

# Electricity conservation on **Ontario farms**



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## OPA's New Construction Program Will Aid Ontario Farmers

**O**ntario farmers who plan to include energy-saving measures in the design and construction of a new barn or a significant renovation of an existing farm building will be eligible for financial incentives under the Ontario Power Authority's High Performance New Construction Program (HPNCP).

**Under the HPNCP, farmers will be eligible for an incentive of \$250 for every kilowatt of electricity demand they eliminate by installing energy-efficiency measures. A total power reduction of 20 kilowatts would result in a \$5,000 financial incentive under the program.**

"Ontario farmers have always been recognized as innovators," says Sean Brady, director of program design for business markets at the Ontario Power Authority. "One of the aims of the High Performance New Construction Program will be to support their efforts by financially assisting them to become more energy efficient."

"In addition to the financial incentive available under the program, farmers installing energy-efficient technologies will also benefit by having significantly lower electricity costs," Brady points out.

For example, the energy savings for an 8,000 square foot barn built with natural ventilation and T8 fluorescent lighting would be 38,500 kilowatt hours (kWh) per year. This represents annual savings of more than \$4,000 per year when compared to the cost of electricity in a traditional-style confinement barn with sidewall fans and incandescent light bulbs.

The type and size of the livestock and the temperature and light levels the farmer wants to maintain in the barn will determine the specific annual energy savings for each individual barn.

At the present stage of technological development in agriculture, it is not yet practical to assume that each and every new barn can be naturally ventilated. But a number of farm buildings in Ontario are already naturally ventilated, as shown by the accompanying story on turkey producer Bill Revington, and the future is clear.

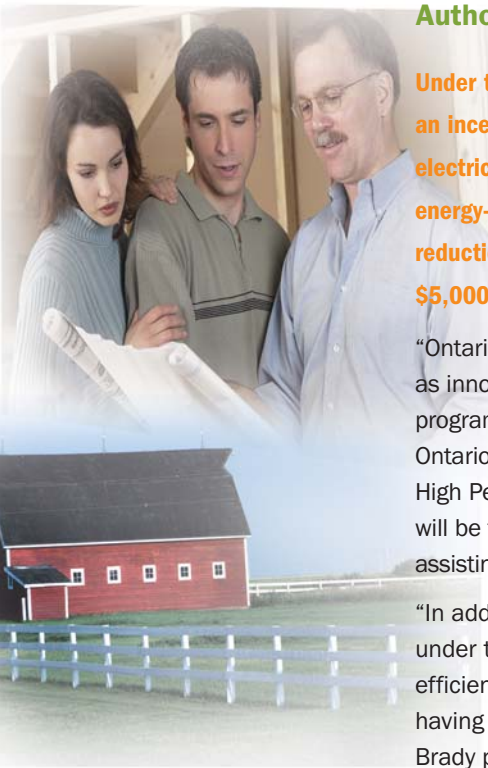
The High Performance New Construction Program will encourage builders and designers to incorporate sustainable and energy-efficient features in new construction and major renovation projects. In addition to Ontario's agriculture and food sector, the HPNCP will also provide financial incentives for energy-efficient new building design in the industrial, commercial, retail and institutional sectors.

The HPNCP will be a major initiative in the OPA's mandate to promote conservation and demand management throughout Ontario and manage the province's current and near-term electricity supply.

Under the HPNCP, the OPA wants to achieve province-wide electricity power demand savings of at least 50 megawatts (MW) by the end of 2012.

"By partially offsetting the cost of installing energy-efficient equipment on Ontario farms, the High Performance New Construction Program will help lower electricity demand across the province, especially in the peak demand periods in the summer," Brady explains.

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## OPA's New Construction Program

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The High Performance New Construction Program will start later this year and operate until December 31, 2012. The deadline for program participant applications will be December 31, 2010. Projects not completed by December 1, 2012, will not be eligible for financial incentives.

To qualify for the HPNCP financial incentive, each farm applicant must provide an accurate conventional design (including load calculations) estimate of energy usage and cost. This must be accompanied by the estimate of energy usage and savings that will be achieved by using natural ventilation and/or high efficiency lighting. This should include the energy-efficiency case design summary and load calculations.

A new 8,000 square foot barn designed and built using natural ventilation and a T8 fluorescent lighting system would result in an approximate 10 kilowatt (kW) summer peak load reduction when compared to a traditional barn built with mechanical fan ventilation and incandescent lighting.

Based on an estimate of new farm building construction for the next five years, the HPNCP could result in province-wide savings of 1,000 kW (1 MW) annually if Ontario farmers built their new barns with natural lighting and energy-efficient lighting, explains Brady.

Here are the key elements of the HPNCP:

- technical assistance to evaluate energy-efficiency and demand management options
- support for the integrated design process and charrettes

- modelling simulation and software support to evaluate and incorporate proven energy-efficient technologies
- incentive funding to partially offset the incremental costs for the purchase and installation of approved high-performance equipment.

New farm construction includes energy-efficiency measures for structures such as livestock and equine buildings, including those for dairy, beef, swine, sheep, goats, rabbits, horses and poultry; driving sheds; repair, service and maintenance shops; milling, processing and warehousing buildings; fruit and vegetable storage buildings; farm market buildings and buildings for aquaculture production and processing.

**More information about the OPA's High Performance New Construction Program will be available at [www.everykilowattcounts.com/Agriculture](http://www.everykilowattcounts.com/Agriculture).**

## Natural ventilation barns save thousands of dollars in energy costs



**OPA's Victoria Gagnon and turkey farmer Bill Revington discuss energy efficiency of natural ventilation and T-8 fluorescent lighting in turkey production.**

**Lower energy costs and a healthy growing environment for tens of thousands of turkeys were top of mind for Ontario turkey producer Bill Revington when he broke with tradition and built two natural ventilation barns.**

Bill faced two challenges – reducing energy costs and protecting the health of more than 14,000 birds housed in two 26,000 square foot grower barns. “We needed to replace two older ‘confinement style’ closed barns with barns that use far less energy and will keep our birds as healthy as possible.”

Each barn houses about 7,300 birds per cycle for about 10 weeks – until they weigh about 13 kilograms – when they are shipped to the processing plant. Annual turkey production from the site that includes a number of other older barns is about 1.2 million kilos, Bill explains.

“In the winter, we were losing too many birds from condemnations. When the air is very dry and dusty, the birds are susceptible to an infection known as airsacculitis, which is caused by dust trapped in birds’ lungs. Bird losses from airsacculitis had climbed as high as 15 percent,” says Bill.

“We realized that there must be a better way to save energy and reduce the number of condemnations.”

The other major cost savings Bill wanted would come from switching to dimmable, photocell-controlled, energy-efficient T8 fluorescent lighting from the existing incandescent lighting. The changeover can reduce annual lighting electricity costs as much as 75 percent in a typical farm operation.

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## Natural ventilation barns

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“The logical choice was to start looking at a naturally ventilated, curtain-sided barn,” Bill says. “This is not a new concept. It is used in other places. In the U.S., it tends to be the design of choice.”

Under the Ontario Power Authority’s High Performance New Construction Program, Bill could qualify for a \$10,000 incentive for the two barns, based on a total power reduction of 20.5 kilowatts (kW) at \$250/kW.

**“We’ve built two new barns with significant environmental benefits for the birds and technological systems that provide significant energy savings.”**

Protecting the health of the birds in the summer also factored in his decision. “With rolling blackouts in the summer, you’re vulnerable in traditional-style confinement barns. If the power goes out and there is no backup power, you can start to lose birds within 15 to 20 minutes.”

After meeting with the designer and looking at other natural ventilation barns, construction of the two new barns got underway in early 2005.

Two years later, over two million kilograms of turkey have been produced in the new barns, and the results have more than met the original expectations, says Bill.

“We’re losing far fewer birds due to airsacculitis, and our energy costs are way down,” he says.

“Natural ventilation is a little more expensive than the traditional style, but when you build a barn, it is a 30-year proposition. If it results in a better product out of the door, then I’m not averse to spending more, especially with energy costs going up.”

Designing a new barn with natural ventilation and energy-efficient lighting at the outset is the most cost-effective method of getting maximum energy savings.

More natural light enters the new barns with the natural ventilation curtains, and the photocell sensors detect when additional artificial light is needed. The lighting is controlled through an electronic dimmer system. The new barns also use a GVA fluorescent lighting system. Although

more expensive to install at the outset, it provides significant savings over the traditional incandescent lighting systems.

Instead of the traditional sidewall mechanical fans found in confinement barns, the new barns use chimney fans for minimum winter ventilation along with natural ventilation in the summer. Heat is provided by infrared tube heaters, which direct the heat onto the birds as well as heating the floor.

“We’ve built two new barns with significant environmental benefits for the birds and technological systems that provide significant energy savings.”

An independent economic analysis completed in December 2006 supports Bill’s decision.

The analysis showed annual electricity savings from operating a dual ventilation barn equipped with T8 lighting versus a traditional mechanical barn equipped with incandescent lights is 38,400 kWh per barn – a 66 percent reduction on electrical energy use, representing savings of \$3,800 annually per barn.

The annual savings attributable to operating a photocell lighting control with T8 fluorescent lights versus operating the same lights on a standard timer was 3,400 kWh – 55 percent energy savings.

Using T8 lighting fixtures versus incandescent lights with both systems on standard timers provides annual savings of 7,060 kWh – 53 percent energy savings. The combined energy and demand financial savings for the lighting systems is about \$1,500 per barn.

When accounting for the additional reduction in lamp replacement, the payback is less than four years, according to the economic analysis.

Bill built the two new barns based on his operations’ fiscal requirement and without any governmental assistance. However, Bill says the newly announced financial incentives for farmers under the OPA’s High Performance New Construction Program represent significant and important financial assistance for Ontario farmers in barn construction.

Farmers already face higher costs in 2007 because building costs have increased by 20 to 25 percent since his barns were built, he adds.