

## OVERVIEW OF ALBERTA'S AGRICULTURAL CARBON OFFSET TRADING SYSTEM 2007 TO 2011

Alberta was first in North America to regulate greenhouse gas (GHG) emissions. Alberta's Specified Gas Emitters Regulation (SGER, 2007)<sup>1</sup> created a market between regulated companies and others who can lower emissions on a voluntary basis, such as by agricultural management improvements. Government of Alberta (GOA) approved offset quantification protocols provide the basis for this carbon trade. Carbon offsets represent important opportunities to gain incentives for management improvements that lower GHG emissions, while improving record keeping capacity, increasing production efficiencies and developing transferrable knowledge for other environmental market opportunities.

One-third of Canada's total GHG emissions are from Alberta<sup>2</sup>. In 2010, 88% of Alberta's GHG emissions came from the energy sector and 7% came from agriculture<sup>2</sup>. The SGER applies to close to 100 Alberta facilities that emit over 100,000 tonnes of carbon dioxide equivalent (t CO<sub>2</sub>e) per year. Of the total 114 Mt CO<sub>2</sub>e of reduction required in 2010, 43% were from power plants and 31% from oil sands<sup>3</sup>. Facilities must reduce their annual emissions intensities by 12% below average levels in 2003 to 2005, using options listed below and illustrated in Figure 1.

### Regulated emitters have 4 options to meet legislated reduction requirements in Alberta:

- make internal improvements
- use or purchase Emission Performance Credits (EPCs) beyond required emission reductions
- pay into the Climate Change and Emissions Management (CCEMC) Corporation Fund at \$15/tonne CO<sub>2</sub>e to support research and development of new methods of reducing emissions
- purchase offsets based on GOA approved protocols

Between 2007 and 2011, Alberta's GHG reduction program lowered emissions by close to 29 million tonnes (Mt)<sup>4</sup>, which is like removing 5.8 million cars from the road (assuming each car emits 5 t CO<sub>2</sub>e/yr). Offsets delivered close to 58% of these reductions<sup>4</sup>. Figure 1 shows that the use of internal improvements and CCEMC Fund payments to meet compliance obligations decreased between 2007 and 2011, and the use of offsets increased from 18% in 2007 to 46% in 2011.

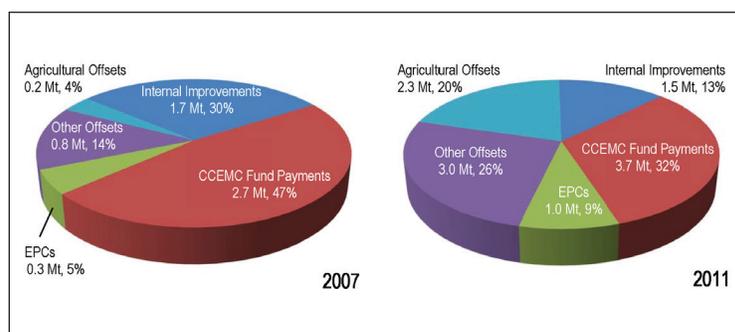


Figure 1. Methods used to meet compliance obligations under the Specified Gas Emitters Regulation (2007) by Alberta companies in 2007 and 2011, including payments into the Climate Change and Emissions Management (CCEMC) Corporation Fund and Emission Performance Credits (EPCs) in excess of required internal improvements<sup>5,6</sup>

### OFFSET CREATION

GHG offsets are created when emissions are voluntarily lowered as a result of a practice improvement. The end result is fewer GHGs in the atmosphere. Offset protocols follow the International Organization for Standardization (ISO 14064-2) process. To qualify as an offset, a practice change must be real (above and beyond business as usual), quantifiable (based on sound science) and verifiable by an independent third party. GOA approved protocols identify which management improvements can generate what quantity of offsets that can be sold to regulated emitters. Offset protocol development in Alberta includes reviews by technical experts, stakeholders, and government, a 30-day public comment period, as well as reviews scheduled every five years. Further details can be found on the Carbon Offset Solutions website<sup>5</sup>.



### Alberta offsets:

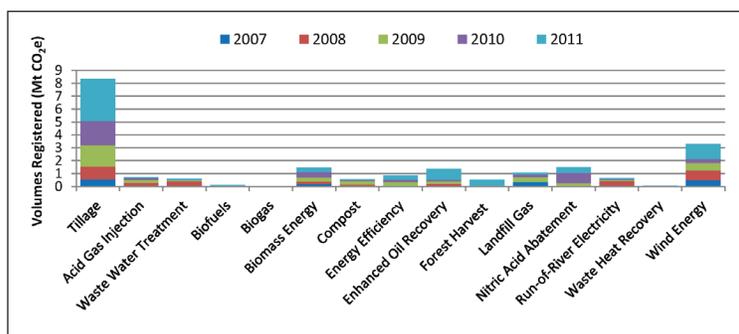
- comply with the ISO 14064-2 process, are internationally compatible, and standardized
- are based on best possible science with rigorous technical review
- use emission factors and calculations so only require tracking of practice changes
- describe monitoring and verification requirements
- reduce costs for project developers by following a prescribed process
- are assured by government approval of protocols, third party verification and registration on the Carbon Offset Registry, and
- provide certainty for investors about GHG tonnes reduced

## AGRICULTURAL OFFSETS

Agricultural offsets can be created using agricultural practice changes that **reduce** GHG emissions such as improved livestock feeding and manure or energy management, or that **remove** GHG emissions from the atmosphere such as conservation cropping practices that increase carbon stored in soils. Summaries of approved and developing agricultural protocols are available on the Alberta Agriculture and Rural Development (ARD) website<sup>6</sup>.

Figure 2 illustrates the variety of offset types registered between 2007 and 2011. Until 2011, the Tillage System Management Protocol was the only agricultural protocol in use. Registered tonnes from the Tillage protocol increased by about 50% each year which was twice the rate of increase of other offsets. The Biogas Protocol was used for the first time in 2011, although these offsets have not been used for compliance (retired).

Figure 2. Volumes of offsets registered between 2007 (6 months only) and 2011, by type<sup>6</sup>



Since 2007, 8.4 Mt CO<sub>2</sub>e of GHG emissions have been removed from the atmosphere using Tillage offsets, generating close to \$105 million (assuming \$12.50/t CO<sub>2</sub>e) for farmers and aggregators. Although registered offsets reduce GHG emissions, it is not until they are retired that they are used by regulated emitters to meet their reduction requirements. Some companies buy registered offsets for future compliance.

Volumes of agricultural offsets increased by close to 6 times since 2007 (Table 1). The selling price of Tillage offsets increased from \$6 to \$12 per tonne of carbon dioxide equivalent (t CO<sub>2</sub>e) in 2007 to \$12 to \$14/t CO<sub>2</sub>e in 2011. This value has been relatively stable and is typically higher than in voluntary carbon markets.

This reflects the high quality of the offset developed in a regulatory context, as well as the \$15/t CO<sub>2</sub>e set by the price cap on the CCEM Fund. Tillage offsets increased from 43% of all offsets generated in 2007 to 60% in 2011, and increased from 4% of compliance in 2007 to 20% in 2011 (Figure 1).

Table 1. Overview of agricultural offset activity in the context of total offsets registered<sup>6</sup>

Offset System Activity	2007	2009	2011	Total
No. of Projects				
Agricultural	3	15	20	63
Total	7	26	30	108
Registered (t CO <sub>2</sub> e)				
Agricultural	558,714	1,654,084	3,272,455	8,356,939
Total	1,557,037	4,432,124	7,456,317	21,132,523
Retired (t CO <sub>2</sub> e)				
Agricultural	202,210	1,609,098	2,321,263	6,709,509
Total	986,700	3,853,222	5,294,390	16,838,694

## RECENT DEVELOPMENTS

The Alberta Offset System continues to improve and evolve. As of January 1, 2012, a higher standard of verification to a reasonable level of assurance (positive proof) is required for all offsets. This means that historical offsets can no longer be created back to 2002. Verifiable records will continue to be key to confirming practice improvements. Protocols approved in 2007 are also undergoing a mandatory 5 year review.

Table 2 outlines the status of various approved and developing agricultural protocols. Possible future protocols may address Covered Manure Storage and Soil Amendments.

The two new agricultural protocols released in April, 2012 provide more opportunities for farmers to gain benefits from generating carbon offsets:

- Conservation Cropping Protocol - includes a revision of the Tillage Protocol with reduced opportunity for offsets due to high adoption rates of reduced and no-till practices, and increased opportunity for offsets from management that reduces areas of summerfallow.
- Residual Feed Intake for Beef - rewards increased efficiencies of feed use through genetic improvements.

Table 2. Status of agricultural offset protocols in Alberta

Offset System Activity	Drafted to Reasonable Assurance	Under 5 year Review	Developing
Conservation Cropping / 2012		Biomass	Afforestation (modification)
Beef Residual Feed Intake / 2012	Pork	Biofuel	Wetlands Restoration
Beef Reduced Age at Harvest / 2011			Transportation Efficiency
Beef Reduced Days on Feed / 2011			Cropland Conversion to Perennials
Nitrous Oxide Emissions Reduction (NERP) / 2010			
Dairy / 2010			
Energy Efficiency / 2007			
Biogas / 2007			

ARD staff are continuing to work with researchers, verifiers, Alberta Environment and Sustainable Resource Development (ESRD) and private industry to:

- Develop new opportunities for agricultural offset incentives to improve management
- Identify innovative methods of verifying practice improvements, including the role of professional agronomists
- Develop approaches to contracting and risk management
- Support the adoption of approved protocols through on-farm demonstrations
- Prepare summaries and interpretive guides
- Deliver information about agricultural offsets at extension meetings and web-based platforms

The many co-benefits associated with implementing offset protocols include increased efficiency of production, heightened value of verifiable farm data and digital records and development of transferrable knowledge for other environmental market opportunities.



## REFERENCES

<sup>1</sup>Alberta Environment. 2007. Specified gas emitters regulation, Alta Reg 139/2007. Available at <http://canlii.ca/t/l3sr> (verified 30 July 2012). Alberta Environment. July 2007. Edmonton, AB, Canada.

<sup>2</sup>Environment Canada. 2012. National Inventory Report, 1990-2010: Greenhouse gas sources and sinks in Canada. Available at [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/6598.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/6598.php) (verified 30 July 2012).

<sup>3</sup>Storey-Bishoff, J. Personal communication. 3 July 2012. Contribution of 2010 large final emitter greenhouse gas emissions by industrial sector (114 Mt total).

<sup>4</sup>C3. 2011. Alberta Protocol Development Process. Available at: <http://carbonoffsetsolutions.climatechangecentral.com/offset-protocols/alberta-protocol-development-process> (verified 4 Sept 2012).

<sup>5</sup>Adapted from Alberta Environment and Sustainable Resource Development. 2012. Greenhouse gas reduction program. Available at <http://environment.alberta.ca/01838.html> (verified 30 July 2012).

<sup>6</sup>C3. Summary of Alberta emissions offset registry activity. 21 June 2012.

<sup>6</sup>Agricultural Carbon Offsets. Information for Alberta's Offset Market. Available at [www.agriculture.alberta.ca/agcarbonoffsets](http://www.agriculture.alberta.ca/agcarbonoffsets) (verified 4 Sept 2012).

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