Evaluating your energy 'payback'

Farm Energy
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SUMMER often marks the beginning of maintenance projects and other improvements around the farmstead, as students finish up the school year and begin their summer work. This extra help can save you time and effort; carefully evaluating those summer projects before the work begins can also save you money.

Our Farm Energy team will be working with several students this summer on a variety of energy efficiency projects at the Iowa State University Research and Demonstration farms across the state. If the summer plans for your farm include new construction, replacement of motors and equipment, or upgrading lighting systems, some number-crunching can help you select the best investment for your business dollars.

As energy prices continue to creep upward, safeguarding your operation begins with comparing the simple payback for energy-related farm projects.

"Saving money today by purchasing equipment with a lower initial cost and higher energy demands puts the buyer at risk when energy prices rise in the future," says Mark Hanna, ISU Extension ag engineer. "This may nullify the savings gained from the low purchase price."

Calculating the simple payback period for a purchase means dividing the initial cost by the projected annual energy savings. According to the online tool provided by the Ag Decision Maker website from ISU Extension and Outreach, the payback period is the "length of time it takes for the accumulated net returns earned from an investment to equal the original investment" (*www.extension.iastate.edu/agdm/wholefarm/html/c1-05.html*).

For example, if the cost for new equipment is $3,600 and the projected annual energy savings (at current energy prices) is $900, the initial cost is repaid through energy savings after four years ($3,600/$900 = 4).

How simple is it?

Simple payback is typically helpful for comparing purchases with relatively short payback periods. However, this method does not account for continued energy savings (return on investment or net returns) after a project reaches its breakeven point. To do this, you need reliable information about the equipment's useful life.

Some examples that illustrate the benefits and limitations of the simple payback method are available in the ISU Farm Energy fact sheet, "Estimating payback for energy efficiency," PM 2089S, available at *farmenergy.exnet.iastate.edu*.

Here's the payback on this equipment:

■ **Lighting.** The initial cost to install compact fluorescent bulbs in a livestock facility is $400, but the estimated annual electrical savings is $2,000. The simple payback period is 0.2 year ($400/$2,000) with a savings of $1,600 in year one and $2,000 in year two. Estimated bulb life for the project is two years, so return on investment is $3,600 over two years. Extra labor costs may be incurred to make the switch to new light bulbs or fixtures, but consider if the energy savings from the upgraded, energy-efficient lighting will cover labor and installation costs.

■ **10-hp electric motor.** A 10-horsepower electric motor is being used 10 hours per week to grind feed. A new replacement motor is estimated to save 1 kilowatt of energy during each hour of operation. This will save 10 kWh per week, or 520 kWh annually. Assuming electricity costs 10 cents per kWh, the annual cost savings is $52. If the replacement cost for a 10-hp motor is $1,000 on average, the simple payback is 19.2 years ($1,000/$52). Therefore, if economics are the only factor considered, replacement would most likely be delayed until near the end of the motor's useful life.

■ **Pickup truck.** The existing farm truck has an estimated fuel efficiency of 15 mpg, but a late-model truck gets an estimated 25 mpg and is available for $15,000 plus trade-in. Assuming 18,000 annual mileage, the newer truck would consume 720 gallons (18,000/25) of fuel versus 1,200 gallons (18,000/15) for the existing truck. At fuel prices of $3 per gallon, the extra 480 gallons of fuel conserved equals $1,440 annually. The simple payback period is 10.4 years ($15,000/$1,440). However, at increased fuel costs of $3.50 per gallon, the simple payback is 8.9 years ($15,000/$1,680).

As illustrated, simple payback is helpful for estimating how long it will take to recover your initial investment, but it doesn't show a project's profitability. When only energy costs are considered, purchases with a long payback may not pay for themselves until they're nearly worn out. Unless your goal is to quickly recover invested funds and put them to work again, look beyond the simple payback. Consider calculating the net present value of long-term projects to better understand the total cost, useful life, maintenance and energy savings of a purchase. This can help determine if it's a wise investment for the farm.

To learn more about farm energy efficiency this summer, look for information about our upcoming webinar by visiting our website. Video archives of previous ISU Farm Energy webinars are also available on the site or follow us on *Twitter @ ISU_Farm_Energy.*

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