



E³A: Energy Management for Farm and Ranch

Steps in the Farm and Ranch Energy Management Series

Energy Conservation and Efficiency in Farm Shops

Energy Saving Practices for Poultry Operations

Energy Saving Practices for Dairy Operations

Energy Efficiency and Farm Water Systems

Energy efficiency and farm water systems

Note: Data in this series were obtained through the Missouri Agricultural and Energy Savings Team – A Revolutionary Opportunity (MAESTRO) program. The MAESTRO program was created to strengthen the financial viability of Missouri's livestock producers through energy efficiency. Specifically, participants in the program were livestock producers who were not required to be permitted as confined animal feeding operations (CAFO). MAESTRO was a grant-funded program that provided cost-share assistance to implement energy-efficient practices recommended in energy management plans through low-interest loans and rebates. Although these guides refer to energy savings in Missouri, many of the concepts described may apply to operations throughout the Midwest. Visit <http://extension.missouri.edu/energy> if you are interested in more energy-saving recommendations.

Farm water systems are often neglected when it comes to energy efficiency. Although the savings to be realized may not be as great as those of energy-efficient lighting, the return can be fairly quick for some energy-saving investments. Here are some general guidelines regarding farm water systems:

- Check all water system components regularly for proper operation and leaks. Leaks can lead to excessive pumping and water heating costs.
- Inspect wiring regularly.
- Use properly sized pipes to reduce friction loss in pumping water.

Pump houses

Pump houses need to be designed to keep water systems from freezing. Several pump houses evaluated in the MAESTRO program had considerable air leakage and were not adequately insulated. The average cost of improvements to the pump houses was estimated at \$448 per farm with an annual energy cost savings of \$267. Most of the costs of pump house improvements came from adding insulation and sealing air leaks; measures that have a 1.7-year payback.

For small air leaks, spray-foam insulation can be used to seal leaks and insulate many pump houses. It might be more cost-effective to seal larger air leaks with caulk or foam insulation and use batt insulation to increase the R-values of walls and ceilings. Pump houses should have a minimum R-value of 20 in the walls and 30 in the ceiling.

Livestock watering systems

Energy-efficiency investments in livestock waterers can be as simple as insulating them or adjusting the thermostat. Here are some guidelines regarding energy efficiency for stock waterers:

- Seal and insulate waterers, if possible.
- Thermostats should be set at 32 to 34 degrees F to keep water from freezing.
- Check waterers regularly to ensure proper operation without leaks.
- Wind barriers can help reduce the cost of heating waterers.
- Be sure to turn off heaters in waterers in warmer weather.
- Install new waterers inside buildings, when possible, to reduce the energy needed to keep them from freezing.
- Use a circulating waterer, which consumes a limited amount of energy.
- Energy-free waterers further reduce energy consumption, but take care to ensure it will provide an adequate water supply for the number of livestock it is intended to serve.

In the MAESTRO program, energy assessments were made for stock waterers for 57 farms. The average estimated installed cost was \$1,677 with an estimated average energy savings of \$278. The average payback on these investments was six years, but that figure can vary considerably from farm to farm.

Solar water systems

In some cases, solar pumping systems might be feasible for farm water systems. Solar pumping is ideal when a system is needed in a remote location and the cost of running electric lines would be prohibitively expensive. Install batteries with the solar watering system to ensure a steady water supply through cloudy weather.

Water heaters

Understanding the proper use, maintenance and necessary insulation of water heaters will help you ensure that they run efficiently. Keep these general guidelines in mind with regard to water heaters:

- The water temperature should be adjusted depending on how it will be used.
- If you have an older water heater, you might benefit from installing an insulating blanket around the water heater. Insulating blankets can be purchased at many hardware stores, or you can make your own by wrapping insulation around the water heater. However, be careful not to block the air inlet for gas water heaters.
- Insulate exposed hot-water pipes.
- Wash clothes in cold water when appropriate.
- Repair leaky faucets, especially those for hot-water.
- Install low-flow shower heads.

Additional information

More information on solar pumping systems can be found in “Solar Powered Livestock Watering Systems” from the National Sustainable Agriculture Information Service: <https://attra.ncat.org/attra-pub/summaries/summary.php?pub=250>

References

MAESTRO Best Practices Guide.