

Reducing Energy Costs in Agriculture



Farmers and consumers alike have long taken for granted plentiful supplies of energy at a reasonable cost. However, energy bills that have doubled or tripled have led to rethinking the energy situation.

With farm profits already low, it is important that farmers consider the significant impact energy costs have on the bottom line and take steps whenever possible to reduce the impact of these higher energy costs.

Following are potential cost-cutting suggestions farmers should consider to reduce the impact of energy costs in the home, in farm buildings, and in the field.

Reducing Energy Costs in Buildings

Stop Air Leaks

Whether in farm buildings or in homes, air leaks are a major cause of heat loss. Windows, doors, and roofs are primary culprits. The total amount saved varies, but older structures usually realize the most savings. Caulking and weatherstripping around windows and doors can reduce heat loss up to 37 percent in those areas. Some older buildings may need to be modified if heat losses are great.

Insulate Adequately

Add insulation (R-19 or 6 inches for walls and floors, R-38 or 12 inches in attics) if current insulation is not enough. Increasing attic insulation from R-19 to R-38 reduces heat loss through the attic by up to 50 percent. Also insulate farm shops and other buildings.

Turn Down the Heat

Keeping a room five degrees cooler (65°F compared to 70°F) can save up to 21 percent on the heating bill. If you're cold, put on layers of clothes.

Use a Smaller Space

Unless there is risk of pipes freezing, block off unused rooms or areas. In very cold weather, try to use and heat a smaller portion of the living area.

Look for Cost-Effective Heat Sources

Most farms have access to used motor oil from farm equipment. If so, an economical way to heat shops and other buildings is with a wood or oil-fired heater if the buildings are used often enough. Another benefit of burning used motor oil is that it makes use of a product that sometimes must be disposed of at a cost.

Maintain the Heating System

When fuel costs are high, it is easy to overlook the value of maintenance. However, a problem in the heating system simply adds to these costs. Change the filter regularly and have the system serviced to make sure it is operating efficiently. Keep a record of services performed. For safety as well as for efficiency reasons, make sure heating systems and structures are properly vented. A heating contractor can tell you if venting is a problem.

Energy Management in the Field

Reduce Tillage

If you are not already doing so, consider planting some crops using the no-till method to reduce the number of trips equipment makes over a field. This planting method can result in significant savings, but follow good management practices to ensure a good stand. Apply herbicides when weeds are small and easier to control to reduce the risks of having to reapply chemicals later.

Practice Good Nutrient Management

With high energy prices, sound nutrient management is more important than ever. Start with soil testing. Soil testing allows you to optimize applications of nitrogen fertilizer, which is influenced by natural gas prices.

Also, consider other fertilizer sources such as animal manures where available. Calibrate application equipment for uniform application. Apply nitrogen fertilizers close to the time of actual crop need. As always, use environmentally sound management practices to keep fertilizer out of water sources.

Consider Used Oil as Equipment Fuel

Waste engine oil and hydraulic oil also can be filtered (5 micron filter or smaller) and burned in a diesel solution in tractors and in other equipment. A good starting point is 90 percent diesel and 10 percent oil, although up to 100 percent oil use is possible with good filtration and preheating. Be sure to check with the engine manufacturer before burning waste oil in engines under warranty. With vegetable oil prices low (20 cents or less per pound) and diesel prices high, soybean or cotton seed oil blends with diesel fuel may be economical.

Save Energy When Drying Grain

Although significant grain drying savings may be realized by allowing grain to dry in the field, the trade-offs must be considered. For example, rice quality may

be lower when harvest is delayed. Aflatoxin may be a problem in corn. In these situations, saving on energy cannot justify a possible loss in grain quality. Cleaning the aeration plenum, or enclosure, under the floor of a grain bin can save energy by reducing the static resistance the fan must overcome. Sealing leaks, cleaning inlet screens, and timing aeration for maximum cooling are other cost-cutting measures for grain producers.

Practice Efficiency

Good equipment maintenance and operator training go hand in hand toward saving energy. A faster, more efficient job saves fuel. Clean or replace air filters, and use appropriate equipment ballast to keep wheels from slipping and using more fuel. Keep tires properly inflated.

Save Energy on Irrigation

Keep irrigation engines serviced and well-tuned. Make sure electric motors, switches, and control panels are clean and free of dirt, insects, or bird nests. Check connections to ensure they are tight, and lubricate moving parts that require it. Use an irrigation scheduling method to time irrigations for more efficient fuel and water use. Start irrigation before soils are completely dry. Use larger amounts of water on fewer acres per irrigation to move water through fields quicker and more efficiently.

Other Energy Management Tips

Compare Fuel Efficiency

Often, rural populations do not have the energy options available to people in urban areas. For example, natural gas—usually the most economical of the major energy sources—is often not available in rural areas. Still, it pays to consider the cost of different fuels in terms of energy value.

To determine the cost and value of a fuel, first consider the number of British Thermal Units (Btu's) produced by the fuel. Here are some major fuel sources and their Btu output:

- Natural gas: 1,000–1,200 Btu's per cubic foot
- Liquid propane: 91,500 Btu's per gallon
- No. 2 diesel: 140,000 Btu's per gallon
- No. 6 fuel oil (used motor oil): 150,000 Btu's per gallon
- Electricity: 3,412 Btu's per kWh (kilowatt hour)

To determine the Btu value per dollar, divide the fuel's Btu per unit by the unit price. Below are examples for comparison. Remember, changing fuel prices affect a particular fuel's Btu value per dollar (if the unit price changes, simply substitute the new price).

- At 80 cents per 100 cubic feet, natural gas gives 125,000 Btu's per dollar.
- At \$1.50 a gallon, liquid propane gives 61,000 Btu's per dollar.
- At \$1.40 a gallon, number 2 diesel fuel gives 100,000 Btu's per dollar.
- At 6.2 cents per kWh, electricity gives 55,032 Btu's per dollar.

Buy Fuel in the Off-Season

Like many other goods, gas prices are a function of supply and demand. If you can, buy fuel in the summer when supplies are more abundant and prices are usually lower.

Shop for Prices

Although it probably is smart to buy fuel from a local utility, it is possible to buy natural gas nationwide from the best bidder. This usually involves buying from a gas corporation, hiring a pipeline company, and then hiring the local utility to deliver it. Some individuals reportedly have saved about 15 percent on gas prices by shopping around the country. If you plan to shop around, reliability of service is critical. Check with your local gas utility about this possibility.

Information Sheet 1621 (POD-09-18)

Reviewed by **James Wooten**, Extension Associate, Agricultural and Biological Engineering. Written by **Larry Oldham**, PhD, Extension Professor, Plant and Soil Sciences and **Dr. Jimmy Bonner**, **Jim Thomas**, **Herb Wilcutt**, and **Dr. Malcolm Broome**, former Extension specialists.



Copyright 2018 by Mississippi State University. All rights reserved. This publication may be copied and distributed without alteration for nonprofit educational purposes provided that credit is given to the Mississippi State University Extension Service.

Produced by Agricultural Communications.

Mississippi State University is an equal opportunity institution. Discrimination in university employment, programs, or activities based on race, color, ethnicity, sex, pregnancy, religion, national origin, disability, age, sexual orientation, genetic information, status as a U.S. veteran, or any other status protected by applicable law is prohibited. Questions about equal opportunity programs or compliance should be directed to the Office of Compliance and Integrity, 56 Morgan Avenue, P.O. 6044, Mississippi State, MS 39762, (662) 325-5839.

Extension Service of Mississippi State University, cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. GARY B. JACKSON, Director