Farming and Energy Use Series

Understanding Energy Efficiency

Energy efficiency cuts costs for farms and can even lead to profitability. It also benefits the natural resources farms depend on—air, land, and water—because it decreases fuel and electricity use, which reduces greenhouse gas emissions and other pollutants.

Energy efficiency means using less energy to perform the same task. The number one priority of an energy efficiency project is to cut the amount of energy you use yet still complete a task successfully. If you don't accomplish your task as well as you did before implementing an energy efficiency project, then the measure wasn't carried out correctly, or may not have been a true energy efficiency measure after all.

First Step: Perform an Energy Inventory on Your Farm

The saying, "you can't manage what you don't measure" applies directly to energy use. Before you put energy efficiency measures in place, first identify where and how your operation is using energy.

Write down some category headings such as:

- Lighting
- Ventilation
- Pumps
- Powered equipment (tractors)
- Vehicles
- Grain dryers
- Cooling
- Heating

Take a walk around your farm and under each category, list any energy-using equipment you are running. For each piece of equipment, answer the following:

1. Is the equipment sized properly?
2. How often are you using the equipment?
3. How old is the equipment?
4. How well maintained is it?

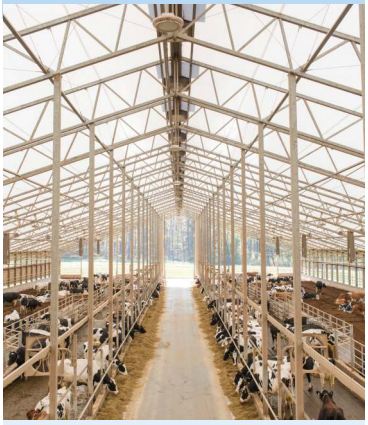
Now think about some ways you can conserve energy. Can you switch off unnecessary lights and equipment? Adjust thermostats in less used areas? What about upgrading older equipment?

Top Six Ways to Save Energy and Money on Your Farm

While every farm is unique and opportunities for efficiency vary, here are six ways many farmers have improved their operation's energy efficiency.

1. Lighting: See clearly and efficiently

Installing energy efficient lighting is a proven way to save energy. Dim or turn off lights when daylight allows. Don't forget to clean the light covers and fixtures to optimize light output. Lighting controls such as light sensors, occupancy sensors, and timer switches are also an option. Consider upgrading inefficient incandescent lighting fixtures to LED lighting.



Sustainability On The Farm: Berks County

"When we built our dairy barn, we incorporated numerous energy saving features: high ceilings, light coated fabric roofing, hi-effciency fans, LED lighting, water sprinklers, ventilation systems operated via climate and time sensors, robotic milking with variable-speed motors, and a compost bed pack. This provided our cattle a comfortable living environment 24/7. These "comforts" allow them to produce more milk efficiently and profitably, improving our farm's sustainability."

Phoebe Bitler, Partner, Vista Grande Farms, LLC, Berks County, and Chair, Center for Dairy Excellence

Photo: Vista Grande Farms dairy barn with energy-saving features

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2. Pumps: Match speed to need

A variable frequency drive or variable speed drive (VSD) for vacuum and transfer pumps can be a major energy saver. Without a VSD, vacuum pumps typically operate at full speed and air intake valves admit excess air as a way of controlling the vacuum level.

In contrast, VSDs match vacuum pump operation to need, without allowing excess air to reduce pump operation, resulting in energy savings up to 50 percent.

Variable Speed Drive (VSD)

3. Fans: Optimize for function

Ventilation for cooling and fresh air exchange is crucial, but it can also be a substantial energy user. Clean fan blades for optimal efficiency. Invest in high-efficiency exhaust and circulation fans, as well as VSDs for circulation fans, to save energy while still providing proper ventilation.

4. Motors: Out with the old

Motor efficiency is the ratio of electrical power input to mechanical power output. No motor is 100 percent efficient, but older motors are often less efficient than new motors.

If you have motors that run more than 2,000 hours/year, an early replacement may be cost-effective. Otherwise, when your motors are at the end of their useful life, replace them with high-efficiency, premium models certified by the National Electrical Manufacturers Association.

5. Space conditioning: Control and customize it

Space conditioning is simply cooling or heating the space in a building, such as a barn. When it comes to space conditioning, a one-size-fits-all approach will cost you. There are a number of ways to tailor and reduce the use of heating and/or cooling in a building to save money:

- Adjust thermostats in lesser-used areas.
- Install more efficient HVAC systems.
- Switching to programmable thermostats that allow you to control heating or cooling at different times of the day.

6. Transportation Fuel Use: Drive it down

"Mobile energy" use on farms includes fuels used to till, plant, harvest, and transport crops. Farm tractors and other vehicles can provide a large savings potential.

- Be sure to keep to a regular maintenance plan that includes proper tire inflation as well as air and fuel filter replacement schedules.
- Choose equipment properly sized for the job.
- Consider using engine block heater timers to warm up diesel equipment in subfreezing temperatures.
- Conservation tillage practices not only reduce soil erosion, but save tractor fuel!

Did you know

Newer, energy efficient LED lighting systems are both dimmable and have adjustable color output that can result in happier, more productive chickens!

Lightbulbs: Do the Math for a 90 Percent Savings

A 200-watt incandescent light puts out 3,405 lumens of light.

A 200-watt-equivalent LED light uses 20 watts to put out 3,405 lumens of light.

How much money can LED lighting save you? Let's do the math.

At 10 cents per kilowatt hour:

If you have ten 200-watt incandescent lights on 12 hours/day:

10 lights x 200 watts/light x 12 hours/day x 365 days/year = 8,760,000 watt hours/year, or 8,760 kilowatt hours/year.

YOUR BILL: $876/year.

If you upgrade the ten lights to LED that use 20 watts with the same lumen output:

You'll use 876 kilowatt hours per year—just 10 percent of the energy you'd use for incandescent.

YOUR BILL: $87/year—a 90 percent savings!

Want more information?
Contact:

Michelle Ferguson
DEP Energy Programs Office
(570) 327-3783
miferguson@pa.gov

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