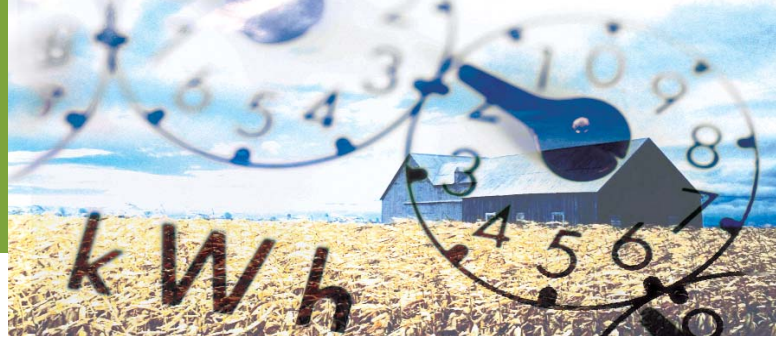


Electricity conservation on **Ontario farms**



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“We’re looking at better ways to do what we do and to be more efficient.”

(Left to right) OPA consultant Terry Rothwell and OPA program manager Vicki Gagnon speak with Carol and Bob Leeming about how they have reduced their electricity costs

Electricity *in the wind*

Reducing the cost of electricity is a financial touchstone for Huron County egg farmers Carol and Bob Leeming. Their energy goal is to match their farm’s electricity consumption with its electricity production.

Their focus on electricity conservation and production, which in the past 18 months has included installing an 80-kilowatt wind turbine and replacing hundreds of inefficient incandescent light bulbs, has cut net purchased electricity use by as much as 75 percent on their 36,000-hen farm.

The Ontario Power Authority and Mark Beaven, operations manager of the Egg Farmers of Ontario, recently visited Leeming Farms to learn about the energy-savings technologies the Leeming family has installed to reduce energy costs.

Poultry layer barns are among the most automated farm operations in Ontario and also one of the largest consumers of electricity. Electricity is used for lighting, ventilation, feeding, manure collection, egg collection and refrigeration.

“Egg production uses a lot of electricity compared to other types of farm operations, which usually require electricity only for ventilation and lighting,” Mark says. He adds that many Ontario egg farmers have been engaged in similar energy-saving investments because of the extensive electricity needs and the many associated opportunities to reduce costs.

Ontario’s 400 egg producers provide about 40 percent of the total amount of eggs grown in Canada or more than 200 million eggs.

Energy costs have always been part of the business planning process at Leeming Farms, Bob says. But, the drive to control electricity costs has accelerated recently as a result of price increases in Ontario and other jurisdictions. He says he wouldn’t be surprised to see electricity costs double in the future.

“We’re looking at better ways to do what we do and to be more efficient. The price of electricity is looming as a significant cost to our operations,” Carol says.

One of the Leeming’s most recent energy-savings measures was replacing about 235 40-watt incandescent bulbs with eight-watt cold cathode compact fluorescent lamps (CFLs). Installation was relatively simple because the replacement lamps were the same shape and size as the incandescent bulbs.

The lamp lifetime for the new CFLs, which are dimmable, is more than triple the lifetime of the incandescent bulbs – 18,000 hours compared to 5,000 hours. The annual energy savings is 44,000 kWh; a 22 percent reduction in their farm’s total annual consumption.

Continued on page 2

Electricity *in the wind*

Patience is one of the first requirements in considering new technology – a prerequisite for farming in today's environment.

Continued from page 1

At Leeming Farms, the net value of a kilowatt-hour (kWh) saved is 11.6 cents, based on a 6.1 percent meter-adjustment factor and a three-phase kWh metered farm service. That represents annual cost savings of \$5,200 on lighting, with an eight-month payback.

(The manufacturers' suggested retail price for all of the eight-watt cold cathode compact fluorescent lamps they used in their barns is \$3,525.) The cost benefit to Leeming Farms is significant because the cost of the lamps represents only 22 percent of the total energy-savings benefit that is achieved over the lifetime of the lamps.

The dimmable feature of the CFLs also provides additional health protection for the birds if a change in lighting conditions is required. Maintaining a healthy environment is a priority, Carol says. The birds need to be kept as stress-free and happy as possible because "when they're happy they lay more eggs." The right light conditions, temperature, water, feed, disease prevention and bio-security are all critical. "We don't want anything (damaging) happening."

The Leemings expect cost savings from installing high-voltage surge arrestors, which protect against voltage spikes that can damage equipment and lights. "The lights should also last longer," Bob says.

Other electricity conservation strategies and technologies are providing additional cost savings. These include a timer and thermostat control on the standby generator's block heater, along with housing the generator and transformer in the same room and installing 200-watt inductively coupled (IC) fluorescent lighting in the workshop. The thermostat ensures electrical power to the block heater comes on only when needed. And by housing all the equipment in the same room, unnecessary heat loss is avoided.

By using IC fluorescent lights instead of metal halide lamps, electricity costs are also lowered. Compared to a metal halide lamp, a 200-watt IC FL light is about 14 percent more efficient and has a 100,000-hour lifetime versus 10,000 hours. IC FL lights also have instant restart and good cold-start abilities.

More efficient motors were also installed in 2002 and 2003 when the new barn was built and a 20-year-old barn renovated.

In August 2006, Leeming Farms joined a small, but growing, group of Ontario farms that have installed wind turbines to generate electricity.

For Carol, who had taken an advanced agricultural leadership program in 2005, the wind turbine project offered the chance to explore the potential for renewable energy from a farmer's perspective. (They had considered an anaerobic digester but



Bob and Carol Leeming brief the OPA's Terry Rothwell and Victoria Gagnon and OEF's Mark Beaven on the energy savings to their farm following installation of eight-watt cold cathode CFLs and IC florescent lights.

the farm didn't produce enough waste to make it economically feasible, Bob says.)

After researching wind harvesting technology, the Leemings began the process of obtaining bank financing and getting project approval from their municipality and Hydro One – their local distribution company – for building and zoning requirements, as well as approval to provide electricity to the province's electrical grid.

It was a new venture for the Leemings as well as uncharted territory for their local electrical distributor, the bank and the municipality. Eighteen months later, the Leemings installed their 80-kilowatt wind turbine and began generating electricity.

The turbine, which was purchased second-hand from Holland, is 40 metres high and 20 metres across at the blades. Its rated generation capacity can match the Leemings average yearly electrical usage – about 200,000 kilowatt-hours.

After one year of operation, their total electricity bill is between 50 and 75 percent lower. Bob admits they were both disappointed that their wind generation wasn't closer to their actual usage. "But, there was not as much wind in January as normal. It wasn't until February that the wind reached its normal levels," he says.

To get their electricity cost to equal the electricity produced by the turbine, "we need not just more wind, but to use less energy," Carol says. "What we use will be what we produce. We want to have a net '0' energy footprint."

Mark Beaven of the Ontario Egg Farmers says producers must think creatively because even changes on a smaller scale – manure driers or motion lights – can cut costs. Asked about the effectiveness of small changes, Carol smiles and points to a small solar panel the couple use to power an electric fence for their horses.

"You need to explore all your energy options because it is important for farmers to consider conservation and renewables to see where they can fit into their farming operations."

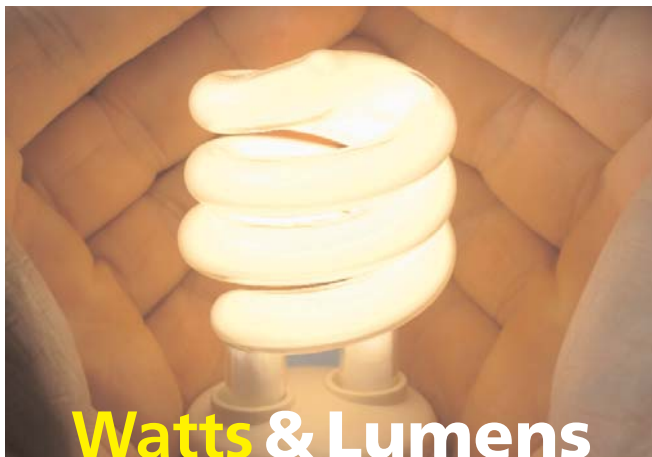
Conservation pays twice

Readers have asked us: Why is the kilowatt-hour of electricity I save worth more than the one I buy?

The answer is: because more electricity is consumed to move energy than is delivered to the home. Whether it's electricity coming through the power lines or oil being pumped through a pipeline, it takes energy to overcome resistance. Energy is also consumed when the high voltage of the transmitted electricity is stepped down to a safer level in the pole-top transformer at the farm.

If you don't need a kilowatt-hour of electricity because you conserve energy, then no energy is used to move that saved kilowatt-hour to the home. You save twice.

For example, let's look at the monthly electric bill for a typical rural family residence in southcentral Ontario. The meter reading might show that the home consumed 880 kWh for one month (the difference between this month's reading and last month's).



There is often confusion about the amount of light output from a compact fluorescent light (CFL) and the amount of electricity used to produce the light.

Light output is measured in lumens. The amount of electricity used to produce the light is measured in watts.

A 15-watt compact fluorescent light produces the same amount of light as a 60-watt incandescent light bulb, but because it is more efficient, it only uses a quarter of the electricity.

Lumens – the amount of electricity used – are often printed on the packages of both incandescent and compact fluorescent lights.

OPA's Peter Love to speak at Royal Winter Fair

Peter Love, Ontario's Chief Energy Conservation Officer, is scheduled to address this year's Royal Winter Fair, November 6 at The Direct Energy Centre, Exhibition Place, Toronto.

More information on the Royal Winter Fair at www.royalfair.org.

This metered quantity – the amount actually consumed in the house – is adjusted on the bill to account for the energy that was used to bring the kilowatt-hours of electricity to the farm home. The adjustment varies depending on transmission distances. In this case, the billed kilowatt-hours are 109.2 percent of the metered ones. The home was billed for 961 kWh.

To calculate the electricity cost for this home, the total electricity charges on the bill (\$131.52) is divided by total billed kilowatt-hours (961). This comes out to \$131.52/961 kWh, which equals \$0.1368/kWh, or about 14¢ per kWh. This is the cost of the kilowatt-hours for which the farm was billed.

Now, let's look at the impact of the farmer's energy-savings efforts have on the farm's electricity bill.

A new ENERGY STAR fridge saves 50 kWh each month (600 kWh/year) compared to a previous 17-year old model. These are 50 kilowatt-hours of electricity that are not needed and will not be transmitted to the farm home from the generating stations. As a result, for every kWh the family saves, they avoid having to pay for 1.092 kWh on their bill.

Because they conserve electricity, the family saves kWh valued at 14¢ X 1.092, about 15 cents.

This is important because it helps the family evaluate their next energy-conservation financial investment. In this case, their payback, return on investment and cost-benefit calculations show an additional 9.2 percent savings from the fridge.

It pays to save – sometimes more than we at first realize.

More energy savings for Ontario farm homes

Ontario farm families can cut their energy use and save money off their monthly electricity bill by using the instant cash coupons now available through the Every Kilowatt Counts (EKC) fall energy-savings program.



The instant rebate coupons, which were distributed to every Ontario household in the Every Kilowatt Counts brochure, are also available at participating retail stores and at www.everykilowattcounts.com.

The coupons are valid until Nov. 30, 2007.

The instant cash rebates, which offer up to \$15 off for a range of energy-efficient products, including compact fluorescent lights and power bars with integrated timers, are aimed at encouraging Ontario households to conserve energy and strengthen the province's electrical power system by purchasing and installing energy-efficient products.

Electricity can be wasted in the home without anyone even being aware. Phantom load, sometimes referred to as "stand-by power," is the electricity consumed by a device, such as a TV, phone charger or DVD player, when it is turned off.

By using a power bar with an integrated timer, featured in this fall's EKC coupon redemption book, homeowners can quickly and easily reduce their phantom load.

When computers are left on for extended periods of time, they waste a significant amount of electricity. Computer peripherals – like printers, speakers, scanners and webcams – are a good place to use a power bar with integrated timer.

A power bar with an integrated timer can also be used with a home entertainment centre, including TV, DVD player or VCR, game console and stereo to reduce electricity loss when the centre is not in use.

Lighting is another major source of home electricity consumption. The average Ontario household uses between 10,800 and 12,000 kilowatt-hours per year, at an average cost of about \$1,800 a year.

For home lighting, compact fluorescent lights (CFLs) use 75 percent less electricity than the standard incandescent bulbs and last longer. Although they may cost slightly more than incandescent bulbs, CFLs save many times their cost in electricity usage.

A typical home has 30 light bulbs using about \$200 worth of electricity a year. Replacing five standard incandescent lights bulbs with CFLs will save a consumer about \$30 every year.

CFLs are most effective in areas where a light is on for more than three hours a day, in hard-to-reach places and where exterior lights remain on for much of the night.

The fall Every Kilowatt Counts program provides instant in-store rebates for the following products:

- **\$2 instant rebate** on ENERGY STAR®-qualified compact fluorescent lights – all shapes, sizes and configurations
- **\$5 instant rebate** on T8 fluorescent fixtures for residential application – utility rooms, garages and kitchens
- **\$7 instant rebate** on ENERGY STAR®-qualified residential light fixtures
- **\$15 instant rebate** on programmable thermostats for electric baseboard heaters
- **\$5 instant rebate** on power bars with integrated timers
- **\$2 instant rebate** on lighting/appliance control devices – motion sensors switches, timers and dimmer switches
- **\$2 instant rebate** on seasonal LED lights – strings only, no wreaths, displays, etc. There will not be a minimum number of bulbs per string required.

The most significant light energy savings comes from a technology called light emitting diode (LED) lights, commonly used in holiday or seasonal lighting.

Seasonal LED lights represent a huge cost savings compared to standard incandescent mini lights because they use 95 percent less energy. A string of incandescent lights of 70 mini lights will cost about \$7.70 to operate for 200 hours. A string of 70 LED lights operating for the same time will cost about eight cents.

Compare to seasonal incandescent light bulbs, seasonal LED strings use up to 95 percent less energy, last 10 times longer, are more durable and produce very little heat.

More information about energy-savings tips to help save electricity in the home is available at www.everykilowattcounts.com.