



Energy Conservation in Agriculture

Low-Cost Energy Conservation: General Farm Enterprise

Scott Sanford

Electricity has allowed many laborious tasks on the farm to be handled by machine. As a result, farmers have raised their production levels. *Wisconsin Energy Statistics* indicates that while petroleum use in agriculture has declined, the use of electricity has steadily increased. Some of this increase is due to greater use of confinement housing and high-density production systems.

There are many management practices you can adopt to reduce energy use or lower your energy costs with little or no upfront investment. The following is a list of ideas that could possibly reduce your energy consumption depending on your operation. Refer to the references at the end of this publication for more information.

General

1. If time-of-use electrical rates are available, consider moving large energy users such as irrigation, water heating and milking operations to off-peak periods.
2. Have your electrical system inspected and implement recommendations. Assistance and grants are available in Wisconsin for correcting wiring problems on farms through your local utility.
3. Consider the use of three-phase power for farm operations if upgrading your electrical system.

Electric motors

1. Inspect and clean accumulated dust off electric motors every month (or sooner if required) to keep motor running cool and prevent overheating.
2. Check belt tension and alignment of all belt-driven equipment monthly. Belt slippage and misalignment of pulleys can shorten belt life by half. (Always replace machine guards.)
3. Consider using cogged belts and pulleys on new equipment. Cogged belts reduce belt drive transmission losses, which are typically 5% for standard V-belt drives.
4. Use the proper size and type of motor for application. Use totally enclosed motors for all farm applications.
5. Install motors in a cool, clean, dry environment, whenever possible.
6. Consider using lower capacity equipment with smaller motors that run over a longer period of time rather than large motors.
7. Install motors according to electrical safety codes and install all safety guards including belt guards with proper fasteners.
8. Use Variable Frequency Drives for varying loads such as milk pumps, vacuum pumps and ventilation fans.

Livestock waterers

1. If purchasing a livestock waterer, consider one that is frost-free or at least well-insulated. The number of animals drinking from the waterer will affect energy use. Low numbers of animals per waterer increases energy costs because less "warm" well water is drawn into the waterer, resulting in lower water temperatures and a greater need for heating to prevent ice formation.
2. Repair or add insulation as needed to the base cabinet.
3. Maintain a seal around the base of the waterer to reduce air infiltration and prevent freezing.
4. Locate the waterer in a sheltered area out of the wind.
5. Make sure covers or balls operate freely.
6. Use a thermostatically controlled heater.
7. Check thermostats monthly and adjust to just above freezing.
8. Shut off electricity to waterers when heating is no longer needed.

Note: A well-maintained, efficiently heated waterer used by the appropriate number of animals costs \$60 to \$80 per season to heat in Wisconsin.

References

1. *Low-Cost/No-Cost Energy Management Practices on Farms*. National Food and Energy Council, Columbia MO.
2. *Field Study of Electrically Heated and Energy Free Automated Livestock Water Fountains*, DP0990, Prairie Agricultural Machinery Institute, Portage la Prairie, MB, Canada, 1991.
3. *Energy Free Water Fountains*, Publication #706, Prairie Agricultural Machinery Institute, Portage la Prairie, MB, Canada, 1994.



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