq | 3.06E-10 | kg/kg | 5.75E-10 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 3.53E-15 | kg/kg | 2.30E-15 | and the state of the |
| | | | · · | | | 3.33E-13 | | | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | F 00F 10 | kg/kg | 0.00E+00 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Sulfuric acid | air | low population density | кд | 0.65 | kg SO2-Eq | 5.93E-16 | kg/kg | 3.86E-16 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| DI I | | | , | 0.00 | 1 2015 | 7 OFF 44 | | 8.10E-05 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 5.95E-11 | kg/kg | 1.82E-10 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus | | | | | | | | | |
| P | air | low population density | kg | 3.06 | kg PO4-Eq | 1.38E-11 | kg/kg | 4.24E-11 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus | air air | low population density low population density, long-term | kg kg | | | 1.38E-11 2.47E-11 | | 4.24E-11 7.57E-11 | Ecoinvent V2, lime, from carbonation, at regional storehouse Ecoinvent V2, lime, from carbonation, at regional storehouse |
| | | | · · | 3.06 | kg PO4-Eq | | kg/kg | | in the state of the |
| Phosphorus | air | low population density, long-term | kg | 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 2.47E-11 | kg/kg kg/kg | 7.57E-11 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus | air air | low population density, long-term unspecified | kg kg | 3.06 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 | kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 | Ecoinvent V2, lime, from carbonation, at regional storehouse Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus | air air soil soil | low population density, long-term unspecified agricultural industrial | kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand | air air soil soil water | low population density, long-term unspecified agricultural industrial river | kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 | kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand | air air soil soil water water | low population density, long-term unspecified agricultural industrial river unspecified | kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand | air air soil soil water water water | low population density, long-term unspecified agricultural industrial river unspecified river | kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | air air soil soil water water water water | low population density, long-term unspecified agricultural industrial river unspecified river unspecified | kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 0.022 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate | air air soil soil water water water water | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river | kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | air air soil soil water water water water water | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river river | kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 3.67E-09 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus | air air soil soil water water water water water water | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river river river unspecified | kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 4.37E-11 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | air air soil soil water water water water water | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river river | kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 3.67E-09 4.37E-11 0.00E+00 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid | air air soil soil water water water water water water air | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river river unspecified river hyper | kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 4.37E-11 0.00E+00 1.10E-06 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground | air air soil soil water water water water water water water air | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river river unspecified river river unspecified | kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoris Coal, brown, in ground Coal, hard, unspecified, in ground | air air soil soil water water water water water water water water air resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river iver iver in the state of | kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 3.67E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | air air soil soil water water water water water water water resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river iver iver unspecified river iver unspecified river in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 3.67E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | air air soil soil water water water water water water water water air resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river inger unspecified in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.86E-06 3.65E-04 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | air air soil soil water water water water water water water resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river iver iver unspecified river iver unspecified river in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.86E-06 3.65E-04 3.49E-03 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 3.67E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 1.60E-01 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | air air soil soil water water water water water water water air resource resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river inger unspecified in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 0.022 1 3.06 3.06 0.97 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.86E-06 3.65E-04 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Cas, mine, off-gas, process, coal mining Cas, natural, in ground Oil, crude, in ground | air air soil soil water water water water water water water air resource resource resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river iver unspecified fiver river unspecified fiver fiver unspecified high population density in ground in ground in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.86E-06 3.65E-04 3.49E-03 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 3.67E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 1.60E-01 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Cas, mine, off-gas, process, coal mining Cas, natural, in ground Oil, crude, in ground | air air soil soil water water water water water water water air resource resource resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river iver unspecified fiver river unspecified fiver fiver unspecified high population density in ground in ground in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.86E-06 3.65E-04 3.49E-03 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 3.67E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 1.60E-01 7.16E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Cas, mine, off-gas, process, coal mining Cas, natural, in ground Oil, crude, in ground | air air soil soil water water water water water water water air resource resource resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river iver unspecified fiver river unspecified fiver fiver unspecified high population density in ground in ground in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.86E-06 3.65E-04 3.49E-03 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 3.67E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 1.60E-01 7.16E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Cas, mine, off-gas, process, coal mining Cas, natural, in ground Oil, crude, in ground | air air soil soil water water water water water water water water er water water water cource resource resource resource resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river iver unspecified fiver river unspecified fiver fiver unspecified high population density in ground in ground in ground in ground in ground | kg kg kg kg kg kg kg kg kg kg kg kg | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.86E-06 3.65E-04 3.49E-03 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 3.67E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 1.60E-01 7.16E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground | air air soil soil water water water water water water water water er water water water cource resource resource resource resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified high population density in ground | kg k | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.86E-06 3.65E-04 3.49E-03 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 3.67E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 1.60E-01 7.16E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground | air air soil soil water water water water water water water water er water water water cource resource resource resource resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified niver in river unspecified fiver in river unspecified high population density in ground biotic | kg k | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.86E-06 3.65E-04 3.49E-03 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 3.67E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 1.60E-01 7.16E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground No LCA-data for production of dicalcium phosphate were available in Ecoinvent, instead LCA-data for the production of natrium phosphate were used back to top | air air soil soil water water water water water water water water er water water water cource resource resource resource resource resource | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified fiver river unspecified high population density in ground biotic | kg k | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.86E-06 3.65E-04 3.49E-03 7.23E-08 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 7.53E-03 1.54E-04 1.40E-02 1.60E-01 7.16E-07 | Ecoinvent V2, lime, from carbonation, at regional storehouse |
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| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground No LCA-data for production of dicalcium phosphate were available in Ecoinvent, instead LCA-data for the production of natrium phosphate were used back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chirtogen monoxide Dinitrogen monoxide | air air soil soil water air resource resource resource resource resource source resource res | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground biotic This module contains material and energy input, production of waste and emiss for the production of sodium phosphate out of phosphoric acid. Transport ar infrastructure have been estimated. No water emissions are accounted for high population density low population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density low population density | kg k | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.94E-04 3.86E-06 3.65E-04 3.49E-03 7.23E-08 1.92E+00 5.95E-01 1.39E-06 2.61E-01 4.23E-04 1.31E-03 1.64E-09 1.32E-03 4.43E-09 8.99E-12 1.21E-17 1.40E-05 1.01E-05 1.33E-11 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 4.57E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 1.60E-01 7.16E-07 1.83E-01 | Ecoinvent V2, lime, from carbonation, at regional storehouse Ecoinvent V2, sodium phosphate, at plant RER |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground No LCA-data for production of dicalcium phosphate were available in Ecoinvent, instead LCA-data for the production of natrium phosphate were used back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide | air air soil soil water air resource resource resource resource resource source resource res | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground biotic This module contains material and energy input, production of waste and emiss for the production of sodium phosphate out of phosphoric acid. Transport ar infrastructure have been estimated. No water emissions are accounted for high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density low population density low population density low population density unspecified high population density low population density | kg k | 3.06 3.06 3.06 3.06 3.06 3.06 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4 | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.86E-06 3.65E-04 3.49E-03 7.23E-08 1.92E+00 5.95E-01 1.39E-06 2.61E-01 4.23E-04 1.31E-03 1.64E-09 1.32E-03 4.43E-09 8.99E-12 1.21E-17 1.40E-05 1.01E-05 1.01E-05 1.01E-05 1.13E-01 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 4.37E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 1.60E-01 7.16E-07 1.83E-01 | Ecoinvent V2, lime, from carbonation, at regional storehouse Ecoinvent V2, sodium phosphate, at plant RER Ecoinvent V2, |
| Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus BOD5, Biological Oxygen Demand BOD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground No LCA-data for production of dicalcium phosphate were available in Ecoinvent, instead LCA-data for the production of natrium phosphate were used back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chirtogen monoxide Dinitrogen monoxide | air air soil soil water air resource resource resource resource resource source resource res | low population density, long-term unspecified agricultural industrial river unspecified river unspecified river unspecified river unspecified river unspecified high population density in ground biotic This module contains material and energy input, production of waste and emiss for the production of sodium phosphate out of phosphoric acid. Transport ar infrastructure have been estimated. No water emissions are accounted for high population density low population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density low population density | kg k | 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 3.06 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 2.47E-11 4.10E-13 1.80E-10 3.72E-09 2.43E-05 5.62E-08 2.46E-05 5.67E-08 4.59E-09 1.20E-09 1.43E-11 1.97E-04 3.94E-04 3.94E-04 3.86E-06 3.65E-04 3.49E-03 7.23E-08 1.92E+00 5.95E-01 1.39E-06 2.61E-01 4.23E-04 1.31E-03 1.64E-09 1.32E-03 4.43E-09 8.99E-12 1.21E-17 1.40E-05 1.01E-05 1.33E-11 | kg/kg | 7.57E-11 1.26E-12 5.52E-10 1.14E-08 5.35E-07 1.24E-09 5.41E-07 1.25E-09 4.59E-09 4.57E-11 0.00E+00 1.10E-06 1.95E-03 7.53E-03 1.54E-04 1.40E-02 1.60E-01 7.16E-07 1.83E-01 | Ecoinvent V2, lime, from carbonation, at regional storehouse Ecoinvent V2, sodium phosphate, at plant RER Ecoinvent V2, |

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Ecoinvent V2, sodium chloride, powder, at plant, RER

Ecoinvent V2, sodium chloride, powder, at plant, RER

APPENDIX C EMISSION FACTOR DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | | | | | | | | | |
|---|--|--|--|--|--|--|---|--|---|
| | air | low population density | kg | 1430 | kg CO2-Eq | 3.04E-10 | kg/kg | 4.35E-07 | Ecoinvent V2, sodium phosphate, at plant RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 1.88E-07 | kg/kg | 2.69E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 1.22E-10 | kg/kg | 7.47E-07 | Ecoinvent V2, sodium phosphate, at plant RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 3.65E-10 | kg/kg | 4.53E-08 | Ecoinvent V2, sodium phosphate, at plant RER |
| | | | | 124 | | 3.03L-10 | | | |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 5.30E-09 | kg/kg | 5.30E-05 | Ecoinvent V2, sodium phosphate, at plant RER |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 8.40E-09 | kg/kg | 1.03E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 5.30E-08 | kg/kg | 6.46E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| | air | | | 25 | kg CO2-Eq | 1.31E-06 | | 3.28E-05 | |
| Methane, biogenic | | high population density | kg | | | | kg/kg | | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 5.26E-05 | kg/kg | 1.32E-03 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 5.42E-06 | kg/kg | 1.35E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 3.28E-17 | kg/kg | 1.64E-16 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 8.98E-09 | kg/kg | 1.70E-05 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 3.76E-15 | kg/kg | 2.69E-11 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, bromotrifluoro-, Halon 1301 | air | | kg | 7140 | | 7.20E-09 | | 5.14E-05 | |
| | | low population density | | | kg CO2-Eq | | kg/kg | | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 4.17E-09 | kg/kg | 7.56E-06 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 3.39E-08 | kg/kg | 6.13E-05 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 1.50E-10 | kg/kg | 1.31E-09 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 2.66E-11 | kg/kg | 2.31E-10 | Ecoinvent V2, sodium phosphate, at plant RER |
| | | | S . | | | | | | |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 3.14E-10 | kg/kg | 3.43E-06 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 3.08E-11 | kg/kg | 3.36E-07 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 2.18E-17 | kg/kg | 2.37E-13 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 7.99E-13 | kg/kg | 1.68E-10 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 1.68E-04 | kg/kg | 4.21E-03 | Ecoinvent V2, sodium phosphate, at plant RER |
| | air | | | 25 | kg CO2-Eq | 2.89E-03 | kg/kg | 7.22E-02 | |
| Methane, fossil | | low population density | kg | 25 | | | | | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 2.21E-11 | kg/kg | 5.53E-10 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 9.71E-06 | kg/kg | 2.43E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 6.77E-09 | kg/kg | 9.48E-06 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 9.74E-15 | kg/kg | 1.36E-11 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.88E-11 | kg/kg | 1.39E-07 | Ecoinvent V2, sodium phosphate, at plant RER |
| | | | | | | | | | |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 4.77E-07 | kg/kg | 3.52E-03 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.30E-12 | kg/kg | 6.16E-09 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 2.54E-10 | kg/kg | 3.76E-06 | Ecoinvent V2, sodium phosphate, at plant RER |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 1.64E-10 | kg/kg | 3.74E-06 | Ecoinvent V2, sodium phosphate, at plant RER |
| | | | S . | 22800 | kg CO2-Eq | 5.98E-08 | | 1.36E-03 | |
| Sulfur hexafluoride | air | unspecified | kg | | | | kg/kg | | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 2.18E-12 | kg/kg | 2.84E-11 | Ecoinvent V2, sodium phosphate, at plant RER |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 4.86E-11 | kg/kg | 6.32E-10 | Ecoinvent V2, sodium phosphate, at plant RER |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 3.80E-03 | kg/kg | 3.80E-03 | Ecoinvent V2, sodium phosphate, at plant RER |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| | | 3 1 1 1 2 2 2 3 | 3 | | 9 1 | | 3- 3 | 2.87E+00 | *** *** **** **** **** **** **** **** **** |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 4.98E-04 | kg/kg | 9.37E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| | air | | | 1.88 | | | | | |
| Ammonia | | low population density | kg | | kg SO2-Eq | 1.46E-05 | kg/kg | 2.74E-05 | Ecoinvent V2, sodium phosphate, at plant RER |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 4.72E-05 | kg/kg | 8.87E-05 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 1.26E-04 | kg/kg | 1.11E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen chloride | air | low population density | | | | | | | |
| | | | ka | 0.88 | ka SO2-Ea | 2.81E-05 | | 2.48E-05 | Econvent V2, sodium phosphate, at plant RER |
| | air | | kg | 0.88 | kg SO2-Eq | 2.81E-05 | kg/kg | 2.48E-05 8.78E-06 | Ecoinvent V2, sodium phosphate, at plant RER Ecoinvent V2, sodium phosphate, at plant REP |
| Hydrogen chloride | air | unspecified | kg kg | 0.88 | kg SO2-Eq | 9.97E-06 | kg/kg kg/kg | 8.78E-06 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride | air air | unspecified high population density | kg kg | 0.88 1.6 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 | kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 | Ecoinvent V2, sodium phosphate, at plant RER Ecoinvent V2, sodium phosphate, at plant RER |
| | air air air | unspecified | kg kg kg kg | 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 | kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 | Ecoinvent V2, sodium phosphate, at plant RER Ecoinvent V2, sodium phosphate, at plant RER Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride | air air air air | unspecified high population density | kg kg | 0.88 1.6 1.6 1.6 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 | kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 | Ecoinvent V2, sodium phosphate, at plant RER Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride | air air air air air | unspecified high population density low population density | kg kg | 0.88 1.6 1.6 | kg SO2-Eq kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 | kg/kg kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 | Ecoinvent V2, sodium phosphate, at plant RER Ecoinvent V2, sodium phosphate, at plant RER Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide | air air air air air | unspecified high population density low population density unspecified high population density | kg kg kg kg | 0.88 1.6 1.6 1.6 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide | air air air air air | unspecified high population density low population density unspecified high population density low population density | kg kg kg kg | 0.88 1.6 1.6 1.6 1.88 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide | air air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified | kg kg kg kg kg kg | 0.88 1.6 1.6 1.6 1.88 1.88 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides | air air air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density high population density unspecified high population density | kg kg kg kg | 0.88 1.6 1.6 1.8 1.88 1.88 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides | air air air air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density | kg kg kg kg kg kg | 0.88 1.6 1.6 1.8 1.88 1.88 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides | air air air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density high population density unspecified high population density | kg kg kg kg kg kg | 0.88 1.6 1.6 1.8 1.88 1.88 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 1.67E-03 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides | air air air air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density | kg kg kg kg kg kg | 0.88 1.6 1.6 1.8 1.88 1.88 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide | air air air air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density | kg kg kg kg kg kg | 0.88 1.6 1.6 1.8 1.88 1.88 0.7 | kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide | air air air air air air air air air air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density | kg kg kg kg kg kg | 0.88 1.6 1.6 1.8 1.88 1.88 0.7 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide | air air air air air air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density | kg kg kg kg kg kg | 0.88 1.6 1.6 1.8 1.88 1.88 0.7 0.7 0.7 1 1 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide | air air air air air air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high river | kg kg kg kg kg kg | 0.88 1.6 1.6 1.8 1.88 1.88 0.7 0.7 0.7 1 1 1 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur doxide | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density river agricultural | kg kg kg kg kg kg | 0.88 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid | air air air air air air air air air air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density | kg kg kg kg kg kg | 0.88 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur doxide | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density river agricultural | kg kg kg kg kg kg | 0.88 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid | air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density | kg kg kg kg kg kg | 0.88 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfur dioxide | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg | 0.88 1.6 1.6 1.88 1.88 1.88 0.7 0.7 1.7 1.1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Phosphorus | air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg k | 0.88 1.6 1.6 1.8 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Phosphorus Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density low population density high population density low population density | kg kg kg kg kg kg kg kg kg kg kg | 0.88 1.6 1.6 1.81 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfur acid Phosphoric acid Phosphorus Phosphorus Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density low population density low population density | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified river agricultural high population density low population density unspecified river agricultural high population density low population density | kg k | 0.88 1.6 1.6 1.8 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfur acid Phosphoric acid Phosphorus Phosphorus Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 0.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified river agricultural high population density low population density unspecified river agricultural high population density low population density | kg k | 0.88 1.6 1.6 1.8 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfur acid Phosphoric acid Sulfuric acid Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density, long-term unspecified agricultural industrial river | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 0.022 | kg SO2-Eq kg SO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.33E-05 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 7.60E-07 6.03E-05 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg kg kg kg kg kg | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.33E-05 1.06E-07 6.46E-05 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus OD, Sielological Oxygen Demand OD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | air | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg SO2-Eq kg SO4-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 1.67E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.86E-06 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 7.60E-07 6.33E-05 1.06E-07 6.46E-05 1.07E-07 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density | kg kg kg kg kg kg kg kg kg kg kg kg kg | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 1 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.86E-06 1.32E-05 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.33E-05 1.06E-07 6.46E-05 1.07E-07 1.32E-05 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus OD, Sielological Oxygen Demand OD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | air | unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 0.022 0.022 | kg SO2-Eq kg SO4-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 1.67E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.86E-06 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 7.60E-07 6.33E-05 1.06E-07 6.46E-05 1.07E-07 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus OD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus | air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density unspecified agricultural industrial river unspecified river unspecified river unspecified river | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.86E-06 1.32E-05 6.55E-05 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.33E-05 1.06E-07 6.46E-05 1.07E-07 1.32E-05 2.01E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus OD, Biological Oxygen Demand OD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphate Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density river unspecified river unspecified river unspecified river river unspecified | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg SO2-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.86E-06 1.32E-05 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 7.60E-07 6.33E-05 1.06E-07 6.46E-05 1.07E-07 1.32E-05 2.01E-04 5.12E-09 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus OD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus | air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density unspecified agricultural industrial river unspecified river unspecified river unspecified river | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.86E-06 1.32E-05 6.55E-05 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 7.60E-07 6.33E-05 1.06E-07 6.46E-05 1.07E-07 1.32E-05 2.01E-04 5.12E-09 0.00E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus OD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus | air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.86E-06 1.32E-05 6.55E-05 1.67E-09 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.33E-05 1.06E-07 6.46E-05 1.07E-07 1.32E-05 2.01E-04 5.12E-09 0.00E+00 3.44E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density low population density iver unspecified river unspecified high population density in ground | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.80E-06 1.32E-05 6.55E-05 1.67E-09 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 0.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.38E-05 1.06E-07 6.46E-05 1.07E-07 1.32E-05 2.01E-04 5.12E-09 0.00E+00 3.44E-04 1.65E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus OD5, Biological Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus | air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.86E-06 1.32E-05 6.55E-05 1.67E-09 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.33E-05 1.06E-07 6.46E-05 1.07E-07 1.32E-05 2.01E-04 5.12E-09 0.00E+00 3.44E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphoric acid Col., Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus Phosphorus Phosphoric acid | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density in unspecified river unspecified river river river river unspecified high population density in ground in ground | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.80E-06 1.32E-05 6.55E-05 1.67E-09 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 0.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.38E-05 1.06E-07 6.46E-05 1.07E-07 1.32E-05 2.01E-04 5.12E-09 0.00E+00 3.44E-04 1.65E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Phosphoric acid Sulfuric acid Phosphorus | air | unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density in population density in ground in ground in ground in ground | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 1.67E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.48E-03 4.80E-06 2.94E-03 4.86E-06 1.32E-05 6.55E-05 1.67E-09 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.36E-07 6.46E-05 1.07E-07 1.32E-05 2.01E-04 5.12E-09 0.00E+00 3.44E-04 1.65E+00 5.06E+00 1.04E-01 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density low population density in ground in ground in ground in ground in ground | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.80E-06 1.32E-05 6.55E-05 1.67E-09 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 0.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 7.60E-07 6.33E-05 1.07E-07 1.32E-05 2.01E-04 5.12E-09 0.00E+00 3.44E-04 1.65E+00 5.06E+00 1.04E-01 7.30E-01 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Phosphoric acid Sulfuric acid Phosphorus CD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density in ground | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 1.67E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 6.55E-05 1.67E-09 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.33E-05 1.06E-07 6.46E-05 1.07E-07 1.32E-05 2.01E-04 5.12E-09 0.00E+00 3.44E-04 1.65E+00 5.06E+00 1.04E-01 7.30E+00 8.33E+00 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density low population density in ground in ground in ground in ground in ground | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 2.94E-03 4.80E-06 1.32E-05 6.55E-05 1.67E-09 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.36E-07 6.46E-05 1.07E-07 1.32E-05 2.01E-04 5.12E-09 0.00E+00 3.44E-04 1.65E+00 5.06E+00 1.04E-01 7.30E+00 8.33E+00 3.28E-04 | Ecoinvent V2, sodium phosphate, at plant RER |
| Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfur acid Phosphoric acid Sulfuric acid Phosphorus CD, Chemical Oxygen Demand COD, Chemical Oxygen Demand | air | unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density in ground | kg k | 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg SO2-Eq kg PO4-Eq | 9.97E-06 4.12E-06 6.08E-05 1.94E-06 1.97E-09 4.58E-06 2.84E-07 2.37E-03 1.04E-03 1.67E-03 3.00E-02 2.50E-03 1.22E-04 2.64E-08 3.33E-12 3.63E-13 2.62E-07 1.58E-09 1.00E-08 1.50E-10 2.30E-07 2.48E-07 2.88E-03 4.80E-06 6.55E-05 1.67E-09 | kg/kg | 8.78E-06 6.59E-06 9.73E-05 3.11E-06 3.70E-09 8.60E-06 5.35E-07 1.66E-03 7.28E-04 1.17E-03 3.00E-02 2.50E-03 1.22E-04 4.97E-08 2.16E-12 0.00E+00 2.36E-13 3.75E-02 8.01E-07 4.83E-09 3.07E-08 4.58E-10 7.03E-07 6.33E-05 1.06E-07 6.46E-05 1.07E-07 1.32E-05 2.01E-04 5.12E-09 0.00E+00 3.44E-04 1.65E+00 5.06E+00 1.04E-01 7.30E+00 8.33E+00 | Ecoinvent V2, sodium phosphate, at plant RER |

kg 1 kg CO2-Eq 6.39E-02 kg/kg 6.39E-02

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back to top Carbon dioxide, fossil Sodium chloride this module includes the solution mining process of sodium chloride, its cleaning form impurities, and the drying step. It is sold as bulk and therefore no packaging materials are included.

high population density

| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 9.25E-02 | kg/kg | 9.25E-02 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
|---|--|--|--|--|--|---|---|--|--|
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 3.26E-07 | kg/kg | 3.26E-07 | Eccinvent V2, sodium chloride, powder, at plant, RER |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 1.39E-02 | kg/kg | 1.39E-02 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 1.66E-05 | kg/kg | 2.62E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 9.93E-05 | kg/kg | 1.56E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 3.83E-10 | kg/kg | 6.02E-10 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.62E-04 | kg/kg | 2.54E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Chloroform | air | | | 30 | kg CO2-Eq | 5.41E-10 | | 1.62E-08 | |
| | | high population density | kg | 30 | | | kg/kg | 6.25E-11 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Chloroform | air air | low population density | kg | | kg CO2-Eq | 2.08E-12 | kg/kg | | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Chloroform | | unspecified | kg | 30 | kg CO2-Eq | 2.69E-18 | kg/kg | 8.06E-17 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 2.30E-06 | kg/kg | 6.85E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 1.41E-06 | kg/kg | 4.19E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 3.10E-12 | kg/kg | 9.25E-10 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 1.35E-06 | kg/kg | 4.03E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 6.58E-11 | kg/kg | 9.41E-08 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 1430 | kg CO2-Eq | 7.17E-11 | kg/kg | 1.03E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | | kg CO2-Eq | 4.58E-09 | kg/kg | 6.54E-06 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 6130 | kg CO2-Eq | 2.85E-11 | kg/kg | 1.75E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | | kg CO2-Eq | 0.055.44 | kg/kg | 0.00E+00 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ethane, 1,1-diffuoro-, HFC-152a | air | high population density | kg | 124 124 | kg CO2-Eq | 9.05E-11 | kg/kg | 1.12E-08 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | | kg CO2-Eq | 4.045.00 | kg/kg | 0.00E+00 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 609 | kg CO2-Eq | 1.24E-09 | kg/kg | 1.24E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | | kg CO2-Eq | 4.075.00 | kg/kg | 0.00E+00 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 1.97E-09 | kg/kg | 2.40E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 1.14E-08 | kg/kg | 1.39E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 1.99E-06 | kg/kg | 4.97E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.65E-06 | kg/kg | 4.12E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, brome, Helen 1001 | air | unspecified | kg | 25 | kg CO2-Eq | 1.36E-06 | kg/kg | 3.41E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 7.28E-18 | kg/kg | 3.64E-17 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, bromotrifluoro, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 6.15E-10 | kg/kg | 1.16E-06 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 2.72E-16 | kg/kg | 1.94E-12 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 5.02E-10 | kg/kg | 3.59E-06 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 9.69E-10 | kg/kg | 1.75E-06 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 2.89E-09 | kg/kg | 5.23E-06 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.03E-11 | kg/kg | 1.76E-10 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 6.16E-12 | kg/kg | 5.36E-11 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 7.36E-11 | kg/kg | 8.02E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 2.10E-12 | kg/kg | 2.29E-08 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 4.84E-18 | kg/kg | 5.28E-14 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 1.87E-13 | kg/kg | 3.93E-11 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 8.79E-06 | kg/kg | 2.20E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 2.59E-04 | kg/kg | 6.48E-03 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 5.17E-12 | kg/kg | 1.29E-10 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 4.38E-07 | kg/kg | 1.10E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 3.21E-10 | kg/kg | 4.50E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 2.16E-15 | kg/kg | 3.03E-12 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 4.66E-12 | kg/kg | 3.44E-08 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 1.03E-07 | kg/kg | 7.60E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 3.04E-13 | kg/kg | 1.44E-09 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 5.96E-11 | kg/kg | 8.82E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 3.80E-11 | kg/kg | 8.66E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.56E-08 | kg/kg | 3.55E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 5.62E-13 | kg/kg | 7.31E-12 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 1.13E-11 | kg/kg | 1.46E-10 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 9.59E-06 | Landle and | 9.59E-06 | Facinity (0) and distribution of all of the property of the pr |
| Nitrogen fluoride | all | low population density | | | | 9.59⊑=00 | kg/kg | 3.33L-00 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| | air | high population density | kg | 17200 | kg CO2-Eq | 9.59E-00 | kg/kg kg/kg | 0.00E+00 | Ecoinvent v2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| | air | | kg | 17200 | | 9.592-00 | | | |
| Ammonia | air air | | kg kg | 17200 1.88 | | 1.12E-05 | | 0.00E+00 | |
| Ammonia Ammonia | air | high population density | kg | | kg CO2-Eq | | kg/kg | 0.00E+00 1.80E-01 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia | air | high population density high population density | kg | 1.88 1.88 1.88 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 | kg/kg kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia | air | high population density high population density low population density | kg | 1.88 1.88 1.88 0.88 | kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride | air | high population density high population density low population density unspecified | kg | 1.88 1.88 1.88 0.88 0.88 | kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 | kg/kg kg/kg kg/kg kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride | air | high population density high population density low population density unspecified high population density | kg | 1.88 1.88 1.88 0.88 0.88 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride | air | high population density high population density low population density unspecified high population density low population density | kg | 1.88 1.88 1.88 0.88 0.88 0.88 | kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride | air air air air air air air air | high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density | kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride | air air air air air air air air air | high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified | kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 1.6 1.6 | kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide | air air air air air air air air air air | high population density high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density | kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 1.6 1.6 1.6 | kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 | kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide | air | high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density | kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 | kg CO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.07E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide | air | high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified | kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 1.6 1.6 1.6 1.88 | kg CO2-Eq kg SO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nydrogen sulfide Nydrogen sulfide Nydrogen sulfide | air | high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density | kg kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 1.6 1.6 1.8 1.88 | kg CO2-Eq kg SO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides | air | high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density | kg kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.8 1.88 1.88 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides | air | high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified | kg kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 1.6 1.6 1.8 1.88 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.66E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Sulfur dioxide | air | high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density | kg kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.8 1.88 1.88 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide | air | high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified | kg kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.8 1.88 1.88 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide | air | high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density | kg kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 4.82E-05 1.18E-04 4.41E-04 1.29E-05 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide | air | high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density unspecified river | kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.8 1.88 1.88 0.7 0.7 0.7 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide | air air air air air air air air air air | high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural | kg kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.8 1.88 1.88 1.7 0.7 0.7 1 1 1 1.88 0.65 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 4.82E-05 1.18E-04 4.41E-04 1.29E-05 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid | air air air air air air air air air air | high population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified river agricultural high population density | kg kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide | air air air air air air air air air air | high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural | kg kg kg kg kg kg kg kg kg kg kg | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.8 1.88 1.88 1.7 0.7 0.7 1 1 1 1.88 0.65 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Sitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide | air | high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.8 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1.88 0.65 0.98 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid | air air air air air air air air air air | high population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 8.99E-14 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus Phosphorus | air | high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density low population density low population density | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 8.99E-14 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus | air air air air air air air air air air | high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density low population density low population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 0.98 0.65 3.06 3.06 3.06 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.18E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 8.99E-14 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Hydrogen sulfide Sulfuric acid Phosphoric acid Sulfuric acid Phosphorus Phosphorus Phosphorus | air air air air air air air air air air | high population density low population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density, long-term unspecified | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 8.99E-14 1.65E-08 2.80E-10 2.37E-09 3.24E-11 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 9.91E-11 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus Phosphorus Phosphorus Phosphorus Phosphorus | air air air air air air air air air air | high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 8.99E-14 1.65E-08 2.80E-10 2.37E-09 3.24E-11 3.92E-08 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 9.91E-11 1.20E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Phosphorus | air air air air air air air air | high population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 4.41E-04 4.129E-05 4.01E-09 7.79E-13 8.99E-14 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 9.91E-11 1.20E-07 6.23E-09 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfurioxide Sulfurioxide Sulfurioxide Sulfurioxide Sulfurioxide Florsphoric acid Sulfurioxide Sulfurioxide Sulfurioxide Phosphorus | air air air air air air air air air air | high population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 1.88 0.7 0.7 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 0.022 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 8.99E-14 1.65E-08 2.80E-10 2.37E-09 3.24E-11 3.92E-08 2.04E-08 1.70E-08 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 9.91E-11 1.20E-07 6.23E-08 3.74E-06 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur bydrogen sulfide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus | air air air air air air air air air air | high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 8.99E-14 1.65E-08 2.80E-10 2.37E-09 3.24E-11 3.92E-08 2.04E-08 1.70E-04 6.96E-07 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 9.91E-11 1.20E-07 6.23E-08 3.74E-06 1.53E-08 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Phosphorus | air air air air air air air air air air | high population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density long-term unspecified agricultural industrial river unspecified river | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 0.022 0.022 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 4.11E-04 4.129E-05 4.01E-09 7.79E-13 8.99E-14 1.65E-08 2.80E-10 2.37E-09 3.24E-11 3.92E-08 2.04E-08 1.70E-04 6.96E-07 2.51E-04 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 9.91E-11 1.20E-07 6.23E-08 3.74E-06 1.53E-08 5.52E-08 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, p |
| Ammonia Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfurio acid Hydrogen sulfide Sulfurio acid Phosphoric acid Sulfurio acid Phosphorus | air air air air air air air air air air | high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 8.99E-14 1.65E-08 2.80E-10 2.37E-09 3.24E-11 3.92E-08 2.04E-08 1.70E-04 6.96E-07 2.51E-04 7.08E-07 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 9.91E-11 1.20E-07 6.23E-08 5.52E-08 5.52E-06 1.56E-08 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, p |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur bydrogen sulfide Sulfur dioxide Hydrogen sulfide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphorus | air air air air air air air air air air | high population density low population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified river agricultural high population density low population density | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 0.88 1.6 1.6 1.6 1.8 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 8.99E-14 1.65E-08 2.80E-10 2.37E-09 3.24E-11 3.92E-08 2.04E-08 1.70E-04 6.96E-07 2.51E-04 7.08E-07 1.11E-05 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.70E-07 2.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 9.91E-11 1.20E-07 6.23E-08 3.74E-06 1.53E-08 5.52E-06 1.53E-08 5.52E-06 1.53E-08 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, p |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus | air air air air air air air air air air | high population density low population density unspecified high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.67E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 4.11E-04 4.129E-05 4.01E-09 7.79E-13 8.99E-14 1.65E-08 2.80E-10 2.37E-09 3.24E-11 3.92E-08 2.04E-08 1.70E-04 6.96E-07 2.51E-04 7.08E-07 1.11E-05 2.36E-07 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 9.91E-11 1.20E-07 6.23E-08 3.74E-06 1.53E-08 1.53E-08 1.52E-06 1.56E-08 1.11E-05 7.23E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, p |
| Ammonia Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfurio acid Phosphoric acid Sulfurio acid Phosphorus | air air air air air air air air air air | high population density low population density unspecified high population density unspecified high population density low population density unspecified river agricultural high population density low popul | kg k | 1.88 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg CO2-Eq kg SO2-Eq kg SO2 | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.07E-07 1.54E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 8.22E-05 1.18E-04 4.41E-04 1.29E-05 4.01E-09 7.79E-13 8.99E-14 1.65E-08 2.80E-10 2.37E-09 3.24E-11 3.92E-08 2.04E-08 1.70E-04 6.96E-07 2.51E-04 7.08E-07 1.11E-05 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.47E-06 6.56E-07 2.47E-06 6.56E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 9.91E-11 1.20E-07 6.23E-08 3.74E-06 1.53E-08 5.52E-06 1.56E-08 1.11E-05 7.23E-07 8.30E-10 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, p |
| Ammonia Ammonia Ammonia Hydrogen chloride Hydrogen chloride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen fluoride Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Hydrogen sulfide Nitrogen oxides Nitrogen oxides Nitrogen oxides Nitrogen oxides Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Sulfur dioxide Hydrogen sulfide Sulfuric acid Phosphoris acid Sulfuric acid Phosphorus COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand COD, Chemical Oxygen Demand Phosphorus Phosphorus | air air air air air air air air air air | high population density low population density unspecified high population density low population density | kg k | 1.88 1.88 0.88 0.88 0.88 1.6 1.6 1.6 1.6 1.88 1.88 1.88 0.7 0.7 0.7 1 1 1.88 0.65 0.98 0.65 3.06 3.06 3.06 3.06 3.06 3.06 3.06 3.06 | kg CO2-Eq kg SO2-Eq | 1.12E-05 5.69E-07 7.48E-06 2.83E-06 7.04E-06 1.67E-06 1.67E-06 4.10E-07 2.38E-10 3.22E-07 4.67E-08 8.96E-05 1.58E-04 4.11E-04 4.129E-05 4.01E-09 7.79E-13 8.99E-14 1.65E-08 2.80E-10 2.37E-09 3.24E-11 3.92E-08 2.04E-08 1.70E-04 6.96E-07 2.51E-04 7.08E-07 1.11E-05 2.36E-07 | kg/kg | 0.00E+00 1.80E-01 2.10E-05 1.07E-06 1.41E-05 2.49E-06 6.20E-06 1.47E-06 1.47E-06 6.56E-07 4.47E-10 6.05E-07 8.79E-08 6.27E-05 1.10E-04 5.76E-05 1.18E-04 4.41E-04 1.29E-05 7.53E-09 5.07E-13 0.00E+00 5.84E-14 8.52E-04 5.04E-08 8.56E-10 7.26E-09 9.91E-11 1.20E-07 6.23E-08 3.74E-06 1.53E-08 1.53E-08 1.52E-06 1.56E-08 1.11E-05 7.23E-07 | Ecoinvent V2, sodium chloride, powder, at plant, RER Ecoinvent V2, sodium chloride, p |

| | | | | | | | | 2.14E-05 | |
|--|----------|-----------|-----|--------|-------|----------|-------|----------|--|
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 4.21E-02 | kg/kg | 4.17E-01 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 2.97E-02 | kg/kg | 5.68E-01 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 2.90E-04 | kg/kg | 1.15E-02 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 1.31E-02 | kg/kg | 5.03E-01 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.35E-02 | kg/kg | 6.17E-01 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 4.17E-06 | kg/kg | 4.13E-05 | Ecoinvent V2, sodium chloride, powder, at plant, RER |
| | | | | | | | | 2.12E+00 | |

| | potassium chloride, as K2O, at regional storehouse | | | | | | | | |
|--|--|---|-----------|--------------|------------------------|----------------------|----------------|----------------------|--|
| Carbon dioxide, fossil | air | high a sampletion density. | les. | 4 | ka CO2 Fa | 2.88E-01 | lea/lea | 2.88E-01 | Facilities to A patentium phloride, on K2O at regional starshouse |
| Carbon dioxide, fossil | air | high population density low population density | kg | 1 | kg CO2-Eq kg CO2-Eq | 7.06E-02 | kg/kg kg/kg | 7.06E-02 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | ko | 1 | kg CO2-Eq | 5.49E-07 | kg/kg | 5.49E-07 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Carbon dioxide, fossil | air | unspecified | ko | 1 | kg CO2-Eq | 8.15E-02 | kg/kg | 8.15E-02 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 3.94E-04 | kg/kg | 6.19E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 6.87E-05 | kg/kg | 1.08E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 6.45E-10 | kg/kg | 1.01E-09 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 5.45E-04 | kg/kg | 8.56E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 8.83E-10 | kg/kg | 2.65E-08 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 2.24E-12 | kg/kg | 6.71E-11 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 4.65E-18 | kg/kg | 1.40E-16 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 3.24E-05 | kg/kg | 9.65E-03 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 1.15E-06 | kg/kg | 3.44E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 5.23E-12 | kg/kg | 1.56E-09 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 2.85E-06 | kg/kg | 8.50E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 1.11E-10 | kg/kg | 1.58E-07 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 5.14E-11 | kg/kg | 7.35E-08 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 7.77E-08 | kg/kg | 1.11E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 4.81E-11 | kg/kg | 2.95E-07 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | Kg | 6130 | kg CO2-Eq | E 00T: 11 | kg/kg | 0.00E+00 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a | air air | high population density | kg | 124 124 | kg CO2-Eq | 5.88E-11 | kg/kg | 7.29E-09 0.00E+00 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air air | low population density | kg kg | 10000 | kg CO2-Eq kg CO2-Eq | 8.96E-10 | kg/kg kg/kg | 0.00E+00 8.96E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ethane, 1,2-dichioro-1,1,2,z-tetrafluoro-, CFC-114 Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air air | low population density unspecified | ng ka | 609 | kg CO2-Eq | 0.30E-10 | kg/kg kg/kg | 8.96E-06 0.00E+00 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 3.32E-09 | kg/kg kg/kg | 4.05E-05 | Econivent v2, potassium chloride, as k2O, at regional storehouse |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kø | 12200 | kg CO2-Eq | 2.05E-08 | kg/kg | 2.50E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 2.11E-07 | kg/kg | 5.27E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 2.58E-06 | kg/kg | 6.44E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 8.67E-07 | kg/kg | 2.17E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 1.26E-17 | kg/kg | 6.30E-17 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 6.53E-09 | kg/kg | 1.23E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 1.36E-15 | kg/kg | 9.72E-12 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 2.15E-09 | kg/kg | 1.53E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 1.63E-09 | kg/kg | 2.96E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 2.29E-08 | kg/kg | 4.14E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 3.32E-11 | kg/kg | 2.89E-10 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 6.62E-12 | kg/kg | 5.76E-11 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 1.23E-10 | kg/kg | 1.35E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 2.23E-11 | kg/kg | 2.43E-07 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, dichlorodifluoro-, CFC-12 Methane, dichlorofluoro-, HCFC-21 | air air | unspecified high population density | кg kg | 10900 210 | kg CO2-Eq kg CO2-Eq | 8.38E-18 3.14E-13 | kg/kg | 9.13E-14 6.60E-11 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, fossil | air | high population density | kg ka | 25 | kg CO2-Eq | 2.94E-04 | kg/kg kg/kg | 7.34E-03 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 1.40E-03 | kg/kg | 7.54E-03 3.50E-02 | Ecoinvent v2, potassium chloride, as k2O, at regional storehouse |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 8.72E-12 | kg/kg | 2.18E-10 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, fossil | air | unspecified | kø | 25 | kg CO2-Eq | 3.71E-06 | kg/kg | 9.27E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 2.29E-09 | kg/kg | 3.20E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 3.75E-15 | kg/kg | 5.25E-12 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 3.03E-12 | kg/kg | 2.24E-08 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 1.84E-07 | kg/kg | 1.36E-03 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 5.10E-13 | kg/kg | 2.42E-09 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 1.00E-10 | kg/kg | 1.48E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 5.85E-11 | kg/kg | 1.33E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 8.97E-09 | kg/kg | 2.04E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 7.95E-13 | kg/kg | 1.03E-11 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 1.21E-11 | kg/kg | 1.57E-10 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.03E-05 | kg/kg | 1.03E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| A | | 12.1 | , | 4.00 | h- 000 F | 0.105.00 | , " | 4.98E-01 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 6.13E-06 | kg/kg | 1.15E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 7.49E-07 | kg/kg | 1.41E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.24E-05 | kg/kg | 2.33E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 1.18E-05 | kg/kg | 1.04E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 4.58E-06 | kg/kg | 4.03E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Hydrogen fluoride | air air | unspecified | kg | 0.88 1.6 | kg SO2-Eq | 3.21E-06 1.08E-07 | kg/kg | 2.83E-06 1.73E-07 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Hydrogen fluoride | air air | high population density | kg | 1.6 1.6 | kg SO2-Eq kg SO2-Eq | 1.08E-07 1.05E-06 | kg/kg | 1.73E-07 1.68E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Hydrogen fluoride | | low population density | kg | | | | kg/kg | | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Hydrogen fluoride Hydrogen sulfide | air | unspecified | kg | 1.6 1.88 | kg SO2-Eq kg SO2-Eq | 8.23E-07 7.90E-10 | kg/kg | 1.32E-06 1.49E-09 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Hydrogen sulfide | air air | high population density low population density | kg | 1.88 | kg SO2-Eq | 7.90E-10 3.25E-06 | kg/kg kg/kg | 6.11E-06 | Econvent v2, potassium chloride, as K2O, at regional storehouse Econvent v2, potassium chloride, as K2O, at regional storehouse |
| Hydrogen sulfide | air air | | kg | 1.88 | kg SO2-Eq | 9.32E-08 | кд/кд kg/kg | 1.75E-07 | Econvent v2, potassium chloride, as K2O, at regional storehouse Econvent v2, potassium chloride, as K2O, at regional storehouse |
| Nitrogen oxides | air | unspecified high population density | ka | 0.7 | kg SO2-Eq | 9.32E-08 4.93E-04 | kg/kg kg/kg | 3.45E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Nitrogen oxides | air | low population density | kg | 0.7 | kg SO2-Eq | 4.93E-04 1.97E-04 | kg/kg kg/kg | 3.45E-04 1.38E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Nitrogen oxides | air | unspecified | ka | 0.7 | kg SO2-Eq | 8.31E-04 | kg/kg kg/kg | 5.81E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Sulfur dioxide | air | high population density | ko | 1 | kg SO2-Eq | 1.85E-04 | kg/kg | 1.85E-04 | Ecoinvent v2, potassium chloride, as k2O, at regional storehouse |
| Sulfur dioxide | air | low population density | kg | 1 | kg SO2-Eq | 5.23E-04 | kg/kg | 5.23E-04 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| | | F-F | 6 | • | 4 | | ··9···9 | | |

| Sulfur dioxide | air | unspecified | kg | 1 | kg SO2-Eq | 3.67E-05 | kg/kg | 3.67E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
|--|----------------------|--|------------|------------------|------------------------|----------------------|----------------|----------------------|--|
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 9.39E-09 | kg/kg | 1.76E-08 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 1.31E-12 | kg/kg | 8.54E-13 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 5.84E-14 | kg/kg | 3.80E-14 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| | | | | | | | | 1.87E-03 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 1.31E-08 | kg/kg | 4.02E-08 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 4.68E-10 | kg/kg | 1.43E-09 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 1.68E-09 | kg/kg | 5.13E-09 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Phosphorus Phosphorus | air soil | unspecified agricultural | kg kg | 3.06 3.06 | kg PO4-Eq kg PO4-Eq | 5.77E-11 3.12E-08 | kg/kg kg/kg | 1.77E-10 9.56E-08 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 7.75E-08 | kg/kg | 2.37E-07 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 3.08E-04 | kg/kg | 6.79E-06 | Ecoinvent v2, potassium chloride, as K20, at regional storehouse |
| BOD5, Biological Oxygen Demand | water | unspecified | kø | 0.022 | kg PO4-Eq | 1.82E-06 | kg/kg | 4.00E-08 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 3.16E-04 | kg/kg | 6.94E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 1.84E-06 | kg/kg | 4.05E-08 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 1.03E-06 | kg/kg | 1.03E-06 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 8.92E-08 | kg/kg | 2.73E-07 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 5.71E-10 | kg/kg | 1.75E-09 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| | | | | | | | | 1.55E-05 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 2.70E-02 | kg/kg | 2.68E-01 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 2.66E-02 | kg/kg | 5.08E-01 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 Nm3 | 39.8 38.293 | MJ-Eq MJ-Eq | 2.60E-04 1.32E-01 | kg/kg kg/kg | 1.03E-02 5.04E+00 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Gas, natural, in ground Oil, crude, in ground | resource resource | in ground | kg | 45.8 | MJ-Eq | 4.89E-02 | kg/kg | 2.24E+00 | Ecoinvent v2, potassium chloride, as K2O, at regional storehouse Ecoinvent v2, potassium chloride, as K2O, at regional storehouse |
| Peat, in ground | resource | in ground biotic | кg kg | 9.9 | MJ-Eq | 9.83E-06 | kg/kg | 9.73E-05 | Econiverti v2, potassium chloride, as K2O, at regional storehouse |
| , g. ounu | Labouree | Dione | ng | J.3 | WO EQ | 0.00L 00 | ng/ng | 8.06E+00 | Zoomon 12, potabolan anomal, as recy at regional attributed |
| | zinc oxide, at plant | | | | | | | | |
| back to top | | | | | | | | | |
| Carbon dioxide, fossil | air | high population density | kg | 1 | kg CO2-Eq | 2.42E+00 | kg/kg | 2.42E+00 | Ecoinvent V2, zinc oxide, at plant |
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eq | 2.45E-01 | kg/kg | 2.45E-01 | Ecoinvent V2, zinc oxide, at plant |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 3.28E-07 | kg/kg | 3.28E-07 | Ecoinvent V2, zinc oxide, at plant |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 5.12E-02 | kg/kg | 5.12E-02 | Ecoinvent V2, zinc oxide, at plant |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 2.43E-04 | kg/kg | 3.82E-04 | Ecoinvent V2, zinc oxide, at plant |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 2.40E-04 | kg/kg | 3.76E-04 | Ecoinvent V2, zinc oxide, at plant |
| Carbon monoxide, fossil Carbon monoxide, fossil | air air | lower stratosphere + upper troposphere | kg | 1.5714 1.5714 | kg CO2-Eq kg CO2-Eq | 3.85E-10 4.82E-04 | kg/kg kg/kg | 6.05E-10 7.57E-04 | Ecoinvent V2, zinc oxide, at plant |
| Chloroform | air | unspecified high population density | kg kg | 30 | kg CO2-Eq | 5.81E-10 | kg/kg | 1.74E-08 | Ecoinvent V2, zinc oxide, at plant Ecoinvent V2, zinc oxide, at plant |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 3.65E-12 | kg/kg | 1.09E-10 | Econvent V2, zinc oxide, at plant |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 2.91E-18 | kg/kg | 8.72E-17 | Ecoinvent V2, zinc oxide, at plant |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 9.81E-06 | kg/kg | 2.92E-03 | Ecoinvent V2, zinc oxide, at plant |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 3.61E-06 | kg/kg | 1.07E-03 | Ecoinvent V2, zinc oxide, at plant |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 3.12E-12 | kg/kg | 9.30E-10 | Ecoinvent V2, zinc oxide, at plant |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 3.76E-06 | kg/kg | 1.12E-03 | Ecoinvent V2, zinc oxide, at plant |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 6.65E-11 | kg/kg | 9.51E-08 | Ecoinvent V2, zinc oxide, at plant |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 1.54E-10 | kg/kg | 2.20E-07 | Ecoinvent V2, zinc oxide, at plant |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 4.74E-08 | kg/kg | 6.78E-05 | Ecoinvent V2, zinc oxide, at plant |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 2.86E-11 | kg/kg | 1.75E-07 | Ecoinvent V2, zinc oxide, at plant |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | 1.055.10 | kg/kg | 0.00E+00 | Ecoinvent V2, zinc oxide, at plant |
| Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 124 | kg CO2-Eq | 1.95E-10 | kg/kg | 2.42E-08 0.00E+00 | Ecoinvent V2, zinc oxide, at plant |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air air | low population density low population density | kg kg | 10000 | kg CO2-Eq kg CO2-Eq | 2.65E-09 | kg/kg kg/kg | 2.65E-05 | Ecoinvent V2, zinc oxide, at plant Ecoinvent V2, zinc oxide, at plant |
| Ethane, 2-chloro-1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | 2.0312-03 | kg/kg | 0.00E+00 | Ecoinvent V2, zinc oxide, at plant |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 1.98E-09 | kg/kg | 2.41E-05 | Ecoinvent V2, zinc oxide, at plant |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 1.61E-08 | kg/kg | 1.97E-04 | Ecoinvent V2, zinc oxide, at plant |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 1.04E-07 | kg/kg | 2.60E-06 | Ecoinvent V2, zinc oxide, at plant |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 4.26E-06 | kg/kg | 1.07E-04 | Ecoinvent V2, zinc oxide, at plant |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 2.95E-06 | kg/kg | 7.38E-05 | Ecoinvent V2, zinc oxide, at plant |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 7.88E-18 | kg/kg | 3.94E-17 | Ecoinvent V2, zinc oxide, at plant |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 6.13E-08 | kg/kg | 1.16E-04 | Ecoinvent V2, zinc oxide, at plant |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 1.14E-15 | kg/kg | 8.14E-12 | Ecoinvent V2, zinc oxide, at plant |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 9.16E-10 | kg/kg | 6.54E-06 | Ecoinvent V2, zinc oxide, at plant |
| Methane, chlorodifluoro-, HCFC-22 Methane, chlorodifluoro-, HCFC-22 | air air | high population density | kg kg | 1810 1810 | kg CO2-Eq kg CO2-Eq | 9.91E-10 2.12E-07 | kg/kg | 1.79E-06 3.84E-04 | Ecoinvent V2, zinc oxide, at plant |
| Methane, chlorotrifluoro-, CFC-13 | air air | low population density unspecified | кg kg | 14400 | kg CO2-Eq kg CO2-Eq | 4.14E-U/ | kg/kg kg/kg | 3.84E-04 0.00E+00 | Ecoinvent V2, zinc oxide, at plant Ecoinvent V2, zinc oxide, at plant |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 2.36E-11 | kg/kg | 2.06E-10 | Ecoinvent V2, zinc oxide, at plant |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 1.08E-11 | kg/kg | 9.39E-11 | Ecoinvent V2, zinc oxide, at plant |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 7.52E-11 | kg/kg | 8.20E-07 | Ecoinvent V2, zinc oxide, at plant |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 2.09E-10 | kg/kg | 2.28E-06 | Ecoinvent V2, zinc oxide, at plant |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 5.24E-18 | kg/kg | 5.71E-14 | Ecoinvent V2, zinc oxide, at plant |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 1.89E-13 | kg/kg | 3.97E-11 | Ecoinvent V2, zinc oxide, at plant |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 1.12E-04 | kg/kg | 2.80E-03 | Ecoinvent V2, zinc oxide, at plant |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 6.48E-03 | kg/kg | 1.62E-01 | Ecoinvent V2, zinc oxide, at plant |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 5.20E-12 | kg/kg | 1.30E-10 | Ecoinvent V2, zinc oxide, at plant |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 2.50E-06 | kg/kg | 6.25E-05 | Ecoinvent V2, zinc oxide, at plant |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 4.30E-10 | kg/kg | 6.01E-07 | Ecoinvent V2, zinc oxide, at plant |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 2.34E-15 | kg/kg | 3.28E-12 | Ecoinvent V2, zinc oxide, at plant |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 1.00E-11 | kg/kg | 7.42E-08 | Ecoinvent V2, zinc oxide, at plant |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 1.45E-07 | kg/kg | 1.07E-03 | Ecoinvent V2, zinc oxide, at plant |
| Methane, trichlorofluoro-, CFC-11 Methane, trifluoro-, HFC-23 | air air | high population density | kg kg | 4750 14800 | kg CO2-Eq | 3.07E-13 6.02E-11 | kg/kg | 1.46E-09 8.91E-07 | Ecoinvent V2, zinc oxide, at plant |
| Sulfur hexafluoride | air air | high population density high population density | kg kg | 22800 | kg CO2-Eq kg CO2-Eq | 0.021-11 | kg/kg kg/kg | 8.91E-07 0.00E+00 | Ecoinvent V2, zinc oxide, at plant Ecoinvent V2, zinc oxide, at plant |
| Sulfur hexafluoride Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 4.59E-11 | kg/kg | 1.05E-06 | Econivent V2, zinc oxide, at plant |
| Sulfur hexafluoride Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 3.42E-08 | kg/kg | 7.80E-04 | Ecoinvent V2, zinc oxide, at plant |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 5.86E-13 | kg/kg | 7.62E-12 | Ecoinvent V2, zinc oxide, at plant |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 1.97E-11 | kg/kg | 2.56E-10 | Ecoinvent V2, zinc oxide, at plant |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 2.49E-05 | kg/kg | 2.49E-05 | Ecoinvent V2, zinc oxide, at plant |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, zinc oxide, at plant |

| | | | | | | | | 2.89E+00 | Ecoinvent V2, zinc oxide, at plant |
|--|---------------|---|-----------|----------------|------------------------|----------------------|----------------|----------------------|---|
| Ammonia | air | high population density | ka | 1.88 | kg SO2-Eg | 7.30E-07 | kg/kg | 1.37E-06 | Ecoinvent V2, zinc oxide, at plant |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 1.11E-06 | kg/kg | 2.09E-06 | Ecoinvent V2, zinc oxide, at plant |
| Ammonia | air | unspecified | ka | 1.88 | kg SO2-Eq | 1.10E-05 | kg/kg | 2.07E-05 | Ecolinvent V2, zinc oxide, at plant |
| Hydrogen chloride | air | high population density | kg kg | 0.88 | kg SO2-Eq | 1.56E-06 | kg/kg | 1.38E-06 | Ecoinvent V2, zinc oxide, at plant |
| Hydrogen chloride | air | low population density | kg kg | 0.88 | kg SO2-Eq | 1.50E-05 | kg/kg | 1.32E-05 | Ecoinvent V2, zinc oxide, at plant |
| Hydrogen chloride | air | unspecified | kg kg | 0.88 | kg SO2-Eq | 2.57E-06 | kg/kg | 2.26E-06 | Econvent V2, zinc oxide, at plant |
| Hydrogen fluoride | air | high population density | kg kg | 1.6 | kg SO2-Eq | 7.13E-08 | kg/kg | 1.14E-07 | Ecoinvent V2, zinc oxide, at plant |
| Hydrogen fluoride | air | low population density | kg kg | 1.6 | kg SO2-Eq | 3.29E-06 | kg/kg | 5.27E-06 | Econvent V2, zinc oxide, at plant |
| Hydrogen fluoride | dii | unspecified | kg ka | 1.6 | kg SO2-Eq | 6.30E-07 | kg/kg | 1.01E-06 | Econivent V2, zinc oxide, at plant |
| Hydrogen sulfide | dii | high population density | kg ka | 1.88 | kg SO2-Eq | 4.23E-10 | kg/kg | 7.96E-10 | Econivent V2, Zinc oxide, at plant |
| Hydrogen sulfide | dii | low population density | kg ka | 1.88 | kg SO2-Eq | 2.93E-05 | kg/kg | 5.52E-05 | Econivent V2, zinc oxide, at plant |
| Hydrogen sulfide | dii | unspecified | kg ka | 1.88 | kg SO2-Eq | 1.35E-07 | kg/kg | 2.53E-07 | Ecoinvent V2, zinc oxide, at plant |
| Nitrogen oxides | dii | high population density | kg L. | 0.7 | kg SO2-Eq | 1.38E-03 | kg/kg | 9.68E-04 | Ecoinvent V2, zinc oxide, at plant |
| U | air | | kg | 0.7 | kg SO2-Eq | 5.62E-04 | | 3.94E-04 | Econvent V2, zinc oxide, at plant |
| Nitrogen oxides Nitrogen oxides | dii | low population density unspecified | kg | 0.7 | kg SO2-Eq | 4.37E-04 | kg/kg kg/kg | 3.06E-04 | Econwent V2, zinc oxide, at plant |
| Sulfur dioxide | air | high population density | kg les | 0.7 | kg SO2-Eq | 4.37E-04 1.83E-04 | kg/kg | 1.83E-04 | Econwent V2, zinc oxide, at plant |
| Sulfur dioxide | air | low population density | kg ka | 1 | kg SO2-Eq | 1.64E-03 | kg/kg | 1.64E-03 | Econivent V2, zinc oxide, at plant |
| Sulfur dioxide Sulfur dioxide | air | • | kg L. | 1 | kg SO2-Eq | 3.00E-05 | | 3.00E-05 | Ecoinvent V2, zinc oxide, at plant |
| Hydrogen sulfide | | unspecified | kg | 1.88 | kg SO2-Eq | 1.21E-08 | kg/kg kg/kg | 2.28E-08 | Econivent V2, zinc oxide, at plant |
| Sulfuric acid | water soil | river agricultural | kg | 0.65 | kg SO2-Eq | 7.82E-13 | | 5.08E-13 | |
| Phosphoric acid | air | agricultural high population density | kg | 0.65 | kg SO2-Eq | 1.02E-13 | kg/kg | 0.00E+00 | Ecoinvent V2, zinc oxide, at plant |
| Sulfuric acid | air | low population density | kg | 0.96 | | 1.94E-13 | kg/kg kg/kg | 1.26E-13 | Ecoinvent V2, zinc oxide, at plant Ecoinvent V2, zinc oxide, at plant |
| Sulluric acid | air | low population density | кд | 0.05 | kg SO2-Eq | 1.94E-15 | kg/kg | 3.63E-03 | Econivent V2, zinc oxide, at plant |
| Phosphorus | | high population density | 1 | 2.00 | kg PO4-Eg | 0.07E.00 | 1 | 6.95E-08 | |
| Phosphorus Phosphorus | air | | Kg | 3.06 3.06 | | 2.27E-08 7.44E-10 | kg/kg | 6.95E-08 2.28E-09 | Ecoinvent V2, zinc oxide, at plant |
| | air air | low population density low population density, long-term | Kg | | kg PO4-Eq | 7.44E-10 5.07E-09 | kg/kg | 2.28E-09 1.55E-08 | Ecoinvent V2, zinc oxide, at plant |
| Phosphorus Phosphorus | air | unspecified | kg | 3.06 3.06 | kg PO4-Eq kg PO4-Eg | 4.64E-11 | kg/kg | 1.42E-10 | Ecoinvent V2, zinc oxide, at plant Ecoinvent V2, zinc oxide, at plant |
| | | | kg | | | | kg/kg | 2.56E-07 | |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 8.37E-08 | kg/kg | | Ecoinvent V2, zinc oxide, at plant |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 3.06E-07 | kg/kg | 9.36E-07 | Ecoinvent V2, zinc oxide, at plant |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 0.022 | kg PO4-Eq | 2.40E-04 | kg/kg | 5.29E-06 4.84E-08 | Ecoinvent V2, zinc oxide, at plant |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 2.20E-06 | kg/kg | 4.84E-08 5.54E-06 | Ecoinvent V2, zinc oxide, at plant |
| COD, Chemical Oxygen Demand | water | river | кg | | kg PO4-Eq | 2.52E-04 | kg/kg | | Ecoinvent V2, zinc oxide, at plant |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 2.22E-06 | kg/kg | 4.89E-08 | Ecoinvent V2, zinc oxide, at plant |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 5.97E-07 | kg/kg | 5.97E-07 | Ecoinvent V2, zinc oxide, at plant |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eq | 3.92E-08 | kg/kg | 1.20E-07 | Ecoinvent V2, zinc oxide, at plant |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 6.11E-10 | kg/kg | 1.87E-09 | Ecoinvent V2, zinc oxide, at plant |
| Phosphoric acid | air | high population density | kg | 0.97 | kg PO4-Eq | | kg/kg | 0.00E+00 | Ecoinvent V2, zinc oxide, at plant |
| | | | | | | | | 1.29E-05 | Ecoinvent V2, zinc oxide, at plant |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 9.02E-02 | kg/kg | 8.93E-01 | Ecoinvent V2, zinc oxide, at plant |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 6.13E-02 | kg/kg | 1.17E+00 | Ecoinvent V2, zinc oxide, at plant |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 5.97E-04 | kg/kg | 2.38E-02 | Ecoinvent V2, zinc oxide, at plant |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 1.19E+00 | kg/kg | 4.56E+01 | Ecoinvent V2, zinc oxide, at plant |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 2.44E-02 | kg/kg | 1.12E+00 | Ecoinvent V2, zinc oxide, at plant |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 1.35E-05 | kg/kg | 1.34E-04 | Ecoinvent V2, zinc oxide, at plant |
| | | | | | | | | 4.89E+01 | |

| FL29 | Transport mineral | See Transport lorry>16t | | | | |
|-------------|---|---|---------------|--|--|--|
| back to top | | | | | | |
| FL18 | Produce trace Included in r | minerals above (FL29) (minerals comprising of less than 1% of | the total | | | |
| | mineral | minerals required have not been included in the analysis) | | | | |
| back to top | | | | | | |
| FL30 | Transport trace mineral | Not applicable - see FL 18 | | | | |
| back to top | | | | | | |
| FL19 | Produce Cobalt (Ionized) | | | | | |
| back to top | | pplements tab). Cobalt lodized Salt Block - considered within th | | | | |
| FL31 | Transport cobalt Not consider (iodized) | red. Very low quantities (see Diet Supplements tab). Included in chloride salt | n sodium | | | |
| back to top | | | | | | |
| FL20 | Produce millrun carrier | Not considered | | | | |
| back to top | | | | | | |
| FL32 | Transport millrun carrier | See Transport lorry 3.5-16t | | | | |
| back to top | | | | | | |
| FL21 | Produce Vitamin | | | | | |
| back to top | | | | | | |
| FL33 | Transport vitamin | See Transport lorry 3.5-16t | See Transport | | | |
| back to top | | | | | | |

FL22 Produce Growth Promotant

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Transport growth promotant FL34 See Transport lorry 3.5-16t

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Produce Vaccination/Antibioti FL23

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Transport vaccination/ FL35 See Transport lorry 3.5-16t

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FL36 Supply water to livestock

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TRANSPORT - ALL

| | Transport, lorry 3.5- | | | | | | | | |
|---|------------------------|--|----------|--------------|------------------------|----------------------|------------------|----------------------|---|
| back to top | 161 | | | | | | | | |
| | Transport, lorry > 16t | transport, lorry >16t, fleet average, RER | | | | | | | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| back to top | | bish socilation density. | l | 4 | h- 000 F- | 1.23E-02 | 1 /41 | 4.005.00 | Facility at 1/0 and transact lawy 40th flast suggest DED |
| Carbon dioxide, fossil Carbon dioxide, fossil | air air | high population density low population density | кд kg | 1 | kg CO2-Eq kg CO2-Eq | 1.23E-02 1.24E-02 | kg/tkm kg/tkm | 1.23E-02 1.24E-02 | Ecoinvent V2, road transport, lorry >16t, fleet average RER Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eq | 2.36E-08 | kg/tkm | 2.36E-08 | Ecoinvent V2, road transport, forty >16t, fleet average RER |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eq | 9.46E-02 | kg/tkm | 9.46E-02 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eq | 8.54E-06 | kg/tkm | 1.34E-05 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 1.77E-05 | kg/tkm | 2.78E-05 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 2.78E-11 | kg/tkm | 4.37E-11 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 3.15E-04 | kg/tkm | 4.94E-04 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 4.24E-11 | kg/tkm | 1.27E-09 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 2.73E-13 | kg/tkm | 8.19E-12 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 4.64E-19 | kg/tkm | 1.39E-17 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 2.66E-07 | kg/tkm | 7.92E-05 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 2.30E-07 | kg/tkm | 6.84E-05 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 2.25E-13 | kg/tkm | 6.71E-11 | Econvent V2, road transport, lorry >16t, fleet average RER |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 3.46E-06 | kg/tkm | 1.03E-03 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 4.73E-12 | kg/tkm | 6.76E-09 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 1430 | kg CO2-Eq | 9.01E-12 2.46E-07 | kg/tkm | 1.29E-08 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air air | unspecified | kg kg | 6130 | kg CO2-Eq kg CO2-Eq | 2.46E-07 2.05E-12 | kg/tkm kg/tkm | 3.51E-04 1.26E-08 | Ecoinvent V2, road transport, lorry >16t, fleet average RER Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density unspecified | kg kg | 6130 | kg CO2-Eq | 2.03E-12 | kg/tkm | 0.00E+00 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg kg | 124 | kg CO2-Eq | 7.11E-12 | kg/tkm | 8.81E-10 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | ka | 124 | kg CO2-Eq | 7.116-12 | kg/tkm | 0.00E+00 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | | low population density | kg | 10000 | kg CO2-Eq | 1.70E-10 | kg/tkm | 1.70E-06 | Ecoinvent V2, road transport, forry >16t, fleet average RER |
| Ethane, 2-chloro-1.1.1.2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | 1.702 10 | kg/tkm | 0.00E+00 | Ecoinvent V2, road transport, lory >16t, fleet average RER |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 1.41E-10 | kg/tkm | 1.72E-06 | Ecoinvent V2, road transport, lory >16t, fleet average RER |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 2.23E-09 | kg/tkm | 2.73E-05 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eg | 4.96E-08 | kg/tkm | 1.24E-06 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eg | 1.39E-07 | kg/tkm | 3.49E-06 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 8.64E-08 | kg/tkm | 2.16E-06 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 1.26E-18 | kg/tkm | 6.28E-18 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 7.00E-11 | kg/tkm | 1.32E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 3.80E-15 | kg/tkm | 2.71E-11 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.64E-09 | kg/tkm | 1.17E-05 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 7.11E-11 | kg/tkm | 1.29E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 2.85E-10 | kg/tkm | 5.15E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 1.49E-12 | kg/tkm | 1.30E-11 | Econvent V2, road transport, lorry >16t, fleet average RER |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 8.08E-13 | kg/tkm | 7.03E-12 | Econvent V2, road transport, lorry >16t, fleet average RER |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 5.27E-12 | kg/tkm | 5.75E-08 | Econvent V2, road transport, lorry >16t, fleet average RER |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 2.86E-13 | kg/tkm | 3.11E-09 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, dichlorodifluoro-, CFC-12 | air air | unspecified | kg | 10900 210 | kg CO2-Eq kg CO2-Eq | 8.35E-19 1.34E-14 | kg/tkm | 9.11E-15 2.82E-12 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, dichlorofluoro-, HCFC-21 Methane, fossil | air | high population density | kg ka | 25 | kg CO2-Eq | 9.55E-06 | kg/tkm kg/tkm | 2.39E-04 | Ecoinvent V2, road transport, lorry >16t, fleet average RER Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, fossil | air | high population density low population density | kg kg | 25 | kg CO2-Eq | 1.57E-04 | kg/tkm | 3.94E-03 | Ecoinvent V2, road transport, forry >16t, fleet average RER |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 3.75E-13 | kg/tkm | 9.38E-12 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 8.41E-06 | kg/tkm | 2.10E-04 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 8.08E-11 | kg/tkm | 1.13E-07 | Ecoinvent V2, road transport, forry >16t, fleet average RER |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 3.74E-16 | kg/tkm | 5.23E-13 | Ecoinvent V2, road transport, lory >16t, fleet average RER |
| Methane, tetrafluoro-, R-14 | air | high population density | ka | 7390 | kg CO2-Eq | 3.66E-13 | kg/tkm | 2.70E-09 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 2.01E-08 | kg/tkm | 1.49E-04 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 2.18E-14 | kg/tkm | 1.04E-10 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 4.28E-12 | kg/tkm | 6.33E-08 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 2.54E-12 | kg/tkm | 5.80E-08 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 1.17E-09 | kg/tkm | 2.66E-05 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 3.70E-14 | kg/tkm | 4.81E-13 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 1.47E-12 | kg/tkm | 1.92E-11 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.39E-06 | kg/tkm | 1.39E-06 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| | | | | | | | | 1.26E-01 | |

Ecoinvent V2, transport, lorry >32t, EURO4, RER

APPENDIX C EMISSION FACTOR DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 9.32E-08 | kg/tkm | 1.75E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
|--|----------|-----------------------------------|---------|-------------|----------------|----------------------|------------------|----------------------|--|
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 1.85E-07 | kg/tkm | 3.48E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.53E-06 | kg/tkm | 2.88E-06 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 1.62E-07 | kg/tkm | 1.43E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 4.03E-07 | kg/tkm | 3.54E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 3.74E-07 | kg/tkm | 3.29E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 9.94E-09 | kg/tkm | 1.59E-08 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 9.17E-08 | kg/tkm | 1.47E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 8.92E-08 | kg/tkm | 1.43E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Hydrogen sulfide | air | high population density | kg | 1.88 | kg SO2-Eg | 5.19E-10 | kg/tkm | 9.76E-10 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Hydrogen sulfide | air | low population density | ka | 1.88 | kg SO2-Eg | 9.93E-08 | kg/tkm | 1.87E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Hydrogen sulfide | air | unspecified | ka | 1.88 | kg SO2-Eg | 3.79E-08 | kg/tkm | 7.13E-08 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eg | 1.51E-05 | kg/tkm | 1.06E-05 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Nitrogen oxides | air | low population density | ka | 0.7 | kg SO2-Eg | 6.26E-05 | kg/tkm | 4.38E-05 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Nitrogen oxides | air | unspecified | ka | 0.7 | kg SO2-Eq | 9.64E-04 | kg/tkm | 6.74E-04 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eq | 3.30E-05 | kg/tkm | 3.30E-05 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Sulfur dioxide | all | low population density | kg | 1 | kg SO2-Eq | 8.97E-05 | kg/tkm | 8.97E-05 | Econivent V2, road transport, lorry >10t, neet average RER Econivent V2, road transport, lorry >10t, fleet average RER |
| Sulfur dioxide | air | unspecified | kg | <u>'</u> | kg SO2-Eq | 1.10E-05 | kg/tkm | 1.10E-05 | Ecoinvent V2, road transport, lorry >10t, neet average RER Ecoinvent V2, road transport, lorry >10t, fleet average RER |
| Hydrogen sulfide | water | | kg L | 1.88 | | 3.96E-09 | kg/tkm | 7.45E-09 | Ecoinvent V2, road transport, lorry >16t, fleet average RER Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| | | river | kg | | kg SO2-Eq | | | | |
| Sulfuric acid | soil | agricultural | kg | 0.65 | kg SO2-Eq | 5.59E-14 | kg/tkm | 3.64E-14 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Sulfuric acid | aır | low population density | kg | 0.65 | kg SO2-Eq | 7.07E-15 | kg/tkm | 4.59E-15 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| B | | | | 0.00 | 1 0045 | 7.055.40 | 1 40 | 8.67E-04 2.22E-09 | 5 1 1/9 1/1 1/1 1/1 255 |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eq | 7.25E-10 | kg/tkm | | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Phosphorus | air | low population density | kg | 3.06 | kg PO4-Eq | 1.78E-10 | kg/tkm | 5.45E-10 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 2.92E-10 | kg/tkm | 8.95E-10 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Phosphorus | air | unspecified | kg | 3.06 | kg PO4-Eq | 6.36E-12 | kg/tkm | 1.94E-11 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Phosphorus | soil | agricultural | kg | 3.06 | kg PO4-Eq | 2.18E-09 | kg/tkm | 6.67E-09 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 3.95E-08 | kg/tkm | 1.21E-07 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| BOD5, Biological Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 2.58E-04 | kg/tkm | 5.67E-06 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| BOD5, Biological Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 7.27E-07 | kg/tkm | 1.60E-08 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 2.61E-04 | kg/tkm | 5.75E-06 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eq | 7.33E-07 | kg/tkm | 1.61E-08 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 6.33E-08 | kg/tkm | 6.33E-08 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Phosphorus | water | river | kg | 3.06 | kg PO4-Eg | 1.52E-08 | kg/tkm | 4.64E-08 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Phosphorus | water | unspecified | ka | 3.06 | kg PO4-Eg | 2.09E-10 | kg/tkm | 6.40E-10 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Phosphoric acid | air | high population density | ka | 0.97 | kg PO4-Eg | | kg/tkm | 0.00E+00 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| | | | 9 | | .5 1 | | | 1.17E-05 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 2.40E-03 | kg/tkm | 2.38E-02 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Coal, hard, unspecified, in ground | resource | in ground | ka | 19.1 | MJ-Ea | 5.04E-03 | kg/tkm | 9.63E-02 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Ea | 4.92E-05 | Nm3/tkm | 1.96E-03 | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 4.20E-03 | Nm3/tkm | 1.61E-01 | Econivent V2, road transport, lorry >10t, fleet average RER Econivent V2, road transport, lorry >10t, fleet average RER |
| Oil, crude, in ground | | | ka | 45.8 | MJ-Eq | 3.75E-02 | kg/tkm | 1.72E+00 | Econivent v2, road transport, lony > 10t, neet average RER Econivent V2, road transport, lony > 10t, neet average RER |
| | resource | in ground biotic | kg | 45.8 9.9 | MJ-Eq MJ-Ea | 3.75E-02 1.19E-06 | kg/tkm ka/tkm | 1.72E+00 1.18E-05 | |
| Peat, in ground | resource | DIOTIC | кд | 9.9 | IVIJ-Eq | 1.19E-06 | kg/tkm | | Ecoinvent V2, road transport, lorry >16t, fleet average RER |
| | | | | | | | | 2.00E+00 | |

Transport, lorry > 32t, EURO4

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| Carbon dioxide, fossil | air | high population density | ka | 1 | kg CO2-Eq | 1.02E-02 | kg/tkm | 1.02E-02 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
|--|-----|--|----|--------|-----------|----------|--------|----------|---|
| Carbon dioxide, fossil | air | low population density | kg | 1 | kg CO2-Eg | 1.04E-02 | kg/tkm | 1.04E-02 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Carbon dioxide, fossil | air | lower stratosphere + upper troposphere | kg | 1 | kg CO2-Eg | 1.93E-08 | kg/tkm | 1.93E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Carbon dioxide, fossil | air | unspecified | kg | 1 | kg CO2-Eg | 7.70E-02 | kg/tkm | 7.70E-02 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Carbon monoxide, fossil | air | high population density | kg | 1.5714 | kg CO2-Eg | 7.00E-06 | kg/tkm | 1.10E-05 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Carbon monoxide, fossil | air | low population density | kg | 1.5714 | kg CO2-Eq | 1.48E-05 | kg/tkm | 2.33E-05 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Carbon monoxide, fossil | air | lower stratosphere + upper troposphere | kg | 1.5714 | kg CO2-Eq | 2.26E-11 | kg/tkm | 3.56E-11 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Carbon monoxide, fossil | air | unspecified | kg | 1.5714 | kg CO2-Eq | 1.31E-04 | kg/tkm | 2.05E-04 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Chloroform | air | high population density | kg | 30 | kg CO2-Eq | 3.45E-11 | kg/tkm | 1.04E-09 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Chloroform | air | low population density | kg | 30 | kg CO2-Eq | 2.22E-13 | kg/tkm | 6.65E-12 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Chloroform | air | unspecified | kg | 30 | kg CO2-Eq | 3.82E-19 | kg/tkm | 1.15E-17 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Dinitrogen monoxide | air | high population density | kg | 298 | kg CO2-Eq | 2.19E-07 | kg/tkm | 6.52E-05 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Dinitrogen monoxide | air | low population density | kg | 298 | kg CO2-Eq | 1.89E-07 | kg/tkm | 5.62E-05 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Dinitrogen monoxide | air | lower stratosphere + upper troposphere | kg | 298 | kg CO2-Eq | 1.84E-13 | kg/tkm | 5.47E-11 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Dinitrogen monoxide | air | unspecified | kg | 298 | kg CO2-Eq | 2.84E-06 | kg/tkm | 8.47E-04 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | high population density | kg | 1430 | kg CO2-Eq | 3.85E-12 | kg/tkm | 5.51E-09 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | low population density | kg | 1430 | kg CO2-Eq | 7.29E-12 | kg/tkm | 1.04E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | air | unspecified | kg | 1430 | kg CO2-Eq | 2.00E-07 | kg/tkm | 2.87E-04 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | high population density | kg | 6130 | kg CO2-Eq | 1.67E-12 | kg/tkm | 1.02E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ethane, 1,1,2-trichloro-1,2,2-trifluoro-, CFC-113 | air | unspecified | kg | 6130 | kg CO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | high population density | kg | 124 | kg CO2-Eq | 5.82E-12 | kg/tkm | 7.21E-10 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ethane, 1,1-difluoro-, HFC-152a | air | low population density | kg | 124 | kg CO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ethane, 1,2-dichloro-1,1,2,2-tetrafluoro-, CFC-114 | air | low population density | kg | 10000 | kg CO2-Eq | 1.37E-10 | kg/tkm | 1.37E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ethane, 2-chloro-1,1,1,2-tetrafluoro-, HCFC-124 | air | unspecified | kg | 609 | kg CO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ethane, hexafluoro-, HFC-116 | air | high population density | kg | 12200 | kg CO2-Eq | 1.15E-10 | kg/tkm | 1.40E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ethane, hexafluoro-, HFC-116 | air | unspecified | kg | 12200 | kg CO2-Eq | 1.83E-09 | kg/tkm | 2.23E-05 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, biogenic | air | high population density | kg | 25 | kg CO2-Eq | 4.05E-08 | kg/tkm | 1.01E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, biogenic | air | low population density | kg | 25 | kg CO2-Eq | 1.14E-07 | kg/tkm | 2.86E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, biogenic | air | unspecified | kg | 25 | kg CO2-Eq | 7.12E-08 | kg/tkm | 1.78E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, bromo-, Halon 1001 | air | unspecified | kg | 5 | kg CO2-Eq | 1.04E-18 | kg/tkm | 5.18E-18 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, bromochlorodifluoro-, Halon 1211 | air | low population density | kg | 1890 | kg CO2-Eq | 5.88E-11 | kg/tkm | 1.11E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | high population density | kg | 7140 | kg CO2-Eq | 3.10E-15 | kg/tkm | 2.21E-11 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, bromotrifluoro-, Halon 1301 | air | low population density | kg | 7140 | kg CO2-Eq | 1.36E-09 | kg/tkm | 9.74E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 5.84E-11 | kg/tkm | 1.06E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 2.38E-10 | kg/tkm | 4.31E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | kg | 14400 | kg CO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, dichloro-, HCC-30 | air | high population density | kg | 8.7 | kg CO2-Eq | 1.22E-12 | kg/tkm | 1.06E-11 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, dichloro-, HCC-30 | air | low population density | kg | 8.7 | kg CO2-Eq | 6.56E-13 | kg/tkm | 5.71E-12 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 4.30E-12 | kg/tkm | 4.69E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | kg | 10900 | kg CO2-Eq | 2.39E-13 | kg/tkm | 2.60E-09 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | kg | 10900 | kg CO2-Eq | 6.88E-19 | kg/tkm | 7.50E-15 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, dichlorofluoro-, HCFC-21 | air | high population density | kg | 210 | kg CO2-Eq | 1.10E-14 | kg/tkm | 2.30E-12 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 7.83E-06 | kg/tkm | 1.96E-04 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, fossil | air | low population density | kg | 25 | kg CO2-Eq | 1.33E-04 | kg/tkm | 3.32E-03 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, fossil | air | lower stratosphere + upper troposphere | kg | 25 | kg CO2-Eq | 3.06E-13 | kg/tkm | 7.65E-12 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |

| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 7.12E-07 | kg/tkm | 1.78E-05 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
|--|---|--|--|---|---|--|---|--|--|
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 6.68E-11 | kg/tkm | 9.35E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, tetrachloro-, R-10 | air | unspecified | kg | 1400 | kg CO2-Eq | 3.08E-16 | kg/tkm | 4.31E-13 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, tetrafluoro-, R-14 | air | high population density | kg | 7390 | kg CO2-Eq | 2.99E-13 | kg/tkm | 2.21E-09 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 1.65E-08 | kg/tkm | 1.22E-04 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | kg | 4750 | kg CO2-Eq | 1.78E-14 | kg/tkm | 8.45E-11 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, trifluoro-, HFC-23 | air | high population density | kg | 14800 | kg CO2-Eq | 3.49E-12 | kg/tkm | 5.16E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Sulfur hexafluoride | air | low population density | kg | 22800 | kg CO2-Eq | 2.08E-12 | kg/tkm | 4.73E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Sulfur hexafluoride | air | unspecified | kg | 22800 | kg CO2-Eq | 9.55E-10 | kg/tkm | 2.18E-05 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 3.03E-14 | kg/tkm | 3.94E-13 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eq | 1.20E-12 | kg/tkm | 1.56E-11 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Carbon dioxide, land transformation | air | low population density | kg | 1 | kg CO2-Eq | 1.15E-06 | kg/tkm | 1.15E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| - | | | · | | | | • | 1.03E-01 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eq | 7.66E-08 | kg/tkm | 1.44E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ammonia | air | low population density | kg | 1.88 | kg SO2-Eq | 1.55E-07 | kg/tkm | 2.91E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.32E-06 | kg/tkm | 2.48E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Hydrogen chloride | air | high population density | kg | 0.88 | kg SO2-Eq | 1.37E-07 | kg/tkm | 1.20E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Hydrogen chloride | air | low population density | kg | 0.88 | kg SO2-Eq | 3.34E-07 | kg/tkm | 2.94E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 3.35E-07 | kg/tkm | 2.95E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Hydrogen fluoride | air | high population density | kg | 1.6 | kg SO2-Eq | 8.25E-09 | kg/tkm | 1.32E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Hydrogen fluoride | air | low population density | kg | 1.6 | kg SO2-Eq | 7.59E-08 | kg/tkm | 1.21E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Hydrogen fluoride | air | unspecified | ka | 1.6 | kg SO2-Eq | 7.52E-08 | kg/tkm | 1.20E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Hydrogen sulfide | air | high population density | ka | 1.88 | kg SO2-Eq | 4.25E-10 | kg/tkm | 7.98E-10 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Hydrogen sulfide | air | low population density | kg | 1.88 | kg SO2-Eq | 8.54E-08 | kg/tkm | 1.61E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Hydrogen sulfide | air | unspecified | ka | 1.88 | kg SO2-Eq | 3.29E-08 | kg/tkm | 6.19E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eq | 1.25E-05 | kg/tkm | 8.72E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Nitrogen oxides | air | low population density | ka | 0.7 | kg SO2-Eq | 5.21E-05 | kg/tkm | 3.65E-05 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Nitrogen oxides | air | unspecified | ka | 0.7 | kg SO2-Eq | 4.71E-04 | kg/tkm | 3.29E-04 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Sulfur dioxide | air | high population density | ka | 1 | kg SO2-Eq | 2.70E-05 | kg/tkm | 2.70E-05 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Sulfur dioxide | air | low population density | ka | 1 | kg SO2-Eq | 7.37E-05 | kg/tkm | 7.37E-05 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Sulfur dioxide | air | unspecified | ka | 1 | kg SO2-Eq | 9.50E-06 | kg/tkm | 9.50E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Hydrogen sulfide | water | river | ka | 1.88 | kg SO2-Eq | 3.44E-09 | kg/tkm | 6.47E-09 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Sulfuric acid | soil | agricultural | ka | 0.65 | kg SO2-Eq | 4.56E-14 | kg/tkm | 2.96E-14 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphoric acid | air | high population density | kg | 0.98 | kg SO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Sulfuric acid | air | low population density | ka | 0.65 | kg SO2-Eq | 5.78E-15 | kg/tkm | 3.76E-15 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| | uii | .c.a population density | ng ng | 0.00 | g OOZ .Lq | 3.10L 13 | ng/mill | 4.89E-04 | Common v2, numbers, forty v25, ECRO-5, NERV |
| Phosphorus | air | high population density | kg | 3.06 | kg PO4-Eg | 6.06E-10 | kg/tkm | 1.85E-09 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphorus | air | low population density | ka | 3.06 | kg PO4-Eq | 1.54E-10 | kg/tkm | 4.70E-10 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphorus | air | low population density, long-term | ka | 3.06 | kg PO4-Eq | 2.37E-10 | kg/tkm | 7.24E-10 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphorus | air | unspecified | ka ka | 3.06 | kg PO4-Eq | 5.20E-12 | kg/tkm | 1.59E-11 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphorus | soil | agricultural | ka | 3.06 | kg PO4-Eq | 1.80E-09 | kg/tkm | 5.50E-09 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphorus | soil | industrial | ka | 3.06 | kg PO4-Eq | 3.23E-08 | kg/tkm | 9.89E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| BOD5, Biological Oxygen Demand | water | river | ka | 0.022 | kg PO4-Eq | 2.09E-04 | kg/tkm | 4.61E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| BOD5, Biological Oxygen Demand | water | unspecified | ka | 0.022 | kg PO4-Eq | 6.31E-07 | kg/tkm | 1.39E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 2.12E-04 | kg/tkm | 4.67E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| COD, Chemical Oxygen Demand | water | unspecified | ka | 0.022 | kg PO4-Eq | 6.36E-07 | kg/tkm | 1.40E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| | | | ng - | 0.022 | | | | | |
| | water | river | ka | 1 | ka PO4-Fa | 5 17F-08 | ka/tkm | 5 17F-08 | Econyent V2 transport lorny >32t ELIRO4 REP |
| Phosphate | water | river | kg | 1 | kg PO4-Eq | 5.17E-08 | kg/tkm | 5.17E-08 | Ecoinvent V2, transport, lorry > 32t, EUROA, RER |
| Phosphate Phosphorus | water | river | kg kg | 1 3.06 3.06 | kg PO4-Eq | 1.27E-08 | kg/tkm | 3.88E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus | water water | river unspecified | kg kg kg | 3.06 | kg PO4-Eq kg PO4-Eq | | kg/tkm kg/tkm | 3.88E-08 5.35E-10 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus | water | river | kg kg kg kg | | kg PO4-Eq | 1.27E-08 | kg/tkm | 3.88E-08 5.35E-10 0.00E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid | water water air | river unspecified high population density | kg | 3.06 0.97 | kg PO4-Eq kg PO4-Eq kg PO4-Eq | 1.27E-08 1.75E-10 | kg/tkm kg/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground | water water air resource | river unspecified high population density in ground | kg kg | 3.06 0.97 9.9 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 | kg/tkm kg/tkm kg/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground | water water air resource resource | river unspecified high population density in ground in ground | kg kg kg | 3.06 0.97 9.9 19.1 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining | water water air resource resource resource | river unspecified high population density in ground in ground in ground | kg kg kg Nm3 | 3.06 0.97 9.9 19.1 39.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | water water air resource resource resource resource | river unspecified high population density in ground in ground in ground in ground in ground | kg kg kg Nm3 Nm3 | 3.06 0.97 9.9 19.1 39.8 38.293 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | water water air resource resource resource resource resource | river unspecified high population density in ground in ground in ground in ground | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground | water water air resource resource resource resource | river unspecified high population density in ground in ground in ground in ground in ground | kg kg kg Nm3 Nm3 | 3.06 0.97 9.9 19.1 39.8 38.293 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | water water air resource resource resource resource resource | river unspecified high population density in ground in ground in ground in ground | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 | Ecoinvent V2, transport, lorry >321, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | water water air resource resource resource resource resource resource resource | river unspecified high population density in ground in ground in ground in ground | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 | Ecoinvent V2, transport, lorry >321, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground | water water air resource resource resource resource resource resource resource resource resource | river unspecified high population density in ground in ground in ground in ground in ground | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 | Ecoinvent V2, transport, lorry >321, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground | water water air resource resource resource resource resource resource resource | river unspecified high population density in ground in ground in ground in ground in ground | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel | river unspecified high population density in ground in ground in ground in ground in ground biotic | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground back to top Carbon dioxide, fossil | water water air resource resource resource resource resource resource resource resource resource | river unspecified high population density in ground in ground in ground in ground in ground biotic | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 | kg/tkm kg/itkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel | river unspecified high population density in ground in ground in ground in ground in ground in ground high population density low population density | kg kg Nm3 Nm3 kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 | kg/tkm kg/itkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 | Ecoinvent V2, transport, lorry >321, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US Ecoinvent V2, transport, freight, rail, diesel, US Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground back to top Carbon dioxide, fossil | water water air resource resource resource resource resource resource resource Transport, freight, rail, diesel | river unspecified high population density in ground in ground in ground in ground in ground biotic | kg kg Nm3 Nm3 kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.88E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground back to top Carbon dioxide, fossil | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air | river unspecified high population density in ground in ground in ground in ground in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified | kg kg Nm3 Nm3 kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 | kg/tkm kg/itkm kg/itkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide, fossil Carbon monoxide, fossil | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air | river unspecified high population density in ground in ground in ground in ground in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density | kg kg Nm3 Nm3 kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 | Ecoinvent V2, transport, lorry >321, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground back to top Carbon dioxide, fossil | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air | river unspecified high population density in ground in ground in ground in ground in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified | kg kg Nm3 Nm3 kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 | kg/tkm kg/itkm kg/itkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air | river unspecified high population density in ground in ground in ground in ground in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density low population density low population density low population density lower stratosphere + upper troposphere | kg kg kg Nm3 Nm3 kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 | kg/tkm kg/itkm kg/itkm kg/itkm kg/itkm Nm3/itkm Nm3/itkm kg/itkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground in ground in ground in ground in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density | kg kg Nm3 Nm3 kg kg kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 | Ecoinvent V2, transport, lorry >321, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground in ground in ground in ground in ground in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density | kg kg Nm3 Nm3 kg kg kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.88E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 | Ecoinvent V2, transport, lorry >321, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform | water water water air resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground in ground in ground in ground in ground in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density low population density | kg kg kg Nm3 Nm3 kg kg kg kg kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1,5714 1,5714 1,5714 1,5714 30 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 | kg/tkm kg/itkm kg/itkm kg/itkm kg/itkm Nm3/itkm Nm3/itkm kg/itkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform | water water water air resource resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground in ground in ground in ground in ground in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density unspecified | kg kg Nm3 Nm3 kg kg kg kg kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1,5714 1,5714 1,5714 1,5714 30 30 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground in ground in ground in ground in ground in ground biotic high population density low population density low population density lower stratosphere + upper troposphere unspecified high population density low population density unspecified high population density low population density unspecified high population density | kg kg Nm3 Nm3 kg kg kg kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1.5714 1.5714 1.5714 1.5714 1.5714 30 30 30 30 298 | kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.88E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 | Ecoinvent V2, transport, lorry >321, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform Chirogen monoxide Dinitrogen monoxide | water water water water air resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density low population density low population density unspecified high population density low population density | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1.5714 1.5714 1.5714 3.0 3.0 3.0 2.98 2.98 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 | kg/tkm kg/itkm kg/itkm kg/itkm kg/itkm Nm3/tkm Nm3/tkm kg/itkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.59E-05 | Ecoinvent V2, transport, lorry >321, EURO4, RER Ecoinvent V2, transport, lorry >321, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground back to top Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide | water water water air resource resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density unspecified high population density low population density low population density low population density | kg kg Nm3 Nm3 kg kg kg kg kg kg kg kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1.5714 1.5714 1.5714 1.5714 1.5714 3.0 3.0 3.0 2.98 2.98 2.98 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground P | water water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density low population density lower stratosphere + upper troposphere unspecified high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density low population density unspecified high population density low population density low population density unspecified high population density low population density | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1.5714 1.5714 1.5714 1.5714 1.5714 1.5714 2.5 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 3.38E-15 1.14E-06 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.88E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 | Ecoinvent V2, transport, lorry >321, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Chloroform Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,2-tetrafluoro-, HFC-134a | water water water air resource resource resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density low population density low population density low population density unspecified high population density low population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1,5714 1,5714 1,5714 1,5714 30 30 298 298 298 298 298 1430 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 3.38E-15 1.14E-06 5.49E-14 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.59E-05 1.01E-12 3.41E-04 7.85E-11 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide fossil Chloroform Chloroform Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-, HFC-134a | water water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density low population density | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1,5714 1,571 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 3.38E-15 1.14E-06 5.49E-14 3.59E-12 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 7.85E-11 5.14E-09 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground P | water water water air resource resource resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density low population density lower stratosphere + upper troposphere unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density low population density low population density unspecified | kg kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1.5714 1.5 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 3.38E-15 1.14E-06 5.49E-14 3.59E-12 2.26E-09 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.88E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 7.85E-11 5.14E-09 3.22E-06 | Ecoinvent V2, transport, lorry >321, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Poat | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density unspecified high population density low population density unspecified high population density low population density low population density low population density unspecified high population density | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1.5714 1.5714 1.5714 1.5714 1.5714 2.5714 3.0 3.0 2.98 2.98 2.98 2.98 2.98 2.98 2.98 2.98 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 3.38E-15 1.14E-06 5.49E-14 3.59E-12 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 7.85E-11 5.14E-09 3.22E-06 1.08E-10 | Ecoinvent V2, transport, lorry >321, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US |
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| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground P | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density lower stratosphere + upper troposphere unspecified high population density low population density low population density unspecified high population density low population density unspecified high population density | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1.5714 1.5715 1.5 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 3.38E-15 1.14E-06 5.49E-14 3.59E-12 2.26E-09 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.88E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 7.85E-11 5.14E-09 3.22E-06 1.09E-10 0.00E+00 3.68E-10 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US Ecoinvent V2, transport, freight, rail, diesel, US Ecoinvent V2, transport, freight, r |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground P | water water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density unspecified high population density lower stratosphere + upper troposphere unspecified high population density low population density low population density unspecified high population density low population density | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1,5714 1,5715 1,571 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 3.38E-15 1.14E-06 5.49E-14 3.59E-12 2.26E-09 1.76E-14 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 7.85E-11 5.14E-09 3.22E-06 1.08E-10 0.00E+00 3.68E-10 0.00E+00 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US Ecoinvent V2, transport, freight, rail, di |
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| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground Peat, in ground Dil, crude, in ground Peat, in ground Peat, in ground Carbon dioxide, fossil Carbon dioxide, fossil Carbon monoxide, fossil Carbon monoxide Dinitrogen monoxide Ethane, 1,1,1,2-tetrafluoro-, HFC-134a Ethane, 1,1,1,2-tetrafluoro-1,2,2-trifluoro-, CFC-113 Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,1-difluoro-, HFC-152a Ethane, 1,2-dichloro-1,1,2-tetrafluoro-, CFC-114 Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 Ethane, hexafluoro-, HFC-116 | water water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1.5714 1.571 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 8.70E-08 1.14E-06 5.49E-14 3.59E-12 2.26E-09 1.76E-14 2.97E-12 6.71E-11 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.88E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 7.85E-11 5.14E-09 3.22E-06 1.08E-10 0.00E+00 3.68E-10 0.00E+00 1.57E-08 1.31E-05 | Ecoinvent V2, transport, forry >32t, EURO4, RER Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US Ecoinvent V2, transport, freight, rail, |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground P | water water air resource resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density unspecified high population density unspecified high population density low population density unspecified high population density | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1.5714 1.5716 1.5 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 3.38E-15 1.14E-06 5.49E-14 3.59E-12 2.26E-09 1.76E-14 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.88E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 7.85E-11 5.14E-09 3.22E-06 1.09E-10 0.00E+00 6.71E-07 0.00E+00 6.71E-07 0.00E+00 1.57E-08 1.31E-05 4.84E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US Ecoinvent V2, transport, freight, rail, d |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground P | water water water water air resource resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density low population density unspecified high population density unspecified high population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1,5714 1,571 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.50E-08 8.70E-08 3.38E-15 1.14E-06 5.49E-14 3.59E-12 2.26E-09 1.76E-14 | kg/tkm kg/tkm kg/tkm kg/itkm Nm3/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 7.85E-11 5.14E-09 3.22E-06 1.08E-10 0.00E+00 3.68E-10 0.00E+00 6.71E-07 0.00E+00 6.71E-07 0.00E+00 1.57E-08 1.31E-05 4.84E-08 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US Ecoinvent V2, transport, freight, rail |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground P | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1.5714 1.571 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 8.70E-08 1.14E-06 5.49E-14 2.26E-09 1.76E-14 2.97E-12 6.71E-11 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 7.85E-11 5.14E-09 3.22E-06 1.08E-10 0.00E+00 3.68E-10 0.00E+00 1.57E-08 1.31E-05 4.84E-08 1.42E-06 9.30E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US Ecoinvent V2, transport, freight, rail, |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground P | water water water air resource resource resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density unspecified high population density low population density low population density unspecified high population density low population density low population density low population density unspecified high population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified high population density low population density unspecified high population density unspecified | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1 1.5714 1.5716 1.5 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 7.16E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 3.38E-15 1.14E-06 5.49E-14 2.26E-09 1.76E-14 1.29E-12 2.26E-09 1.76E-14 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 7.85E-11 5.14E-09 3.22E-06 1.08E-10 0.00E+00 3.88E-10 0.00E+00 6.71E-07 0.00E+00 1.57E-08 1.31E-05 4.84E-08 1.42E-06 9.30E-07 4.76E-19 | Ecoinvent V2, transport, forry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US Ecoinvent V2, transport, freig |
| Phosphate Phosphorus Phosphorus Phosphorus Phosphoric acid Coal, brown, in ground Coal, hard, unspecified, in ground Gas, mine, off-gas, process, coal mining Gas, natural, in ground Oil, crude, in ground Peat, in ground P | water water water air resource resource resource resource resource resource Transport, freight, rail, diesel air air air air air air air air air ai | river unspecified high population density in ground biotic high population density low population density lower stratosphere + upper troposphere unspecified high population density low population density unspecified high population density unspecified high population density unspecified high population density low population density unspecified high population density unspecified | kg kg Nm3 Nm3 kg | 3.06 0.97 9.9 19.1 39.8 38.293 45.8 9.9 1 1 1 1.5714 1.571 | kg PO4-Eq kg PO4-Eq kg PO4-Eq kg PO4-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq MJ-Eq kg CO2-Eq | 1.27E-08 1.75E-10 1.99E-03 4.32E-03 4.22E-05 3.51E-03 3.10E-02 9.70E-07 5.98E-03 4.20E-03 3.55E-10 3.80E-02 1.37E-06 4.17E-13 2.35E-04 2.60E-12 7.76E-14 3.51E-20 8.53E-08 8.70E-08 8.70E-08 1.14E-06 5.49E-14 2.26E-09 1.76E-14 2.97E-12 6.71E-11 | kg/tkm kg/tkm kg/tkm kg/tkm kg/tkm Nm3/tkm Nm3/tkm kg/tkm | 3.88E-08 5.35E-10 0.00E+00 9.51E-06 1.97E-02 8.26E-02 1.68E-03 1.34E-01 1.42E+00 9.60E-06 1.66E+00 5.98E-03 4.20E-03 3.55E-10 3.80E-02 2.16E-06 1.13E-05 6.55E-13 3.69E-04 7.80E-11 2.33E-12 1.05E-18 2.54E-05 2.59E-05 1.01E-12 3.41E-04 7.85E-11 5.14E-09 3.22E-06 1.08E-10 0.00E+00 3.68E-10 0.00E+00 1.57E-08 1.31E-05 4.84E-08 1.42E-06 9.30E-07 | Ecoinvent V2, transport, lorry >32t, EURO4, RER Ecoinvent V2, transport, freight, rail, diesel, US Ecoinvent V2, transport, freight, rail, |

| Methane, bromotrifluoro-, Halon 1301 | air | low population density | ka | 7140 | kg CO2-Eq | 4.54E-10 | ka/tkm | 3.24E-06 | Ecoinvent V2, transport, freight, rail, diesel, US |
|--|-------------|--|------------|--------|------------|-----------|---------|----------|---|
| | | | kg L- | | | | ng/ uun | | |
| Methane, chlorodifluoro-, HCFC-22 | air | high population density | kg | 1810 | kg CO2-Eq | 2.35E-12 | kg/tkm | 4.25E-09 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, chlorodifluoro-, HCFC-22 | air | low population density | kg | 1810 | kg CO2-Eq | 1.34E-10 | kg/tkm | 2.42E-07 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, chlorotrifluoro-, CFC-13 | air | unspecified | ka | 14400 | kg CO2-Eq | | ka/tkm | 0.00E+00 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, dichloro-, HCC-30 | air | high population density | ka | 8.7 | kg CO2-Eq | 2.73E-13 | kg/tkm | 2.37E-12 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | | | kg L- | | | | • | | |
| Methane, dichloro-, HCC-30 | air | low population density | кд | 8.7 | kg CO2-Eq | 2.30E-13 | kg/tkm | 2.00E-12 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, dichlorodifluoro-, CFC-12 | air | high population density | kg | 10900 | kg CO2-Eq | 7.90E-14 | kg/tkm | 8.62E-10 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, dichlorodifluoro-, CFC-12 | air | low population density | ka | 10900 | kg CO2-Eq | 1.45E-13 | kg/tkm | 1.58E-09 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, dichlorodifluoro-, CFC-12 | air | unspecified | ka | 10900 | kg CO2-Eq | 6.33E-20 | kg/tkm | 6.90E-16 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | all . | | , Ng | | | | | | |
| Methane, dichlorofluoro-, HCFC-21 | aır | high population density | kg | 210 | kg CO2-Eq | 1.56E-16 | kg/tkm | 3.28E-14 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, fossil | air | high population density | kg | 25 | kg CO2-Eq | 1.17E-06 | kg/tkm | 2.92E-05 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, fossil | air | low population density | ka | 25 | kg CO2-Eq | 3.71E-05 | kg/tkm | 9.29E-04 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, fossil | air | | lea . | 25 | kg CO2-Eq | 5.63E-15 | kg/tkm | 1.41E-13 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | an | lower stratosphere + upper troposphere | kg | | | | | | |
| Methane, fossil | air | unspecified | kg | 25 | kg CO2-Eq | 1.45E-06 | kg/tkm | 3.62E-05 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, tetrachloro-, R-10 | air | high population density | kg | 1400 | kg CO2-Eq | 1.41E-11 | kg/tkm | 1.97E-08 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, tetrachloro-, R-10 | air | unspecified | ka | 1400 | kg CO2-Eq | 2.83E-17 | kg/tkm | 3.96E-14 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, tetrafluoro-, R-14 | air | | kg l | 7390 | | 1.53E-13 | kg/tkm | 1.13E-09 | |
| | an | high population density | kg | | kg CO2-Eq | | | | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, tetrafluoro-, R-14 | air | unspecified | kg | 7390 | kg CO2-Eq | 9.68E-09 | kg/tkm | 7.16E-05 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, trichlorofluoro-, CFC-11 | air | high population density | ka | 4750 | kg CO2-Eq | 2.54E-16 | kg/tkm | 1.20E-12 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, trifluoro-, HFC-23 | air | | ka | 14800 | kg CO2-Eq | 4.97E-14 | kg/tkm | 7.35E-10 | |
| | an | high population density | , vg | | | 4.97 E-14 | | | Ecoinvent V2, transport, freight, rail, diesel, US |
| Sulfur hexafluoride | air | high population density | kg | 22800 | kg CO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Sulfur hexafluoride | air | low population density | ka | 22800 | kg CO2-Eq | 3.35E-13 | kg/tkm | 7.64E-09 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Sulfur hexafluoride | air | unspecified | ka | 22800 | kg CO2-Eq | 4.84E-10 | kg/tkm | 1.10E-05 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | all . | | ny | | | | | | |
| Methane, monochloro-, R-40 | air | high population density | kg | 13 | kg CO2-Eq | 3.26E-15 | kg/tkm | 4.24E-14 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Methane, monochloro-, R-40 | air | low population density | kg | 13 | kg CO2-Eg | 4.19E-13 | kg/tkm | 5.45E-12 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Carbon dioxide, land transformation | air | low population density | ka | 1 | kg CO2-Eq | 3.42E-07 | kg/tkm | 3.42E-07 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | all . | | kg | 47000 | | 3.42E-07 | | | |
| Nitrogen fluoride | air | high population density | kg | 17200 | kg CO2-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | | | | | | | | 5.01E-02 | |
| Ammonia | air | high population density | kg | 1.88 | kg SO2-Eg | 2.82E-08 | kg/tkm | 5.29E-08 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | | | ivg In- | | | | | | |
| Ammonia | air | low population density | кд | 1.88 | kg SO2-Eq | 7.80E-08 | kg/tkm | 1.47E-07 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Ammonia | air | unspecified | kg | 1.88 | kg SO2-Eq | 6.38E-07 | kg/tkm | 1.20E-06 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Hydrogen chloride | air | high population density | ka | 0.88 | kg SO2-Eq | 1.21E-07 | kg/tkm | 1.07E-07 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | | | lea . | | | 1.79E-07 | | | |
| Hydrogen chloride | air | low population density | кд | 0.88 | kg SO2-Eq | | kg/tkm | 1.58E-07 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Hydrogen chloride | air | unspecified | kg | 0.88 | kg SO2-Eq | 1.67E-07 | kg/tkm | 1.47E-07 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Hydrogen fluoride | air | high population density | ka | 1.6 | kg SO2-Eg | 5.64E-09 | kg/tkm | 9.03E-09 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | oir. | | lea. | | | 4.06E-08 | | 6.49E-08 | |
| Hydrogen fluoride | all | low population density | kg | 1.6 | kg SO2-Eq | | kg/tkm | | Ecoinvent V2, transport, freight, rail, diesel, US |
| Hydrogen fluoride | air | unspecified | kg | 1.6 | kg SO2-Eq | 4.33E-08 | kg/tkm | 6.93E-08 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Hydrogen sulfide | air | high population density | ka | 1.88 | kg SO2-Eg | 1.41E-11 | kg/tkm | 2.65E-11 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Hydrogen sulfide | oir. | low population density | lea. | 1.88 | kg SO2-Eg | 4.81E-08 | kg/tkm | 9.04E-08 | |
| | all | | kg | | | | | | Ecoinvent V2, transport, freight, rail, diesel, US |
| Hydrogen sulfide | air | unspecified | kg | 1.88 | kg SO2-Eq | 1.85E-08 | kg/tkm | 3.47E-08 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Nitrogen oxides | air | high population density | ka | 0.7 | kg SO2-Eg | 6.49E-06 | kg/tkm | 4.54E-06 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Nitrogen oxides | oir | low population density | ka | 0.7 | kg SO2-Eg | 2.06E-05 | kg/tkm | 1.44E-05 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | can | | Ng | 0 | | | | | |
| Nitrogen oxides | air | unspecified | кд | 0.7 | kg SO2-Eq | 6.05E-04 | kg/tkm | 4.24E-04 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Sulfur dioxide | air | high population density | kg | 1 | kg SO2-Eg | 1.57E-05 | kg/tkm | 1.57E-05 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Sulfur dioxide | air | low population density | ka | 1 | kg SO2-Eq | 4.62E-05 | kg/tkm | 4.62E-05 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | a.i. | | ivg In- | | | | | | |
| Sulfur dioxide | air | unspecified | кд | 1 | kg SO2-Eq | 1.01E-05 | kg/tkm | 1.01E-05 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Hydrogen sulfide | water | river | kg | 1.88 | kg SO2-Eq | 1.93E-09 | kg/tkm | 3.63E-09 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Sulfuric acid | soil | agricultural | ka | 0.65 | kg SO2-Eq | 4.80E-16 | kg/tkm | 3.12E-16 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | air | | ivg In- | 0.98 | | 4.002 10 | | 0.00E+00 | |
| Phosphoric acid | all | high population density | kg | | kg SO2-Eq | | kg/tkm | | Ecoinvent V2, transport, freight, rail, diesel, US |
| Sulfuric acid | air | low population density | kg | 0.65 | kg SO2-Eq | 2.95E-15 | kg/tkm | 1.92E-15 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | | | | | | | | 5.17E-04 | |
| Phosphorus | air | high population density | ka | 3.06 | kg PO4-Eg | 4.95E-10 | kg/tkm | 1.51E-09 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | | | ng L- | | | | | | |
| Phosphorus | air | low population density | кд | 3.06 | kg PO4-Eq | 8.54E-11 | kg/tkm | 2.61E-10 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphorus | air | low population density, long-term | kg | 3.06 | kg PO4-Eq | 1.17E-10 | kg/tkm | 3.57E-10 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphorus | air | unspecified | ka | 3.06 | kg PO4-Eg | 3.07E-12 | kg/tkm | 9.39E-12 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | | | lig lig | 3.06 | kg PO4-Eq | 1.19E-09 | | 3.64E-09 | |
| Phosphorus | soil | agricultural | ĸy | | | | kg/tkm | | Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphorus | soil | industrial | kg | 3.06 | kg PO4-Eq | 1.93E-08 | kg/tkm | 5.89E-08 | Ecoinvent V2, transport, freight, rail, diesel, US |
| BOD5, Biological Oxygen Demand | water | river | ka | 0.022 | ka PO4-Ea | 1.50E-04 | kg/tkm | 3.30E-06 | Ecoinvent V2, transport, freight, rail, diesel, US |
| BOD5, Biological Oxygen Demand | water | unspecified | ka | 0.022 | kg PO4-Eq | 3.53E-07 | kg/tkm | 7.78E-09 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | | | ny . | | | | | | |
| COD, Chemical Oxygen Demand | water | river | kg | 0.022 | kg PO4-Eq | 1.51E-04 | kg/tkm | 3.33E-06 | Ecoinvent V2, transport, freight, rail, diesel, US |
| COD, Chemical Oxygen Demand | water | unspecified | kg | 0.022 | kg PO4-Eg | 3.54E-07 | kg/tkm | 7.79E-09 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphate | water | river | ka | 1 | kg PO4-Eq | 8.19E-09 | kg/tkm | 8.19E-09 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | | | ng L- | 2.00 | | | | | |
| Phosphorus | water | river | кд | 3.06 | kg PO4-Eq | 4.17E-09 | kg/tkm | 1.27E-08 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphorus | water | unspecified | kg | 3.06 | kg PO4-Eq | 4.18E-11 | kg/tkm | 1.28E-10 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Phosphoric acid | air | high population density | ka | 0.97 | kg PO4-Eq | | kg/tkm | 0.00E+00 | Ecoinvent V2, transport, freight, rail, diesel, US |
| . noophono dold | uii | riigii population acrisity | ''g | 0.01 | Ag I OT LY | | ng/ uun | | Econivors v.z., stanspors, noigns, rais, alocos, co |
| | | | | | | | | 6.73E-06 | |
| Coal, brown, in ground | resource | in ground | kg | 9.9 | MJ-Eq | 1.06E-03 | kg/tkm | 1.05E-02 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Coal, hard, unspecified, in ground | resource | in ground | kg | 19.1 | MJ-Eq | 2.46E-03 | kg/tkm | 4.70E-02 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Gas, mine, off-gas, process, coal mining | resource | in ground | Nm3 | 39.8 | MJ-Eq | 2.44E-05 | Nm3/tkm | 9.71E-04 | Ecoinvent V2, transport, freight, rail, diesel, US |
| | | | | | | | | | |
| Gas, natural, in ground | resource | in ground | Nm3 | 38.293 | MJ-Eq | 1.20E-03 | Nm3/tkm | 4.59E-02 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Oil, crude, in ground | resource | in ground | kg | 45.8 | MJ-Eq | 1.31E-02 | kg/tkm | 5.99E-01 | Ecoinvent V2, transport, freight, rail, diesel, US |
| Peat, in ground | resource | biotic | kg | 9.9 | MJ-Eq | 4.46E-08 | kg/tkm | 4.42E-07 | Ecoinvent V2, transport, freight, rail, diesel, US |
| . Jac, in ground | 10300106 | Diotio | ng | 0.0 | IVIO-LY | 4.40L-00 | ng/mii | | Econtrolic v.E., transport, Itali, transport, 100 |
| | | | | | | | | 7.03E-01 | |

Enteric Ferm. Emissions

| Methane - Dairy Cows | air | 1.35E+02 | kg/head/year |
|---------------------------------|-----|----------|--------------|
| Methane - Dairy Heifers | air | 7.30E+01 | kg/head/year |
| Methane - Bulls | air | 9.29E+01 | kg/head/year |
| Methane - Beef Cows | air | 8.48E+01 | kg/head/year |
| Methane - Beef Heifers | air | 7.53E+01 | kg/head/year |
| Methane - Heifers for Slaughter | air | 6.70E+01 | kg/head/year |
| Methane - Steers | air | 6.04E+01 | kg/head/year |
| Methane - Calves | air | 4.83E+01 | kg/head/year |

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| Methane - Beef Cows - Pregnant - Confined Location - Jan-Apr | | | | |
|--|------------|---------------------------------------|----------------------|----------------------------|
| Method 1: IPCC Tier 2 | air | | 6.17E+01 | kg/head/yea |
| Method 2: Literature Values | air | | 1.14E+02 | kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton Methane - Beef Cows - Lactating - Pasture - May- | air | | 1.00E+02 | kg/head/yea |
| Method 1: IPCC Tier 2 | air | | 1.03E+02 | kg/head/yea |
| Method 2: Literature Values | air | | 1.35E+02 | kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton Methane - Beef Cows - Pregnant - Confined Location - | air | | 1.14E+02 | kg/head/yea |
| Oct-Dec | | | | |
| Method 1: IPCC Tier 2 | air | | 7.36E+01 | kg/head/yea |
| Method 2: Literature Values Method 3: CowBytes © & Blaxter & Clapperton | air air | | 9.75E+01 8.19E+01 | kg/head/yea kg/head/yea |
| Methane - Breeding Bulls - Confined Location - Jan- | | | | |
| Method 1: IPCC Tier 2 | air | | 8.45E+01 1.24E+02 | kg/head/yea |
| Method 2: Literature Values Method 3: CowBytes © & Blaxter & Clapperton | air air | | 1.24E+02 1.54E+02 | kg/head/yea kg/head/yea |
| Methane - Breeding Bulls Grazing - Pasture - May- | a.i | | | ng/nodd/you |
| Method 1: IPCC Tier 2 | air | | 1.14E+02 | kg/head/yea |
| Method 2: Literature Values Method 3: CowBytes © & Blaxter & Clapperton | air air | | 1.11E+02 1.40E+02 | kg/head/yea kg/head/yea |
| Methane - Breeding Bulls - Confined Location - Nov- | an . | | | ng/nodd/you |
| Method 1: IPCC Tier 2 | air | | 9.29E+01 | kg/head/yea |
| Method 2: Literature Values Method 3: CowBytes © & Blaxter & Clapperton | air air | | 1.35E+02 1.67E+02 | kg/head/yea kg/head/yea |
| Methane - Beef Cows Grazing <6 months - Pasture - | an | | 1.07 £ 102 | ng/neda/yee |
| Apr-Sept | | | | |
| Method 1: IPCC Tier 2 Method 2: Literature Values | air air | | 2.34E+01 2.03E+01 | kg/head/yea kg/head/yea |
| Method 2: Clapperton Method 3: CowBytes © & Blaxter & Clapperton | air | | 2.56E+01 | kg/head/yea |
| Methane - Beef Calves - Import/Steer 8-9 mths - | | | | . , |
| Feedlot - Jan-Jul Method 1: IPCC Tier 2 | oir | | 4.605.04 | lea/bood/see |
| Method 1: IPCC Her 2 Method 2: Literature Values | air air | | 4.60E+01 4.95E+01 | kg/head/yea kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton | air | | 8.01E+01 | kg/head/yea |
| Methane - Beef Calves - Import/Heifer 8-9 mths - | | | | |
| Feedlot - Jan-Jul Method 1: IPCC Tier 2 | air | | 4.77E+01 | kg/head/yea |
| Method 2: Literature Values | air | | 4.75E+01 | kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton | air | · | 7.77E+01 | kg/head/yea |
| Methane - Replacement Heifers 6-7 mths - Confined - Oct-Dec | | | | |
| Method 1: IPCC Tier 2 | air | | 4.47E+01 | kg/head/yea |
| Method 2: Literature Values | air | | 5.52E+01 | kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton Methane - Stocker Heifers 6-7 mths - Feedlot - Oct- | air | : | 5.76E+01 | kg/head/yea |
| Method 1: IPCC Tier 2 | air | | 4.47E+01 | kg/head/yea |
| Method 2: Literature Values | air | • | 5.66E+01 | kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton | air | · · · · · · · · · · · · · · · · · · · | 5.59E+01 | kg/head/yea |
| Methane - Stocker Steers 6-7 mths - Feedlot - Oct- Method 1: IPCC Tier 2 | air | | 4.43E+01 | kg/head/yea |
| Method 2: Literature Values | air | | 5.93E+01 | kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton | air | | 5.83E+01 | kg/head/yea |
| Methane - Finished Heifers 6-7 mths - Feedlot - Oct- Method 1: IPCC Tier 2 | air | | 3.13E+01 | kg/head/yea |
| Method 2: Literature Values | air | | 3.10E+01 | kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton | air | | 5.35E+01 | kg/head/yea |
| Methane - Finished Steers 6-7 mths - Feedlot - Oct- Method 1: IPCC Tier 2 | air | | 3.19E+01 | kg/head/yea |
| Method 2: Literature Values | air | | 3.35E+01 | kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton | air | | 5.55E+01 | kg/head/yea |
| Methane - Replacement Heifers 9-10 mths - Confined - Jan-May | | | | |
| Method 1: IPCC Tier 2 | air | | 5.42E+01 | kg/head/yea |
| Method 2: Literature Values | air | | 6.86E+01 | kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton Methane - Replacement Heifers 14-15 mths - Pasture | air | | 7.20E+01 | kg/head/yea |
| - Jun-Sept | | | | |
| Method 1: IPCC Tier 2 | air | | 7.77E+01 | kg/head/yea |
| Method 2: Literature Values | air | | 6.15E+01 | kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton Methane - Replacement Heifers 18-19 mths - | air | | 7.59E+01 | kg/head/yea |
| Confined - Oct-Dec | | | | |
| Method 1: IPCC Tier 2 | air | | 7.03E+01 | kg/head/yea |
| Method 2: Literature Values Method 3: CowBytes © & Blaxter & Clapperton | air air | | 8.45E+01 8.99E+01 | kg/head/yea kg/head/yea |
| Methane - Finished Heifers 8-9 mths - Feedlot - Jan- | a.i | | 0.002.01 | ng/nodd/you |
| Method 1: IPCC Tier 2 | air | | 4.94E+01 | kg/head/yea |
| Method 2: Literature Values Method 3: CowBytes © & Blaxter & Clapperton | air air | | 4.90E+01 8.08E+01 | kg/head/yea kg/head/yea |
| Methane - Stocker Heifers 8-9 mths - Feedlot - Jan- | an | • | 002101 | g, . 10 a a/ y 0 a |
| Method 1: IPCC Tier 2 | air | | 5.42E+01 | kg/head/yea |
| Method 2: Literature Values Method 3: CowBytes © & Blaxter & Clapperton | air air | | 6.90E+01 6.79E+01 | kg/head/yea kg/head/yea |
| Methane - Stocker Heifers 13-14 mths - Pasture - Jun- | dii | · · | 0.7 3LTU I | ng/rieau/yea |
| Sept | | | | |
| Method 1: IPCC Tier 2 | air | | 7.06E+01 | kg/head/yea |
| Method 2: Literature Values Method 3: CowBytes © & Blaxter & Clapperton | air air | | 6.01E+01 7.43E+01 | kg/head/yea kg/head/yea |
| Methane - Finished Heifers 17-18 mths - Feedlot - | -500 | | | J |
| Oct-Dec | | | 5 45E 04 | 1/h · · · |
| Method 1: IPCC Tier 2 Method 2: Literature Values | air air | | 5.45E+01 5.24E+01 | kg/head/yea kg/head/yea |
| Method 3: CowBytes © & Blaxter & Clapperton | air | | 8.42E+01 | kg/head/yea |
| Methane - Finished Steers 8-9 mths - Feedlot - Jan- | | | | |
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| | Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population. June 2005. | |
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| Basarab, J.A. et. al. | Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population. June 2005. | |
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| Method 1: IPCC Tier 2 | air |
|--|-----|
| Method 2: Literature Values | air |
| Method 3: CowBytes © & Blaxter & Clapperton | air |
| Methane - Stocker Steers 8-9 mths - Feedlot - Jan- | |
| Method 1: IPCC Tier 2 | air |
| Method 2: Literature Values | air |
| Method 3: CowBytes © & Blaxter & Clapperton | air |
| Methane - Stocker Steers 13-14 mths - Pasture - Jun- | |
| Sept | |
| Method 1: IPCC Tier 2 | air |
| Method 2: Literature Values | air |
| Method 3: CowBytes © & Blaxter & Clapperton | air |
| Methane - Finished Steers 17-18 mths - Feedlot - Oct- | |
| Dec | |
| Method 1: IPCC Tier 2 | air |
| Method 2: Literature Values | air |
| Method 3: CowBytes © & Blaxter & Clapperton | air |
| Methane - Stocker Import Heifers - 8-9 mths - Pasture | |
| - Jun-Sept | |
| Method 1: IPCC Tier 2 | air |
| Method 2: Literature Values | air |
| Method 3: CowBytes © & Blaxter & Clapperton | air |
| Methane - Import Heifers - 12-13 mths - Feedlot - Oct- | |
| Dec | |
| Method 1: IPCC Tier 2 | air |
| Method 2: Literature Values | air |
| Method 3: CowBytes © & Blaxter & Clapperton | air |
| Methane - Import Heifers - 8-9 mths - Feedlot - Jun- | |
| Method 1: IPCC Tier 2 | air |
| Method 2: Literature Values | air |
| Method 3: CowBytes © & Blaxter & Clapperton | air |
| Methane - Stocker Import Steers - 8-9 mths - Pasture - | |
| Jun-Sept | |
| Method 1: IPCC Tier 2 | air |
| Method 2: Literature Values | air |
| Method 3: CowBytes © & Blaxter & Clapperton | air |
| Methane - Import Steers - 12-13 mths - Feedlot - Oct- | |
| Dec | |
| Method 1: IPCC Tier 2 | air |
| Method 2: Literature Values | air |
| Method 3: CowBytes © & Blaxter & Clapperton | air |
| Methane - Import Steers - 8-9 mths - Feedlot - Jun- | -:- |
| Method 1: IPCC Tier 2 | air |
| Method 2: Literature Values | air |
| Method 3: CowBytes © & Blaxter & Clapperton | air |
| | |

| CountryCode | Country |
|-----------------|-------------------------------|
| | http://www.iso.org/iso/en/pro |
| | ds- |
| | services/iso3166ma/02iso- |
| 2 letter codes: | 3166-code-lists/index.html |
| CH | Switzerland |
| NO | Norway |
| RER | Europe |
| RME | Middle East |
| RNA | North America |

END WORKSHEET back to top

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APPENDIX C EMISSION FACTOR DATA FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| 4.84E+01 | kg/head/year |
|----------------------|------------------------------|
| 5.24E+01 8.42E+01 | kg/head/year kg/head/year |
| 5.36E+01 | kg/head/year |
| 7.26E+01 7.12E+01 | kg/head/year kg/head/year |
| 6.88E+01 | kg/head/year |
| 5.80E+01 7.10E+01 | kg/head/year kg/head/year |
| | |
| 5.30E+01 5.53E+01 | kg/head/year |
| 8.71E+01 | kg/head/year |
| | |
| 5.83E+01 4.69E+01 | kg/head/year kg/head/year |
| 5.74E+01 | kg/head/year |
| 4.83E+01 | kg/head/year |
| 4.75E+01 | kg/head/year |
| 7.56E+01 | kg/head/year |
| 4.74E+01 4.36E+01 | kg/head/year kg/head/year |
| 6.62E+01 | kg/head/year |
| 5.80E+01 | kg/head/year |
| 5.25E+01 | kg/head/year |
| 6.47E+01 | kg/head/year |
| 4.75E+01 | kg/head/year |
| 4.95E+01 7.79E+01 | kg/head/year kg/head/year |
| | , |
| 4.62E+01 4.61E+01 | kg/head/year kg/head/year |
| 6.86E+01 | kg/head/year |
| | |

APPENDIX C
N FACTOR DATA FROM LCA MODEL

| Basarab, J.A. et. al. | . Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population | June 2005. |
|--|--|--------------------------|
| Basarab, J.A. et. al. | . Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population. | June 2005. |
| Basarab, J.A. et. al. | . Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population | June 2005. |
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| Basarab, J.A. et. al. | Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population. Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population. Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population. | June 2005. |
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| Basarab, J.A. et. al. Basarab, J.A. et. al. | . Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population | June 2005. June 2005. |
| Basarab, J.A. et. al. | Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population. Methane Emissions From Enteric Fermentation in Alberta's Beef Cattle Population. Methane Emissions From Enteric Fermentation in Alberta's Reaf Cattle Population. | June 2005. |

APPENDIX D

FEEDLOT NUTRITION, GENERIC RATIONS FOR ALBERTA BEEF CATTLE (RECEIVED FROM MR. DWIGHT KARREN)

TABLE D1

RATIONS FOR BACKGROUNDED CALVES PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Units | Diet 1 | Diet 2 | | |
|---------------------------|----------|--------|--------|--|--|
| RATION (DRY MATTER BASIS) | | | | | |
| Barley | % | 0 | 14.3 | | |
| Barley Silage | % | 96.0 | 81.7 | | |
| Barley Straw | % | 0 | 0 | | |
| Supplement | % | 4.0 | 4.0 | | |
| Total | % | 100 | 100 | | |
| RATION (AS FEI | D BASIS) | | | | |
| Barley | % | 0 | 6.6 | | |
| Barley Silage | % | 98.4 | 91.6 | | |
| Barley Straw | % | 0 | 0 | | |
| Supplement | % | 1.6 | 1.8 | | |
| Total | % | 100 | 100 | | |
| Barley | lbs | 0 | 195.3 | | |
| Barley Silage | lbs | 5710.2 | 2714.8 | | |
| Supplement | lbs | 95.7 | 53.5 | | |
| ANALYSIS | | | | | |
| Date In | - | 5-Jan | 1-Oct | | |
| Date Out | - | 29-May | 5-Jan | | |
| Days on feed | d | 144 | 96 | | |
| Start Weight | lbs | 600 | 500 | | |
| End Weight | lbs | 750 | 600 | | |
| Gain | lbs | 150 | 100 | | |
| ADG | lbs/d | 1.04 | 1.04 | | |
| DMI | lbs/d | 15.28 | 12.81 | | |

NOTES:

% - percent

ADG - Average daily gain DMI - Dry matter intake

lbs - pounds

lbs/d - pounds per day

d - day

TABLE D2

SUPPLEMENTS FOR BACKGROUNDED CALVES PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Supplement | Units | Ingredient | Amount |
|-----------------|-----------|--------------------|---------|
| Calcium | lb/head/d | lime | 51.11 |
| Potassium | lb/head/d | potassium chloride | 1.48 |
| Sodium | lb/head/d | sodium chloride | 6.17 |
| Copper | lb/head/d | copper sulfate | 0.16 |
| Manganese | lb/head/d | manganese oxide | 0.10 |
| Zinc | lb/head/d | zinc oxide | 2.08 |
| Selenium | lb/head/d | selinite | 0.00078 |
| Cobalt | lb/head/d | cobalt carbonate | 0.0018 |
| Iodine | lb/head/d | EDDI | 0.0030 |
| Vitamin A | lb/head/d | VitApremix | 0.016 |
| Vitamin D | lb/head/d | VitDpremix | 0.0021 |
| Vitamin E | lb/head/d | VitEpremix | 0.065 |
| Monensin | lb/head/d | Rumnesin | 0.62 |
| min-vit | lb/head/d | - | 61.81 |
| Millrun Carrier | lb/head/d | - | 87.34 |

NOTES:

lb/head/d - pounds of ingredient per head per day on feed

TABLE D3

RATIONS FOR LONG STEER YEARLINGS PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Units | Diet 1 | Diet 2 | Diet 3 | Diet 4 | Diet 5 | Diet 6 | Diet 7 |
|---------------------------|----------|--------|--------|--------|--------|--------|--------|--------|
| RATION (DRY MATTER BASIS) | | | | | | | | |
| Barley | % | 0 | 14.3 | 28.7 | 43.0 | 57.3 | 71.7 | 86.0 |
| Barley Silage | % | 96.0 | 81.7 | 67.3 | 53.0 | 38.7 | 24.3 | 10.0 |
| Barley Straw | % | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Supplement | % | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Total | % | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| RATION (AS FEI | D BASIS) | | | | | | | |
| Barley | % | 0 | 6.6 | 14.6 | 24.5 | 36.9 | 53.2 | 75.3 |
| Barley Silage | % | 98.4 | 91.6 | 83.4 | 73.3 | 60.6 | 43.9 | 21.3 |
| Barley Straw | % | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Supplement | % | 1.6 | 1.8 | 2.0 | 2.2 | 2.5 | 2.9 | 3.4 |
| Total | % | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Barley | lbs | 0 | 19.5 | 48.2 | 66.6 | 100.2 | 138.1 | 2977.8 |
| Barley Silage | lbs | 95.7 | 270.6 | 274.9 | 199.7 | 164.7 | 113.8 | 842.2 |
| Supplement | lbs | 1.6 | 5.3 | 6.6 | 6.1 | 6.8 | 7.5 | 135.5 |
| ANALYSIS | ANALYSIS | | | | | | | |
| Date In | - | 1-Sep | 4-Sep | 11-Sep | 18-Sep | 25-Sep | 2-Oct | 9-Oct |
| Date Out | - | 4-Sep | 10-Sep | 18-Sep | 25-Sep | 2-Oct | 9-Oct | 11-Feb |
| Days on feed | d | 3 | 7 | 7 | 7 | 7 | 7 | 126 |
| Start Weight | lbs | 850 | 851 | 860 | 875 | 890 | 910 | 935 |
| End Weight | lbs | 851 | 860 | 875 | 890 | 910 | 935 | 1450 |
| Gain | lbs | 1 | 9 | 15 | 15 | 20 | 25 | 515 |
| ADG | lbs/d | 0.33 | 1.29 | 2.14 | 2.14 | 2.86 | 3.57 | 4.10 |
| DMI | lbs/d | 12.18 | 17.51 | 21.59 | 19.91 | 22.49 | 24.76 | 24.76 |

NOTES:

% - percent

ADG - Average daily gain
DMI - Dry matter intake

lbs - pounds

lbs/d - pounds per day

d - day

SUPPLEMENTS FOR LONG STEER YEARLINGS PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Supplement | Units | Ingredient | Amount |
|-----------------|-----------|--------------------|-----------|
| Calcium | lb/head/d | lime | 58.07 |
| Potassium | lb/head/d | potassium chloride | 1.68 |
| Sodium | lb/head/d | sodium chloride | 7.01 |
| Copper | lb/head/d | copper sulfate | 0.18 |
| Manganese | lb/head/d | manganese oxide | 0.12 |
| Zinc | lb/head/d | zinc oxide | 2.36 |
| Selenium | lb/head/d | selinite | 0.00088 |
| Cobalt | lb/head/d | cobalt carbonate | 0.0020996 |
| Iodine | lb/head/d | EDDI | 0.0034 |
| Vitamin A | lb/head/d | VitApremix | 0.018 |
| Vitamin D | lb/head/d | VitDpremix | 0.0024 |
| Vitamin E | lb/head/d | VitEpremix | 0.074 |
| Monensin | lb/head/d | Rumnesin | 0.70 |
| min-vit | lb/head/d | - | 70.22 |
| Millrun Carrier | lb/head/d | - | 99.22 |
| | | | |

NOTES:

RATIONS FOR LONG HEIFER YEARLINGS PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Units | Diet 1 | Diet 2 | Diet 3 | Diet 4 | Diet 5 | Diet 6 | Diet 7 |
|---------------|----------|----------|--------|--------|--------|--------|--------|--------|
| RATION (DRY | MATTER | R BASIS) | | | | | | |
| Barley | % | 0 | 14.3 | 28.7 | 43.0 | 57.3 | 71.7 | 86.0 |
| Barley Silage | % | 96.0 | 81.7 | 67.3 | 53.0 | 38.7 | 24.3 | 10.0 |
| Barley Straw | % | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Supplement | % | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Total | % | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| RATION (AS FI | ED BASIS | 5) | | | | | | |
| Barley | % | 0 | 6.6 | 14.6 | 24.5 | 36.9 | 53.2 | 75.3 |
| Barley Silage | % | 98.4 | 91.6 | 83.4 | 73.3 | 60.6 | 43.9 | 21.3 |
| Barley Straw | % | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Supplement | % | 1.6 | 1.8 | 2.0 | 2.2 | 2.5 | 2.9 | 3.4 |
| Total | % | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Barley | lbs | 0 | 18.6 | 36.1 | 50.0 | 97.0 | 113.3 | 3036.1 |
| Barley Silage | lbs | 88.6 | 257.8 | 206.0 | 149.9 | 159.3 | 93.4 | 858.7 |
| Supplement | lbs | 1.5 | 5.1 | 4.9 | 4.5 | 6.6 | 6.2 | 138.1 |
| ANALYSIS | | | | | | | | |
| Date In | - | 1-Sep | 4-Sep | 11-Sep | 18-Sep | 25-Sep | 2-Oct | 9-Oct |
| Date Out | - | 4-Sep | 10-Sep | 17-Sep | 24-Sep | 2-Oct | 8-Oct | 27-Feb |
| Days on feed | d | 3 | 7 | 7 | 7 | 7 | 7 | 142 |
| Start Weight | lbs | 750 | 751 | 760 | 770 | 780 | 800 | 820 |
| End Weight | lbs | 751 | 760 | 770 | 780 | 800 | 820 | 1350 |
| Gain | lbs | 1 | 9 | 10 | 10 | 20 | 20 | 530 |
| ADG | lbs/d | 0.33 | 1.29 | 1.43 | 1.43 | 2.86 | 2.86 | 3.73 |
| DMI | lbs/d | 11.27 | 16.68 | 16.18 | 14.95 | 21.75 | 20.31 | 22.33 |

NOTES:

% - percent

ADG - Average daily gain DMI - Dry matter intake

lbs - pounds

lbs/d - pounds per day

d - day

SUPPLEMENTS FOR LONG HEIFER YEARLINGS PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Supplement | Units | Ingredient | Amount |
|-----------------|-----------|--------------------|-------------|
| Calcium | lb/head/d | lime | 57.22813428 |
| Potassium | lb/head/d | potassium chloride | 1.651948738 |
| Sodium | lb/head/d | sodium chloride | 6.91006042 |
| Copper | lb/head/d | copper sulfate | 0.177804728 |
| Manganese | lb/head/d | manganese oxide | 0.116852946 |
| Zinc | lb/head/d | zinc oxide | 2.324861162 |
| Selenium | lb/head/d | selinite | 0.000869682 |
| Cobalt | lb/head/d | cobalt carbonate | 0.002069087 |
| Iodine | lb/head/d | EDDI | 0.00338572 |
| Vitamin A | lb/head/d | VitApremix | 0.018211863 |
| Vitamin D | lb/head/d | VitDpremix | 0.002337676 |
| Vitamin E | lb/head/d | VitEpremix | 0.0724687 |
| Monensin | lb/head/d | Rumnesin | 0.688788286 |
| min-vit | lb/head/d | - | 69.19779328 |
| Millrun Carrier | lb/head/d | - | 97.78118517 |

NOTES:

RATIONS FOR YEARLINGS ON PASTURE PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Units | Pasture | Total |
|--------------|-------|---------|-------|
| Days on feed | d | 120 | 120 |
| Mineral | lbs | 0.1875 | 22.5 |

NOTES:

lbs - pounds d - day

SUPPLEMENTS FOR YEARLINGS ON PASTURE PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Supplement | Units | Ingredient | Amount |
|------------|-----------|--------------------|----------|
| Phosphorus | lb/head/d | dicalphos | 15.28 |
| Sodium | lb/head/d | sodium chloride | 6.25 |
| Magnesium | lb/head/d | potassium chloride | 0.17 |
| Iodine | lb/head/d | EDDI | 0.0046 |
| Copper | lb/head/d | copper sulfate | 0.29 |
| Manganese | lb/head/d | manganese oxide | 0.22 |
| Zinc | lb/head/d | zinc oxide | 0.28 |
| Cobalt | lb/head/d | cobalt carbonate | 0.0027 |
| Selenium | lb/head/d | selinite | 0.0016 |
| Vitamin A | lb/head/d | VitApremix | 0.00014 |
| Vitamin D | lb/head/d | VitDpremix | 0.000049 |
| Vitamin E | lb/head/d | VitEpremix | 0.00029 |

NOTES:

RATIONS FOR FED STEERS PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Units | Diet 3 | Diet 4 | Diet 5 | Diet 6 | Diet 7 |
|---------------|---------|----------|--------|--------|--------|--------|
| RATION (DRY | MATTE | R BASIS) | | | | |
| Barley | % | 28.7 | 43.0 | 57.3 | 71.7 | 86.0 |
| Barley Silage | % | 67.3 | 53.0 | 38.7 | 24.3 | 10.0 |
| Barley Straw | % | 0 | 0 | 0 | 0 | 0 |
| Supplement | % | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Total | % | 100 | 100 | 100 | 100 | 100 |
| RATION (AS FI | ED BASI | S) | | | | |
| Barley | % | 14.6 | 24.5 | 36.9 | 53.2 | 75.3 |
| Barley Silage | % | 83.4 | 73.3 | 60.6 | 43.9 | 21.3 |
| Barley Straw | % | 0 | 0 | 0 | 0 | 0 |
| Supplement | % | 2.0 | 2.2 | 2.5 | 2.9 | 3.4 |
| Total | % | 100 | 100 | 100 | 100 | 100 |
| Barley | lbs | 45.0 | 145.6 | 394.4 | 512.4 | 3760.7 |
| Barley Silage | lbs | 256.4 | 436.7 | 648.0 | 422.4 | 1063.7 |
| Supplement | lbs | 6.1 | 13.3 | 26.9 | 28.0 | 171.1 |
| ANALYSIS | | | | | | |
| Date In | - | 1-Oct | 15-Oct | 29-Oct | 11-Oct | 25-Oct |
| Date Out | - | 14-Oct | 29-Oct | 25-Nov | 7-Nov | 22-Apr |
| Days on feed | d | 14 | 14 | 28 | 28 | 180 |
| Start Weight | lbs | 550 | 560 | 600 | 690 | 790 |
| End Weight | lbs | 560 | 600 | 690 | 790 | 1450 |
| Gain | lbs | 10 | 40 | 90 | 100 | 660 |
| ADG | lbs/d | 0.71 | 2.86 | 3.21 | 3.57 | 3.67 |
| DMI | lbs/d | 10.07 | 21.77 | 22.13 | 22.97 | 21.86 |

NOTES:

% - percent

ADG - Average daily gain
DMI - Dry matter intake

lbs - pounds

lbs/d - pounds per day

d - day

SUPPLEMENTS FOR FED STEERS PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Supplement | Units | Ingredient | Amount |
|-----------------|-----------|--------------------|--------|
| Calcium | lb/head/d | lime | 84.10 |
| Potassium | lb/head/d | potassium chloride | 2.43 |
| Sodium | lb/head/d | sodium chloride | 10.16 |
| Copper | lb/head/d | copper sulfate | 0.26 |
| Manganese | lb/head/d | manganese oxide | 0.17 |
| Zinc | lb/head/d | zinc oxide | 3.42 |
| Selenium | lb/head/d | selinite | 0.0013 |
| Cobalt | lb/head/d | cobalt carbonate | 0.0030 |
| Iodine | lb/head/d | EDDI | 0.0050 |
| Vitamin A | lb/head/d | VitApremix | 0.027 |
| Vitamin D | lb/head/d | VitDpremix | 0.0034 |
| Vitamin E | lb/head/d | VitEpremix | 0.11 |
| Monensin | lb/head/d | Rumnesin | 1.01 |
| min-vit | lb/head/d | - | 101.70 |
| Millrun Carrier | lb/head/d | - | 143.70 |

NOTES:

RATIONS FOR FED HEIFERS PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Units | Diet 3 | Diet 4 | Diet 5 | Diet 6 | Diet 7 |
|---------------------------|--------|--------|--------|--------|--------|--------|
| RATION (DRY MATTER BASIS) | | | | | | |
| Barley | % | 28.7 | 43.0 | 57.3 | 71.7 | 86.0 |
| Barley Silage | % | 67.3 | 53.0 | 38.7 | 24.3 | 10.0 |
| Barley Straw | % | 0 | 0 | 0 | 0 | 0 |
| Supplement | % | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| Total | % | 100 | 100 | 100 | 100 | 100 |
| RATION (AS FED | BASIS) | | | | | |
| Barley | % | 14.6 | 24.5 | 36.9 | 53.2 | 75.3 |
| Barley Silage | % | 83.4 | 73.3 | 60.6 | 43.9 | 21.3 |
| Barley Straw | % | 0 | 0 | 0 | 0 | 0 |
| Supplement | % | 2.0 | 2.2 | 2.5 | 2.9 | 3.4 |
| Total | % | 100 | 100 | 100 | 100 | 100 |
| Barley | lbs | 43.1 | 114.5 | 351.5 | 460.9 | 3552.7 |
| Barley Silage | lbs | 245.6 | 343.2 | 577.5 | 380.0 | 1004.8 |
| Supplement | lbs | 5.9 | 10.4 | 24.0 | 25.2 | 161.6 |
| ANALYSIS | | | | | | |
| Date In | - | 1-Oct | 15-Oct | 29-Oct | 11-Oct | 25-Oct |
| Date Out | - | 14-Oct | 29-Oct | 26-Nov | 7-Nov | 19-Apr |
| Days on feed | d | 14 | 14 | 28 | 28 | 176 |
| Start Weight | lbs | 500 | 510 | 540 | 620 | 710 |
| End Weight | lbs | 510 | 540 | 620 | 710 | 1350 |
| Gain | lbs | 10 | 30 | 80 | 90 | 640 |
| ADG | lbs/d | 0.71 | 2.14 | 2.86 | 3.21 | 3.64 |
| DMI | lbs/d | 9.64 | 17.11 | 19.72 | 20.66 | 21.12 |

NOTES:

% - percent

ADG - Average daily gain
DMI - Dry matter intake

lbs - pounds

lbs/d - pounds per day

d - day

SUPPLEMENTS FOR FED HEIFERS PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Supplement | Units | Ingredient | Amount |
|-----------------|-----------|--------------------|--------|
| Calcium | lb/head/d | lime | 77.83 |
| Potassium | lb/head/d | potassium chloride | 2.25 |
| Sodium | lb/head/d | sodium chloride | 9.40 |
| Copper | lb/head/d | copper sulfate | 0.24 |
| Manganese | lb/head/d | manganese oxide | 0.16 |
| Zinc | lb/head/d | zinc oxide | 3.16 |
| Selenium | lb/head/d | selinite | 0.0012 |
| Cobalt | lb/head/d | cobalt carbonate | 0.0028 |
| Iodine | lb/head/d | EDDI | 0.0046 |
| Vitamin A | lb/head/d | VitApremix | 0.025 |
| Vitamin D | lb/head/d | VitDpremix | 0.0032 |
| Vitamin E | lb/head/d | VitEpremix | 0.10 |
| Monensin | lb/head/d | Rumnesin | 0.94 |
| min-vit | lb/head/d | - | 94.11 |
| Millrun Carrier | lb/head/d | - | 132.99 |

NOTES:

RATIONS FOR THE COW AND BULL HERD PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Units | Winter | Calving | Breeding | Pasture | Total |
|-------------------|-------|--------|---------|----------|---------|---------|
| Days on feed | d | 90 | 90 | 60 | 125 | 365 |
| Alfalfa grass hay | lbs | 28 | 35 | - | - | 5670.00 |
| Pasture | lbs | - | - | FC | FC | FC |
| Mineral | lbs | 0.19 | 0.19 | 0.19 | 0.19 | 68.44 |

NOTES:

lbs - pounds d - day

FC - Free choice, amount of feed consumed undetermined

SUPPLEMENTS FOR THE COW AND BULL HERD PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| Supplement | Units | Ingredient | Amount |
|------------|-----------|--------------------|---------|
| Phosphorus | lb/head/d | dicalphos | 46.47 |
| Sodium | lb/head/d | sodium chloride | 19.00 |
| Magnesium | lb/head/d | potassium chloride | 0.52 |
| Iodine | lb/head/d | EDDI | 0.014 |
| Copper | lb/head/d | copper sulfate | 0.88 |
| Manganese | lb/head/d | manganese oxide | 0.68 |
| Zinc | lb/head/d | zinc oxide | 0.86 |
| Cobalt | lb/head/d | cobalt carbonate | 0.0081 |
| Selenium | lb/head/d | selinite | 0.0049 |
| Vitamin A | lb/head/d | VitApremix | 0.00041 |
| Vitamin D | lb/head/d | VitDpremix | 0.00015 |
| Vitamin E | lb/head/d | VitEpremix | 0.00090 |

NOTES:

RATION ENERGY AND PROTEIN CONTENT PROVIDED BY FEEDLOT NUTRITION ALBERTA BEEF LIFE CYCLE ANALYSIS ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

| | Units | Diet 1 | Diet 2 | Diet 3 | Diet 4 | Diet 5 | Diet 6 | Diet 7 |
|--------|---------|--------|--------|--------|--------|--------|--------|--------|
| DM | lbs | 37.91 | 41.49 | 45.84 | 51.19 | 57.93 | 66.80 | 78.78 |
| eNDF | % | 37.14 | 32.71 | 28.24 | 23.81 | 19.38 | 14.91 | 10.48 |
| DE | Mcal/kg | 2.76 | 2.91 | 3.06 | 3.21 | 3.37 | 3.52 | 3.67 |
| NE_m | Mcal/kg | 1.31 | 1.43 | 1.55 | 1.66 | 1.78 | 1.90 | 2.02 |
| NE_g | Mcal/kg | 0.75 | 0.85 | 0.94 | 1.03 | 1.13 | 1.22 | 1.31 |
| DIP | % | 8.96 | 8.98 | 9.00 | 9.02 | 9.04 | 9.06 | 9.09 |
| CP | % | 11.82 | 11.89 | 11.96 | 12.04 | 12.11 | 12.18 | 12.25 |

NOTES:

DM - dry matter

eNDF - effective neutral detergent fiber

DE - digestible energy

 $\begin{array}{ll} NE_m & \quad \text{- net energy for maintenance} \\ NE_g & \quad \text{- net energy for growth} \\ DIP & \quad \text{- digestible intake protein} \end{array}$

CP - crude protein

lbs - pounds % - percent

Mcal/kg - mega calories per kilogram

APPENDIX E

DESCRIPTION OF MODELLING PROCESS AND CALCULATIONS

APPENDIX E

DESCRIPTION OF MODELLING PROCESS AND CALCULATIONS

The Life Cycle Analysis (LCA) spreadsheet (Microsoft Office Excel) model was designed as a first approximation for the beef production in Alberta and to allow for versatility and further refinement of the model. The calculations throughout the model are all linked to the primary and secondary data, allowing for easy manipulation of the model for exploring "what if" scenarios and implementing new data.

The following paragraphs describe the spreadsheet tabs within the spreadsheet model.

Introduction tab – overall presentation of the structure of the spreadsheet.

Figure 1a tab – Activity Map of the LCA system, containing the processes that characterize the LCA of the beef production, from cradle to farm-gate. This tab includes the processes for construction and operation and maintenance.

Figure 1b tab – continuation of the Activity Map of the LCA system. This tab includes the additional tabs for operation and maintenance and decommissioning.

Beef Data tab – a top-down compilation of livestock, agricultural and miscellaneous system-related data. The data sources are referenced in a transparent manner to allow for easy tracking of the used data. Assumptions made due to lack of available data are clearly documented within the Beef Data tab. The cells containing data values in the Beef Data tab are designed as "source" cells. Further calculations performed through the model are linked to the data within this tab. Modifications or updates to the source cells in the Beef Data tab will result in automatic update of the entire model.

Beef Data Check tab – validation of data presented in the **Beef Data** tab. Validation of data is performed against the following criteria: vintage, geography, precision, completeness, representativity, reproducibility, source and uncertainty.

Diets tab – summary of the components of the diets per class of cattle, based on the diet information prepared by the ruminant nutritionist for this project. For each class of cattle (cow, bull, calf-fed calves, yearling-fed calves) the data is structured as follows:

- Feeding periods
- Typical days spent on each feeding period
- Components of diet per day per head per feeding period

- Total "cattle*days" (based on the number of cattle) for the respective feeding period
- Total amount of feed and supplement for the respective feeding period for cattle. In the **Diets** tab, the supplement data is presented as a lumped value of the components included in the composition of the supplement.

The summarized quantities of feed and supplement within the diet represent the total requirements of the components of the diet for the entire population of cattle, during the entire period considered in the study (calf crop).

The "cattle*days" selected as a unit allows a versatile quantification of the emissions related to the activity of the cattle and, eventually, calculation of the environmental footprints corresponding to each type of animal, for the period of time considered within the boundaries of the beef production system (calf crop). As the system is quite complex with imported and exported cattle, mortalities, and cattle from the dairy industry, the use of "cattle*days" simplified the calculations to allow for inflows and outflows of the system. Table 6 of the report provides an example calculation of the 'cattle*days' for cows.

Diet Supplements tab – represents a summary of the individual components of the supplements from the diets per class of cattle, based on the diet information prepared by the ruminant nutritionist for this project.

The supplements are classified as:

- Supplement requirements all minerals, vitamins and other supplemental components included in the composition of the supplement
- Millrun carrier, an inert additive to be mixed with the supplements.

The total supplement and the millrun carrier requirements per day, respectively, are calculated for each type of cattle (cow, bull, calf-fed calves, yearling-fed calves). The requirements per day are multiplied by the total number of 'cattle*days' for each type of cattle for each feeding period to obtain the total supplement and millrun carrier requirements.

Cow-Rplc FC, Bull-Rplc FC, Calf FC, and Yearling FC tabs

Flow charts were prepared for the cows, bulls, calf-fed calves, and yearling-fed calves included in the system for the production of one calf crop. The flow charts allowed for easy tracking of each type of cattle throughout the production of one calf crop. The May 15, 2001 census data from Statistics Canada for all categories of animals was used as the starting numbers (i.e. January 2001 values for cows and bulls, and May 1, 2001 for

calves). Slaughtered cows and bulls in Alberta 2001 based on Alberta Agriculture Statistics Yearbook (2008) were incorporated into the shrunk live weight portion of the functional unit. Slaughtered heifers and steers in Alberta for 2002 based on Alberta Agriculture Statistics Yearbook were also incorporated into the shrunk live weight portion of the functional unit.

Calculations were conducted for cows and bulls for one year to account for one entire cycle of calf production. Statistics Canada May 15, 2001 census data was used as the initial number of cows and bulls in the Alberta beef system for January 2001.

The replacement heifers as of May 15, 2001 have also been incorporated into the cow flow chart for January 2001. Calculations were worked in a bottom-up approach from the slaughtered number of cows in 2001 to the assumed number of cows in January 2001. It was assumed that there were no cow imports based on lack of sufficient data to account for cow imports. It was also assumed that all cows leaving the cow/calf operations for export or slaughter and cow mortalities were removed on December 1, 2001 for simplicity purposes. It was assumed that the slaughtered cow number included all cull cows from dairy. Based on the available information, the number of cows in each stage of the Alberta beef cycle (i.e. winter feeding, calving, breeding, pasture, cows sent to local auction, cows sent to feedlot, cow mortalities, cows for export, cows from the dairy industry, cows for slaughter) were calculated.

The difference between Statistics Canada January 1, 2001 number for bulls in the Alberta beef system and the May 15, 2001 census data was assumed to account for the replacement bulls. The rest of the calculations performed for the bull flow chart were calculated using the same method as for the cows. The same assumptions mentioned above for the cows are also applicable for the calculations of bulls.

The May 15, 2001 census data from Statistics Canada was assumed to be the total number of calves born by May 1, 2001. This total was divided between calves for the calf-fed system and the yearling-fed system based on the 45 percent to 55 percent split as provided by Alberta Agriculture and Rural Development (ARD). It was assumed that all newborn mortalities have been excluded from the census data. Both the calf-fed and yearling-fed flow charts were worked in a bottom-up approach from the 2002 slaughtered heifer and steer numbers as based on Alberta Agriculture Statistics Yearbook (2008) to the May 15, 2001 census data. Imports and exports were incorporated before the backgrounding feedlot stage and before the slaughterhouse stage for both systems. Calves from the Alberta dairy system were also incorporated into both flow charts prior to the backgrounding feedlot stage. Mortalities were removed from each flow chart prior to weaning, prior to the finishing feedlot and prior to the slaughterhouse based on the mortality rates used. The stages included in the

calf-fed system were the pre-weaning period, local auction, backgrounding feedlot, finishing feedlot, and slaughter. The stages included in the yearling-fed system were the pre-weaning period, local auction, backgrounding feedlot, backgrounding pasture, finishing feedlot, and slaughter. Refer to Section 4.2 within the report for a description of the time spent in each of these stages for each system.

Table 4 within the report provides a summary of the cattle population numbers included in this study.

Note that there are discrepancies between some of the references used to calculate the number of animals in each stage of the calf crop cycle, and it may be warranted to further investigate the animal numbers throughout the entire system as they interconnect for any future iterations of this analysis.

Slaughterhouse tab – This tab provides information on the number of cattle within each cattle type that have been slaughtered during the production of one calf crop. The number of cows and bulls slaughtered in 2001 are provided, and the number of heifers and steers slaughtered in 2002 have been provided. The heifers and steers have been divided into the calf-fed and yearling-fed systems based on the 45 percent calf-fed to 55 percent yearling-fed ratio. The weight leaving the feedlot and the shrunk live weight at the slaughterhouse are also given in order to calculate the total weight slaughtered for the system, which is provided as total shrunk live weight at the slaughterhouse door. The total shrunk live weight was also divided between the calf-fed and yearling-fed systems to allow for the LCA analysis of each system.

Emission Factor Data tab – presents the emission factors gathered for the Life Cycle Inventory (LCI) for all the processes identified on the Activity Maps (Figures 1a and 1b).

The structure of the Emission Factor Data tab includes an index with all the processes identified on the Activity Maps (Figures 1a and 1b). Each process in the index is linked to the corresponding emission factors located further down the tab.

The presentation of the emission factor data for each process is structured as follows:

Parameter: the emission factors associated with a certain process from the Activity Map (i.e. E1 Produce crude)

Category: environmental media of the emission (air, water, soil) or resource consumption (resource)

Subcategory: characteristics of the environmental media of the emission

Life Cycle Impact Assessment (LCIA) unit – the emission factors are grouped into environmental impact categories (GWP, aquatic acidification, aquatic eutrophication, non-renewable resources). For each environmental impact category, the total emissions are calculated, based on selected LCIA methodology:

- GWP IPCC 2007
- Aquatic acidification IMPACT 2002+
- Aquatic eutrophication IMPACT 2002+
- Non-renewable resources IMPACT 2002+

The equivalent emissions for each category are calculated per unit of environmental release (LCIA unit) (i.e. kg).

Equivalence factors (*eq factors*): the characterization of the environmental impact uses science-based conversion factors, called equivalence factors, to convert and combine the LCI results into representative indicators of impacts to the environment. Equivalence factors translate the different inventory inputs into directly comparable environmental impact indicators.

Equivalence units (*eq units*): units for the equivalence factors, common for a selected environmental impact category:

- GWP kg CO₂-Eq
- Aquatic acidification IMPACT 2002+ kg SO₂-Eq
- Aquatic eutrophication IMPACT 2002+ kg PO₄-Eq
- Non-renewable resources IMPACT 2002+ MJ-Eq

Mean Value Process – the value of emission factor as obtained from the quantification of environmental releases from the selected process

Unit process - equivalent emissions from each unit of the respective LCIA per unit of the quantified process.

Emissions/unit – the value of emissions factor multiplied by the equivalence factor (i.e. kg CO₂-Eq per kg crude oil produced)

Source - source/reference of the emission factor data

For each process:

- The emission factors are grouped into environmental impact categories (GWP, aquatic acidification, aquatic eutrophication, non-renewable resources) as shown with colour-coding of the rows
- The equivalent emissions/unit are calculated and summarized separately for each environmental impact category
- The total (summarized values) for each environmental impact category represent the contribution of the selected process to the respective environmental impact category

The cells containing data in the Parameter, Category, Subcategory, LCIA unit, eq factors, eq units, Mean Value Process, Unit process columns are designed as "source cells". The model can be adjusted or refined further based on revised values of the emission factors and equivalence units. Modification or update of the source cells in the Emission Factor Data tab will result in automatic update of the entire model.

Emission Factor Data Check tab - validation of data presented in the Emission Factor Data tab. Validation of data is performed against the following criteria: vintage, geography, precision, completeness, representativity, reproducibility, source and uncertainty.

EF Data - LCIA Categories tab - summarizes all LCIA data from the Emission Factor Data tab. The LCIA data is linked directly, as dependant, with the LCIA emission factors within the Emission Factor Data tab.

The Index summarizes all the processes identified on the Activity Maps (Figures 1a and 1b). Each process is linked to the corresponding LCIA results further down the tab.

For the aquatic acidification environmental impact category, the emissions/process quantified based on the IMPACT 2002+ method can be replaced by the user with corresponding emissions/process from alternative LCIA methods, such as CML2001, EDIP2003, TRACI (yellow highlighted cells).

Fertilizer Data tab – data used to calculate the fertilizer needs for the feed required in the system

Fertilizer from Manure–Calcs tab – quantifies the degree to which synthetic fertilizer use is offset by the application of feedlot cattle manure

Calculations are based on the total number of steers and heifers passing through feedlots under both the calf-fed and yearling-fed systems for the duration of the LCA study (one

calf crop). The numbers of heifers and steers were based on slaughter numbers from the Alberta Agriculture Statistics Yearbook (2008).

Manure generation was calculated based on estimates of manure generation from Statistics Canada. It was assumed that all manure from the calf-fed and yearling-fed systems was available for application at the same time. Nitrogen availability was estimated to be 65 percent in the first year following application. No consideration of remnant nutrients was made for subsequent applications. No estimates of nutrient losses due to volatilization, run-off, or other loss vectors were made.

The nutrient composition of manure was based on information from the Saskatchewan Soil Conservation Association.

Total fertilizer needs were based on ARD-recommended fertilizer application rates and the area requirements for feed production for the duration of the LCA study. Offset of synthetic fertilizer application was estimated by the degree to which manure application satisfied the total fertilizer needs of the crop.

Fertilizer Requirements tab – bottom-up approach of data calculation. Calculation of fertilizer need per each component of the diet (barley, barley silage, and alfalfa grass) based on the total amount of feed required for all cattle for the entire period considered in the LCA study (one calf crop).

The next seven tabs in the model describe the subsystems of the entire LCA of beef production, as presented on the Activity Maps (Figure 1a and Figure 1b) (forage and cereal sub-activities, energy generation activities, operation and maintenance activities, cereal activities, forage activities, feedlot and pasture activities, and cattle transportation activities).

Forage and Cereal Sub-Act tab – quantifies the amounts required for all activities within the Forage and Cereal Sub-Activities section of the Activity Map (Figure 1a)

Bottom-up approach of data calculation, starting with the major components for diets, and yield per cultivated hectare.

The values obtained in this tab are used further to calculate the environmental impacts associated with each individual process from the Activity Map.

Energy Generation Act tab – quantifies the amounts required for all activities within the Energy Generation Activities section of the Activity Map (Figure 1a).

Top-down approach of data calculation, starting with the gasoline and diesel consumption for all beef-related farm operations in Alberta, for the entire period considered in the LCA study (one calf crop).

The values obtained in this tab are used further to calculate the environmental impacts associated with each individual process from the Activity Map.

O&M Activities tab – quantifies the amounts required for all activities within the Operation and Maintenance Activities section of the Activity Map (Figure 1a).

Bottom-up approach of data calculation, starting with the needs for operation and maintenance on the livestock farms, including maintenance of livestock constructions, maintenance of roads and replacement of worn components in the livestock constructions, for the entire period considered in the LCA study.

Note that this was a data gap for this study, and the emissions associated with these processes are assumed to be negligible compared to the rest of the study. Data gaps encountered during the LCI process are marked on the appropriate cells in the **O&M Activities** tab. Further improvement of the model allows replacement of the data gaps with new data. Modification or update of the source cells for data gaps will result in automatic update of the entire model.

The values obtained in this tab are used further to calculate the environmental impacts associated with each individual process from the Activity Map.

Cereal Activities tab - quantifies the amounts required for all activities within the Cereal Activities section of the Activity Map (Figure 1a).

Bottom-up approach of data calculation, starting with the total cultivated area required for the cereal components of the diets for all class of cattle, for the entire period of the LCA study (one calf crop).

The emissions from the agricultural processes described on the Activity Map were quantified based on the emissions generated by similar processes described and quantified in the Ecoinvent V2 database. However, while the result of the agricultural process is the same for both systems, Canadian and, in the case of Ecoinvent, either generic or European, the technology behind the process might be different. The technical notes documenting the agricultural processes in Ecoinvent and the calculation methodology for the corresponding environmental emissions were used to adjust the emissions, to better reflect the conditions for Alberta. The adjustment of emissions was

based on the fuel consumption for the same agricultural process for Alberta and, respectively, Ecoinvent specific conditions.

The values obtained within this tab are used further to calculate the environmental impacts associated with each individual process from the Activity Map.

Forage Activities tab - quantifies the amounts required for all activities within the Forage Activities section of the Activity Map (Figure 1a).

Bottom-up approach of data calculation, starting with the total cultivated area required for the forage components of the diets for all class of cattle, for the entire period of the LCA study (one calf crop).

The emissions from the agricultural processes described on the Activity Map were quantified based on the emissions generated by similar processes described and quantified in the Ecoinvent V2 database. However, while the result of the agricultural process is the same for both systems, Canadian and, in the case of Ecoinvent, either generic or European, the technology behind the process might be different. The technical notes documenting the agricultural processes in Ecoinvent and the calculation methodology for the corresponding environmental emissions were used to adjust the emissions, to better reflect the conditions for Alberta. The adjustment of emissions was based on the fuel consumption for the same agricultural process for Alberta and, respectively, Ecoinvent specific conditions.

The values obtained within this tab are used further to calculate the environmental impacts associated with each individual process from the Activity Map.

Feedlot & Pasture Act tab - quantifies the amounts required for all activities within the Feedlot & Pasture Activities section of the Activity Map (Figure 1b).

Bottom-up approach of data calculation.

Data gaps encountered during the LCI process are marked on the appropriate cells in the **Feedlot & Pasture Act** tab. Further improvement of the model allows replacement of the data gaps with new data. Modification or update of the source cells for data gaps will result in automatic update of the entire model.

The values obtained within this tab are used further to calculate the environmental impacts associated with each individual process from the Activity Map.

Cattle Transport Activities tab - quantifies the amounts required for all transportation activities within the Cattle Transport Activities section of the Activity Map (Figure 1b).

Calculations are based on the total number of cattle transported during a certain transportation activity, average weight of transported cattle, total weight transported, and distance of transportation.

The values obtained within this tab are used further to calculate the environmental impacts associated with each individual process from the Activity Map.

The next 21 tabs in the model describe the emissions related to the biological activity of the cattle (methane [CH₄] emissions from enteric fermentation, nitrous oxide [N₂O] and CH₄ emissions from manure) and from soil cropping practices. The emissions associated with the biological activity of the cattle and the soil cropping were added to the LCI data used for the quantification of Global Warming Potential (GWP) from the processes presented on the Activity Map. The additional emissions associated with the total phosphorus generated by the surface run-off of the cropped land, expressed as PO_4 equivalents are added to the LCI data used for the quantification of aquatic eutrophication from the processes presented on the Activity Map. The calculation of these emissions are presented in tab **P run-off**.

Cattle CH4 Enteric Emissions tab – calculation of the total cattle CH₄ enteric fermentation emissions per calf crop.

Calculations use a modified IPCC 2006 Tier 2 methodology using location-specific data and information provided by the ruminant nutritionist for this project. Methane emissions from enteric fermentation in Alberta's beef cattle population were calculated for one calf crop. See Appendix F in the report for the calculations table and for more information.

Calculations are performed for each class of cattle (type of animal) and for each feeding period.

Cattle CH4 Manure Emission tab – calculation of the total cattle CH₄ manure emissions per calf crop. Calculations use the methodology described in Holos (2008) and IPCC 2006. Calculations are performed for each class of cattle (type of animal) and for each feeding period.

Cattle N Excretion tab – calculation of the nitrogen excreted from the cattle per calf crop. Calculations use the methodology described in Holos (2008), National Research Council

2000, IPCC 2006, and expert opinion. Calculations are performed for each class of cattle (type of animal) and for each feeding period.

N20 Dir Manure emission Holos tab – calculation of the direct N₂O emissions from manure. Calculations use the methodology described in Holos (2008), National Research Council 2000, and IPCC 2006. Calculations are performed for each class of cattle (type of animal), for each feeding period, and for each type of manure management system.

N20 Indir Manure emiss Holos tab – calculation of the indirect N₂O emissions from manure. Calculations use the methodology described in Holos (2008), National Research Council 2000, and IPCC 2006. Calculations are performed for each class of cattle (type of animal), for each feeding period, and for each type of manure management system.

CO2 Direct Soils tab – direct CO₂ emissions from the application of synthetic fertilizers to soil. Calculations use the methodology described by IPCC 2006, Tier 1, eq 11.13.

C Change in Soil From Land Use tab – calculation of soil carbon change from the change in land use.

Calculations use the methodology described in Holos (2008) and McConkey et al, 2007, and are performed within this tab as follows:

- 1.0 Soil carbon change emissions from land use
 - 1.1 Carbon change in mineral soils
 - 1.1.1 Carbon change due to change in tillage practice
 - 1.1.2 Carbon change due to change in fallow area
 - 1.1.3 Carbon change due to change in perennial / annual crop areas
 - 1.1.4 Carbon change due to change in grassland
 - 1.1.5 Carbon change in mineral soils
 - 1.2 Carbon change in organic soils

The differences in tillage practices from 2001 to 2006 were used within this tab to calculate the soil carbon change over these 5 years (based on available data). The results for 2 years were allocated to this project. There was assumed to be no change in land use between these years, and therefore, the soil carbon change from land use changes was calculated.

SOC on land tab – an estimate of the rate of soil organic carbon (SOC) sequestered on grazed pasture for beef production in Alberta.

This tab was introduced as a placeholder for the rate of SOC sequestration as requested by ARD. The rate of SOC sequestration has been estimated based upon expert opinion from ARD. The calculations have only made use of a single average sequestration rate and the total pasture land area of Alberta used for beef production. Due to the highly approximated nature of this estimation, it has been included only for discussion purposes and the amount of carbon dioxide sequestered by pastures has not been included in the total footprint reported by this LCA study of beef production in Alberta.

Summary soil N2O crop, land use tab – a summary of the calculations for the total N_2O emissions per crop and land use. The next 9 tabs in the model present in detail the calculations for each category of crop and land.

All calculations use the methodology described in Holos (2008) and are performed as follows:

- 1.2 Direct emissions
 - 1.2.1 Emissions due to N inputs from
 - 1.2.1.1 fertilizer
 - 1.2.1.2 crop residues
 - 1.2.1.3 mineralization
 - 1.2.1.4 application of manure on land
 - 1.2.2 Emissions due to tillage
 - 1.2.3 Emissions due to soil texture
 - 1.2.4 Emissions due to irrigation
 - 1.2.5 Emissions due to landscape/topography
 - 1.2.6 Emissions due to fallow
- 1.3 Indirect emissions
 - 1.3.1 Emissions due to leaching and run-off
 - 1.3.2 Emissions due to volatilization
- 1.4 Emissions due to organic soil cultivation
- 1.5 Total emissions
- **1.2.1 Emissions due to inputs** tab calculation of direct N₂O emissions due to inputs of fertilizer, crop residues, mineralization, and application of manure on land.
- **1.2.2 Emissions due to tillage** tab calculation of direct N₂O emissions due to tillage.

- **1.2.3 Emissions due to soil tex** tab calculation of direct N_2O emissions due to soil texture.
- **1.2.4** Emiss due to irrig tab calculation of direct N₂O emissions due to irrigation.
- **1.2.5 Emiss due to topography** tab calculation of direct N_2O emissions due to topography.
- 1.2.6 Emiss due to fallow tab calculation of direct N₂O emissions due to fallow.
- **1.3.1 & 1.3.2 Run-off & volat** tab calculation of indirect N_2O emissions due to run-off and volatilization.
- **1.4 Emiss organic soil cultivat** tab calculation of N_2O emissions due to organic soil cultivation.

Total emissions tab – numerical summary of all N₂O emissions from crop and land use.

P run-off tab – calculation of P_2O_5 run-off based on P_2O_5 crop fertilizing needs for all cultivated components of the diet. Calculations are based on the methodology from Nemecek et al. 2007.

Beef activ, soil & crop tab – summary of all GHG emissions from beef activity, soil and cropping practice, as follows:

- Cattle Enteric Fermentation Emissions
- Cattle Methane Emissions from Manure
- Direct N₂O Emissions From Manure Management
- Indirect N₂O Emissions From Manure Management
- Direct CO₂ Emissions From Managed Soils
- Soil Carbon Change in Soil From Land Use
- Total N₂O emissions from cropping and land use
- Total P emissions from run-off

LCIA calculations activity map tab – calculation of the total environmental impacts for each process described on the Activity Map (Figures 1a and 1b).

The final emissions are calculated based on the emissions per unit for each selected environmental impact multiplied by the number of units in the assessed process. For example:

Produce Mineral - Lime: 107,974,342 kg of lime requirements for the entire number of cattle and period of time considered in the LCA

For each kg of lime, the following equivalent emissions apply:

| lime, from carbonation, at regional storehouse | |
|--|--|
|--|--|

| GLO | IPCC 2007 | 1.17E-02 | kg CO ₂ -Eq |
|-----|--------------------------|----------|------------------------|
| RER | IMPACT 2002+ (Midpoint) | 8.10E-05 | kg SO ₂ -Eq |
| RER | IMPACT 2002+ (Midpoint) | 1.10E-06 | kg PO ₄ -Eq |
| GLO | cumulative energy demand | 1.83E-01 | MJ-Eq |

Total emissions from production of lime: multiply the quantity of lime (as kg) with emissions per kg.

Results are summarized, respectively, by sections of the Activity Map and as totals for all processes (activities). A summary table has been provided at the bottom of this tab to summarize the emissions associated with each environmental impact category.

The next 21 tabs of the model present the graphical output of the LCIA calculations. For each environmental impact category (GWP, aquatic acidification, aquatic eutrophication, non-renewable resources), the tabular data is presented separately for Forage and Cereal activities, Feedlot and Pasture activities, Cattle transportation activities and Energy generation activities.

For & Cer act-results (GHG), (acid), (eutrof) and (resourc) tabs

Fdlt & Pstr-results (GHG), (acid), (eutrof) and (resources) tabs

Cattle Transport-results (GHG), (acid), (eutr) and (res) tabs

Energy-results (GHG), (acid), (eutrof) and (resources) tabs

Enteric-results (GHG) tab

Total Results (GHG), (acid), (eutrof) and (resources) tabs

Used Processes tab – presents a comprehensive list of all the processes used to quantify the emissions from the units of the Activity Map. For each activity described on the Activity Map, the source of the process used to quantify the emissions is indicated. Where the emissions from the processes were modified to reflect conditions more

appropriate for the characteristics of the project, a description of this modification has been provided in the table. A reference to the methodology details of the modifications is also presented.

Feed Processing tab – description of the calculations of emissions based on the total electricity, natural gas and water used for processing of the feed.

APPENDIX F

CATTLE ENTERIC FERMENTATION EMISSIONS CALCULATION TABLE FROM LCA MODEL

APPENDIX F

CATTLE ENTERIC FERMENTATION EMISSIONS CALCULATIONS TABLE FROM LCA MODEL ALBERTA AGRICULTURE AND RURAL DEVELOPMENT EDMONTON, ALBERTA

Cattle Enteric Fermentation Emissions

GE

Modified IPCC 2006 Tier 2 Approach Using Location Specific Data and Information Provided by the Nutritionist

Emission Factor GE * (Ym/100) * 365 55.65 (kg CH₄/head/yr) 55.65 GE Ym 365

energy content of methane (MJ / kg CH₄) gross energy intake (MJ / head / day) methane conversion factor (% feed converted to methane)

days/year

DMI DMI * Energy Density of Fee Energy density of feed from IPCC 18.45

dry matter intake (kg dry matter/day) MJ/kg

| | D : 4 | | | | | | | | | | | | | |
|---------------------------------|-------------------------------|----------------------------------|---------------------------------------|-----------------------------|--|---|--|--------------------------------|--|--|---|--|--|--|
| | Diet | Total No. of Days on Diet (days) | No. of Animals * Days (head * day) | Average Weight (kg) | Average Dry Matter Intake, DMI (lbs dry matter / head / day) | Average Dry Matter Intake, DMI (kg dry matter / head / day) | Methane Conversion Factor, Ym (% feed energy converted to CH₄) | Energy Density of Feed (MJ/kg) | Gross Energy Intake (MJ / head / day) | Methane Emission Factor (kg / head / day) | Methane Emissions (kg CH ₄) | | | |
| | | (dayo) | (noda day) | from Beef Data tab and from | (ibo di y matter / neda / day) | (ng ary matter / nead / day) | (70 lood ellergy converted to ell ₄) | (mo/kg) | (ino / rioda / day) | (ng/nodd/ddy) | (Ng 31.4) | | | |
| | | (nutritionist) | (Calculated) | nutritionist | (nutritionist and John Basarab) | (Calculated) | (IPCC 2006 Tier 2 Values) | (IPCC Tier 2 Value) | (Calculated) | (Calculated) | (Calculated) | | | |
| Type of Animal | | | | | | | | | | | | | | |
| Calves before weaning - stage 1 | 0-3 months | 92 | 194,427,747 | | 0.00 | 0.00 | 0.00 | 18.45 | 0 | 0 | 0 | | | |
| Calves before weaning - stage 2 | 3-6 months | 92 | 190,420,680 | | 8.25 | 3.74 | 6.50 | 18.45 | 69.00 | 0.08060 | 15,347,240 | | | |
| Cows | Winter Diet | 90 | 214,305,471 | 605.55 | 25.20 | 11.43 | 6.50 | 18.45 | 210.89 | 0.24633 | 52,789,081 | | | |
| Cows | Calving Diet | 90 | 226,189,268 | 605.55 | 31.50 | 14.29 | 6.50 | 18.45 | 263.62 | 0.30791 | 69,645,466 | | | |
| | Breeding Diet | 60 | 149,973,319 | 605.55 | 30.00 | 13.61 | 6.50 | 18.45 | 251.06 | 0.29325 | 43,979,021 | | | |
| | Pasture | 125 | 299,946,638 | 605.55 | 30.00 | 13.61 | 6.50 | 18.45 | 251.06 | 0.29325 | 87,958,042 | | | |
| Dulle | Winter Diet | 90 | 9,230,053 | 997.90 | 30.00 | 42.64 | 6.50 | 18.45 | 251.06 | 0.20225 | 2 700 072 | | | |
| Bulls | | 90 | 9,230,053 | 997.90 997.90 | 30.00 | 13.61 13.61 | 6.50 | 18.45 | 251.06 251.06 | 0.29325 0.29325 | 2,706,673 2,952,213 | | | |
| | Calving Diet Breeding Diet | 60 | 6,675,106 | 997.90 | 30.00 | 13.61 | 6.50 | 18.45 | 251.06 | 0.29325 | 2,952,213 1,957,446 | | | |
| | Pasture | 125 | 13,350,213 | 997.90 | 30.00 | 13.61 | 6.50 | 18.45 | 251.06 | 0.29325 | 3,914,892 | | | |
| | | | | | | | | | | | | | | |
| Backgrounding - Calf-Fed | Backgrounding | 96 | 110,770,800 | 226.80 | 12.81 | 5.81 | 6.50 | 18.45 | 107.18 | 0.12518 | 13,866,766 | | | |
| Calf-Fed (Heifer) | Diet 3 | 14 | 8,532,928 | 229.00 | 9.64 | 4.37 | 6.50 | 18.45 | 80.71 | 0.09426 | 804,355 | | | |
| | Diet 4 | 14 | 8,532,928 | 238.00 | 17.11 | 7.76 | 6.50 | 18.45 | 143.21 | 0.16727 | 1,427,336 | | | |
| | Diet 5 | 28 | 17,065,856 | 263.00 | 19.72 | 8.94 | 6.50 | 18.45 | 165.03 | 0.19276 | 3,289,540 | | | |
| | Diet 6 | 28 | 17,065,856 | 302.00 | 20.66 | 9.37 | 6.50 | 18.45 | 172.93 | 0.20198 | 3,447,005 | | | |
| | Diet 7 | 178 | 108,459,610 | 467.00 | 21.12 | 9.58 | 3.00 | 18.45 | 176.79 | 0.09530 | 10,336,565 | | | |
| Calf-Fed (Steer) | Diet 3 | 14 | 7,298,065 | 252.00 | 10.07 | 4.57 | 6.50 | 18.45 | 84.27 | 0.09843 | 718,359 | | | |
| | Diet 4 | 14 | 7,298,065 | 263.00 | 21.77 | 9.88 | 6.50 | 18.45 | 182.23 | 0.21284 | 1,553,346 | | | |
| | Diet 5 | 28 | 14,596,131 | 293.00 | 22.13 | 10.04 | 6.50 | 18.45 | 185.16 | 0.21627 | 3,156,726 | | | |
| | Diet 6 | 28 | 14,596,131 | 336.00 | 22.97 | 10.42 | 6.50 | 18.45 | 192.24 | 0.22454 | 3,277,399 | | | |
| | Diet 7 | 178 | 92,763,625 | 508.00 | 21.86 | 9.92 | 3.00 | 18.45 | 182.98 | 0.09864 | 9,150,440 | | | |
| Backgrounding - Yearling-Fed | Backgrounding | 144 | 202,133,931 | 272.16 | 15.28 | 6.93 | 6.50 | 18.45 | 127.90 | 0.14939 | 30,197,219 | | | |
| Yearling - Pasture | Pasture | 120 | 169,233,166 | 340.19 | 20.00 | 9.07 | 6.50 | 18.45 | 167.38 | 0.19550 | 33,084,591 | | | |
| Yearling-Fed (Heifer) | Diet 1 | 3 | 2,234,814 | 340.00 | 11.27 | 5.11 | 6.50 | 18.45 | 94.33 | 0.11018 | 246,233 | | | |
| rearing rea (riener) | Diet 2 | 7 | 5,214,567 | 343.00 | 16.68 | 7.57 | 6.50 | 18.45 | 139.58 | 0.16303 | 850,137 | | | |
| | Diet 3 | 7 | 5,214,567 | 347.00 | 16.18 | 7.34 | 6.50 | 18.45 | 135.43 | 0.15818 | 824,843 | | | |
| | Diet 4 | 7 | 5,214,567 | 352.00 | 14.95 | 6.78 | 6.50 | 18.45 | 125.08 | 0.14609 | 761,802 | | | |
| | Diet 5 | 7 | 5,214,567 | 358.00 | 21.75 | 9.87 | 6.50 | 18.45 | 182.06 | 0.21265 | 1,108,870 | | | |
| | Diet 6 | 7 | 5,214,567 | 367.00 | 20.31 | 9.21 | 6.50 | 18.45 | 169.98 | 0.19854 | 1,035,292 | | | |
| | Diet 7 | 126 | 93,824,961 | 492.00 | 22.33 | 10.13 | 3.00 | 18.45 | 186.86 | 0.10073 | 9,451,138 | | | |
| Yearling-Fed (Steer) | Diet 1 | 3 | 1,911,398 | 386.00 | 12.18 | 5.52 | 6.50 | 18.45 | 101.90 | 0.11902 | 227,486 | | | |
| · , , | Diet 2 | 7 | 4,459,929 | 388.00 | 17.51 | 7.94 | 6.50 | 18.45 | 146.54 | 0.17116 | 763,356 | | | |
| | Diet 3 | 7 | 4,459,929 | 393.00 | 21.59 | 9.79 | 6.50 | 18.45 | 180.67 | 0.21102 | 941,154 | | | |
| | Diet 4 | 7 | 4,459,929 | 400.00 | 19.91 | 9.03 | 6.50 | 18.45 | 166.65 | 0.19465 | 868,115 | | | |
| | Diet 5 | 7 | 4,459,929 | 408.00 | 22.49 | 10.20 | 6.50 | 18.45 | 188.22 | 0.21984 | 980,486 | | | |
| | Diet 6 | 7 | 4,459,929 | 418.00 | 24.76 | 11.23 | 6.50 | 18.45 | 207.19 | 0.24200 | 1,079,305 | | | |
| | Diet 7 | 126 | 80,246,863 | 541.00 | 24.76 | 11.23 | 3.00 | 18.45 | 207.18 | 0.11169 | 8,962,495 | | | |

Heifer replacements are included in the calf-fed, yearling-fed, and cow numbers.

As per IPCC 2006 Tier 2 guidelines, milk fed calves have zero methane emissions from enteric fermentation.

DMI for calves before weaning (3 to 6 months) values given as expert opinion by John Basarab.

2006 IPCC Guidelines for National Greenhouse Gas Inventories

http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html

IPCC Emission Factor Data Search Engine - methane conversion factor for calves on forage (http://www.ipcc-nggip.iges.or.jp/EFDB/find_ef_ft.php).

TOTAL METHANE EMISSIONS 423,660,431 kg CH₄

Global Warming Potential of Methane

Source: Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (SAR) (100 year)

kg CO₂eq 10,591,510,783 1,426,781,002 kg live weight kg CO2eq / kg live weight 7.4