USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Resource Concerns

ENERGY

Equipment and Facilities

Soil
Water
Air
Plants
Animals
Energy
Inefficient Use
Equipment and Facilities
Field Operations

Inefficient Energy Use - Equipment and Facilities

The inefficient use of energy increases costs and dependence on non-renewable energy sources.

What is it?

Inefficient energy use occurs whenever facilities, equipment, or machinery operate more hours than needed to meet production goals. It may also occur when facilities, equipment, or machinery become worn out, outdated, or are poorly controlled or maintained.

Why is it important?

High energy prices have put considerable pressure on the U.S. economy. High input costs and the inability to set prices leave the agricultural sector with limited options to be economically viable. Reducing energy use helps our nation to be energy independent and reduces costs, helping producers stay competitive in the marketplace.

What can be done about it?

There are two ways to reduce energy related production costs: 1) increase energy efficiency of the operation and 2) increase use of energy sources produced on the farm. For increased energy efficiency, NRCS Energy Estimator and Assessment tools gauge potential energy savings for a wide variety of efficiency upgrades. If these tools show energy saving opportunities, or if there are concerns about energy use and cost, NRCS staff will likely recommend an energy audit. During an energy audit, energy experts evaluate the farming operation and recommend changes to improve energy use. Common recommendations include changes to lighting, ventilation, heating and cooling of livestock facilities, drying/curing, milk cooling, irrigation pumping, and manure handling. An energy analyst evaluates the age and condition of facilities, equipment, and machinery, and how they are operated and maintained. For on-farm renewable energy, the Energy tools provide a similar gauge of renewable energy resources. NRCS staff can help identify ways, for example, to better use solar and wind resources, take advantage of geothermal or micro-hydropower potential, and use waste for bio-energy to leverage increased efficiency efforts.

Equipment and Facilities at a Glance

Problems / Indicators - Unacceptably high energy costs	
Causes	Solutions
• Unvented, propane-fired heated systems • Throttling valves to control water flow • Using incandescent or T12 lights • Inefficient motors and farm equipment	• Convert to radiant heating • Add variable frequency drive pump • Upgrade inefficient pump and/or motor • Upgrade to T8, LED, or CFL lighting • Renewable energy sources • Low pressure irrigation systems

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What can be done about it?

Money can be saved and energy dependency can be reduced by improving the efficiency of field operations, and by adopting practices that help reduce energy-intensive inputs, such as soil amendments, fertilizers, or pesticides. For improved efficiency, Natural Resources Conservation Service (NRCS) staff will most likely start by evaluating field operations used to till, plant, cultivate, and harvest crops. This assessment helps identify steps to take to reduce field operations or improve efficiency. The NRCS Residue Management Energy Estimator tool can be used to estimate potential energy savings associated with changes in tillage, cultivation, and fertilizer use. By using a guidance system on tractors and equipment, application overlaps can be reduced and application rates can be optimized to account for variability in soil types, elevation, soil chemistry, fertility, and productivity within fields. These steps can reduce the need for fuel, fertilizer, herbicide, and insecticide, and save money. For reduced inputs, adoption of Integrated Pest Management techniques of prevention, avoidance, monitoring, and suppression can reduce pesticide and fuel use and lower environmental risk. Substituting manure for commercial fertilizer, or using nitrogen-fixing legumes as cover crops or in crop rotations can reduce the use of fossil fuel-based commercial fertilizer. Tractor operations are likely to increase, but usually money is saved. Overall energy use is lower because less natural gas will be used to produce commercial nitrogen fertilizer (that was not purchased).

Field Operations at a Glance

Problems / Indicators - Unacceptably high energy costs	
Causes	Solutions
• Unnecessary trips across the field • Overlap when applying fertilizer, pesticides • High use of commercial fertilizer	• Convert to conservation tillage • Global positioning system guided spraying equipment • Incorporate nitrogen-fixing legumes into rotation or as cover crop

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