



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 conservation and efficiency in farm shops

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.

Energy losses in farm shops resemble those in homes, but they are often overlooked. The farm shop is usually not heated as continuously or to as high a temperature as the home, but energy savings in the shop are attainable with some conservation and efficiency practices.



The first step to consider is to obtain an energy audit, especially if you have high energy use in the shop. The energy audit for a farm shop is similar to one for a home. An energy audit is an in-depth examination that determines:

- if and how energy is being lost,
- which systems are operating inefficiently, and
- what type of cost-efficient measures can be implemented to make the farm more energy-efficient.

To explain further, an energy audit evaluates the current energy usage, makes calculations of existing systems’ efficiency and compares them to proposed new systems. The Agricultural Energy Management Plan (AgEMP) that follows an energy audit explains any energy-saving measures recommended for the shop. AgEMP reports might qualify for financial assistance from various funding sources, including but not limited to federal grants, loan programs or energy tax credits.

The MAESTRO program was created to strengthen the financial viability of Missouri’s livestock producers through energy efficiency. All data on potential energy savings for shops were obtained through this program. Sixty farms representing beef, swine and dairy operations had their shops evaluated for energy usage. The energy savings came from updating lighting, insulating and sealing the shops from air leakage, and upgrading to more efficient heaters. The payback on renovations was 9.7 years, using the estimated savings detailed in Table 1.

Table 1. Average estimated savings per farm.

	Estimated savings (mmbtu)	Installed cost	Savings per year	Electricity saved (kWh)
Total	783.48	\$228,358	\$23,464	88,160.41
Average per farm	13.058	\$3,806	\$391	1,469.01

Low-cost energy-saving practices

- Take advantage of energy-saving measures suggested in AgEMP reports generated through the MAESTRO program.
- Seal holes that allow air to leak into the building.
- Turn down or turn off heat when the shop is not in use.
- Turn off lights when not in use. Consider motion detectors to automatically turn off lights when no one is in the shop.
- Seal leaks in compressed air systems. Leaks cause the compressor to run more often, which wastes energy.

Medium-cost energy-saving practices

- Add insulation to the shop if insulation levels are low. R-values — a measure of insulation effectiveness — of 15 to 20 are best for side walls, 30 for the ceiling and 10 for doors.
- Replace doors and windows that are in poor condition. Adding storm windows can also help reduce energy loss.
- Use zone heating and only heat the area in which you are working. There are a variety of heaters that will suffice to heat the work area.
- Replace incandescent or inefficient fluorescent lights with more efficient lighting.

High-cost energy-efficient practices

- Replace heating systems. This is most practical when the existing system is near the point of failure. Consider using waste-oil heaters or other renewable energy sources that could be produced on the farm.
- Add insulation as necessary. The expense of the job will depend on how much additional insulation is needed.



Proper insulation levels are important when considering ways to make your operation more energy efficient.

Additional information

Energy Fundamentals for Farm Lighting.
<http://farmenergy.exnet.iastate.edu/wp-content/uploads/downloads/2012/02/PM-2089N.pdf>

Farm Lighting Energy Efficiency Checklist and Tips.
<http://www.extension.org/pages/32591/farm-lighting-energy-efficiency-checklist-and-tips>

References

Farmstead Energy Audit, North Dakota State University.
<http://www.ag.ndsu.edu/pubs/ageng/structu/ae1366.pdf>
Conserve Heat Energy in the Farm Shop, Iowa State University.
<http://farmenergy.exnet.iastate.edu/wp-content/uploads/downloads/2012/02/PM-2089P.pdf>
Farm Shop Energy Efficiency Checklist and Tips. <http://www.extension.org/pages/30409/farm-shop-energy-efficiency-checklist-and-tips>