



## CHAPTER

# 6.0

### **Energy Inputs**

This chapter outlines beneficial management practices to decrease fuel consumption and discusses alternative energy sources.

## 6.1 Energy Efficiency

By decreasing the amount of fuel used, you can lower your energy costs, boost the efficiency of your operation and decrease the amount of harmful emissions released into the environment. Energy accounting provides a simple process to determine your energy use and costs to help you identify which energy-saving options will work best for your operation.



For more information on energy efficiency, see *First Steps to Energy Management: Save Energy and Money* (AAFRD). This guide will help you through the steps to add up your energy use and costs and provides some simple, low-cost ideas for reducing energy use on your farm. For a copy, call the AgTech Centre (1-403-329-1212) or the Conservation and Development Branch (1-780-422-4385). All Alberta Government offices may be reached toll-free by first dialing 310-0000.

### Practices to reduce fuel consumption include:

- ▶ Keep cutting tools sharp and implements level to the ground to prevent unnecessary power requirements.
- ▶ Practice routine and timely maintenance on all farm equipment and implements.
- ▶ Perform multiple tasks on each pass through the field where possible.
- ▶ Inflate tires according to the manufacturer's recommendations.
- ▶ Use radial tires
- ▶ Reduce tillage.
- ▶ Match the tractor to the load. The typical optimum pull is 40% of the tractor weight.
- ▶ Add or remove ballast to match the load when tractors are used for different field operations. Removing weight also reduces soil compaction.
- ▶ Gear up and throttle down: Shift to a faster gear and slow the engine speed to maintain the desired field speed. This decreases the fuel consumption, but when the engine speed is reduced, reaction time of the tractor hydraulics will be slower and PTO speed is correspondingly reduced. This could result in unacceptable performance and/or reduced productivity from the PTO-driven device. Gearing up and throttling down can be used when loads require less than 65% of a tractor's power.
- ▶ Shut engines off when not in use.
- ▶ For high temperature grain drying, use a continuous flow dryer.
- ▶ For low temperature aeration grain drying, use automatic controls. If you do not have automatic controls, monitor the drying process regularly.



For more information, see the *AgTech Centre Innovator* newsletter, Volume 1, Issue 2 ([http://www1.agric.gov.ab.ca/\\$department/newslett.nsf/all/agin39?opendocument](http://www1.agric.gov.ab.ca/$department/newslett.nsf/all/agin39?opendocument)).

## 6.2 Alternative Energy Sources

Wind power, solar power and biodiesel are the three most common renewable energy sources for agricultural users at present. Other alternatives such as biogas and earth energy are being developed and may be good options in the future. These options reduce the use of non-renewable energy sources, and so help to reduce harmful emissions.

### 6.2.1 Wind Power

Modern wind turbines can provide reliable, cost-effective, pollution-free energy for individuals and communities. The cost of these systems depends on the power output. A 1-kW system costs about \$5,000, and a large-scale commercial system that produces 600 kW can cost \$1 million.



➔ Wind turbines can provide energy for individuals and communities.

*Courtesy of AAFRD*

Wind systems need a relatively consistent wind flow. Trees and other obstructions can impede wind flow to the rotors. Collect at least one year of wind data before selecting a site. A wind power system usually requires an average annual wind speed of at least 15 km/h. An average wind speed of greater than 25 km/h is desirable, and over 29 km/h is excellent, especially if the intent is to sell the power.

## 6.2.2 Solar Power

Capturing enough solar energy for effective use depends on available solar energy, weather conditions, location, the technology used and the application. Although the initial cost of solar energy technology can be high, it has the potential to reduce energy bills considerably and provide an economic source of power in remote areas.



➔ Solar energy can be used to convert sunlight into electrical power.

*Courtesy of AAFRD*

On farms, solar energy can be used for heating or to convert sunlight into electricity to power such things as water pumps, electric fencing and grain dryers.

### 6.2.3 Biodiesel

Biodiesel is made from renewable resources, such as soybean oil, canola oil or animal fats. This high-performing fuel improves air quality by greatly reducing emissions of carbon monoxide, ozone-forming hydrocarbons, hazardous diesel particulates, acid-rain-causing sulphur dioxide, and carbon dioxide. However, nitrogen oxide emissions may increase.

Biodiesel-powered engines deliver similar torque, horsepower, haulage rates and kilometres per litre as petroleum-powered diesels. Biodiesel can be used in existing engines and fuel injection equipment without harming performance. It has superior lubricating properties and can extend engine life. Winter operating procedures are the same for biodiesel as they are for number two petroleum diesel. Biodiesel can be blended with petroleum diesel or used neat (100%). Some farm equipment manufacturers have approved the use of soy-based biodiesel fuel blends for some of their diesel-powered engines.

Biodiesel is currently not available for retail sale, so producers must find their own source. Although it is possible to produce biodiesel on farm, it is not currently an economic option in most situations. Commercial biodiesel is widely available in Europe and may be available in Canada later in this decade.



For more information on these and other alternative energy sources, see recent issues of the AgTech Centre Innovator newsletter or go to AAFRD's website, click on 'Engineering' and follow the links.

## 6.3 Information Sources

### 6.3.1 Contacts

All Alberta Government offices may be reached toll-free by dialing 310-0000.

- ▶ Alberta Agriculture, Food and Rural Development: Ag-Info Call Centre, phone: 1-866-882-7677; website: <http://www.agric.gov.ab.ca>
- ▶ Your district office of Prairie Farm Rehabilitation Administration (PFRA) of Agriculture and Agri-Food Canada, or the PFRA website: [www.agr.gc.ca/pfra](http://www.agr.gc.ca/pfra)
- ▶ Alberta Environment: phone: 1-780-944-0313; website: <http://www3.gov.ab.ca/env/>
- ▶ Natural Resources Canada, Office of Energy Efficiency: website: <http://oee.nrcan.gc.ca/english/>

### 6.3.2 References

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