

# Electricity conservation on **ONTARIO FARMS**



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Flowers have a unique, often unexplainable, place in our lives, mirroring our many emotions from sympathy and regret to happiness and excitement.

**The OPA's Victoria Gagnon (l.) speaks with Rosa Flora employees Ralph DeBoer, operations manager, and Jackie Shiels, special projects coordinator, about how they manage their company's energy costs.**



## **FLOWER GROWERS STRESS ENVIRONMENTAL STEWARDSHIP, ECONOMY AND SERVICE**

**At Ontario's Rosa Flora Limited, one of Canada's largest cut flower producers, growing flowers is about much more than producing a saleable product.**

"Rosa Flora wants to be known as a company that is aware of its actions and our society and environment," says Arjan Vos, the Dunnville company's controller. "By implementing technology, green or other, we can remain competitive and be a good steward."

The Ontario Power Authority recently visited Rosa Flora to learn how the company has managed its energy costs to help keep it competitive in the fiercely competitive international flower market. Energy is Rosa Flora's second largest expense.

"For every dollar we spend on labour, we spend 50 cents on energy," Arjan says. "As a company we want to take care of our employees, providing them with good jobs."

"For us to remain competitive, we must be very cost-effective in other areas. Therefore we focus a great deal of our resources on effective work processes, including the adoption of green and other types of technology," he says.

In the past five years, more than half of Rosa Flora's capital investments have been on green technology, including biomass (wood-burning) boilers for heating and a 615-kilowatt (kW) wind turbine that now provides a significant amount of the operation's electricity needs.

When investing in alternative and renewable technologies, the company examines such factors as what competitors are doing and changing consumer preferences, in addition to its desire to reduce its carbon footprint.

"Looking just at a payback model, we would have a difficult time investing in green energy for both biomass and wind energy," Arjan says. "We're also building relationships with our customers who see what we're doing to protect the environment. We grow flowers. But it is service and reputation that is important."

Arjan says it wasn't until the 1990s that energy management became critical for the greenhouse industry. "Up till then, it was fairly easy to make a living selling flowers."



## Flower growers stress environmental stewardship, economy and service

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### The 615-kW wind turbine at Rosa Flora's greenhouse operations.

“But with the rise in energy prices (natural gas and electricity), the rapid growth of the international flower market and a more demanding consumer, operating a successful Ontario international flower business became very challenging,” he says.

In 1992, Rosa Flora built a 1.6-megawatt cogeneration system. Under the Non-Utility Generators program managed by the former Ontario Hydro, the system's two 800-kW generators provide an alternative source of electricity during peak demand hours. The company sends any excess electricity to the province's electricity grid.

It is the cogeneration plant's reduced environmental impact that may send the company's strongest message and underscores its commitment to the environment.

Unlike traditional natural gas-fired electricity generators that waste nearly 70 percent of the fuel they consume as reject and exhaust heat, cogeneration uses the exhaust heat to warm the greenhouses. “Financially and environmentally, the investment makes sense,” Arjan says. Of equal importance in these carbon-conscious times, the carbon dioxide in the engine exhaust is also directed into the greenhouse atmosphere to be used by the flowers' photosynthetic process.

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Rosa Flora moved to reduce its environmental imprint even further in 2003, installing two biomass wood-fueled boilers to heat the greenhouses. The company was one of the first businesses in Canada to install the boilers, which use industrial waste wood. A third boiler has since been added.

“We are currently able to produce 100 percent of our heat requirements without the use of natural gas,” Arjan says.

He warns, however, that biomass is not without problems when compared to natural gas heating systems, including an occasional shortage of wood, environmental requirements and increased time for maintenance.

“It is rewarding to see so much waste wood diverted from landfill. But if we didn't have 1.2 million square feet in greenhouse production, we wouldn't be considering this at all,” Arjan says.

With electricity costs representing at least 50 percent of Rosa Flora's total energy costs, the company also moved to reduce consumption by installing more efficient motors and growing lamps. The new 600-watt high-pressure sodium lamps replaced 400-watt lamps and produce more light at less cost, while maintaining the higher light level for longer (see sidebar, page 3).

Throughout its greenhouses, the company has also installed variable speed drives on many motors used on its water circulation pumps and conveyors to reduce electricity usage.

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## Flower growers stress environmental stewardship, economy and service

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The Ontario Power Authority, through its Electricity Retrofit Incentive Program, provided funding to Rosa Flora for one of the lighting upgrades.

The reduced electricity consumption from the more efficient lamps means “more bang for the buck,” says operations manager Ralph DeBoer. “We also better control how much light is used with different types of plants.”

Just over two years ago, Rosa Flora undertook its most ambitious green energy technology project – a wind turbine.

“Our interest in green technologies coupled with steadily rising electricity prices encouraged us to pursue a wind turbine that was the right size and fit for our operations,” Arjan says. A German-engineered wind turbine capable of producing 615 kW of electricity was installed in September 2006.

The wind-generated electricity is delivered directly into the Rosa Flora system and offsets the electricity required from the Ontario power grid. Although located in a low to moderate wind zone, the turbine produces between one million and 1.2 million kW of electricity annually, Ralph says.

The company is considering investing in another wind turbine in the future, although the final decision will depend on a number of factors, including the financial incentives that are available.

Rosa Flora has a long history of capitalizing on the use of technology solutions to advance the greenhouse industry.

“We were the first in Canada to install cooling lines underground for certain crops and to have water towers to store excess heat for later use. We were also one of the first to use rolling benches for cut flower crops, increasing usable growing space,” Arjan says.

Having come through three distinct decades, each requiring major changes for its business, Rosa Flora expects this decade to also be one of major transition, especially for electricity generation and conservation.



The OPA's Victoria Gagnon (l.) and Brian Shields discuss energy-efficient lighting with Rosa Flora's Jackie Shiels.

## More lumens and less power: high-efficiency greenhouse lighting at Rosa Flora

Lighting in greenhouses is a significant energy-saving opportunity. At Rosa Flora greenhouses, 760 magnetic-ballasted 400-watt (W) high-pressure sodium (HPS) growing lights were recently replaced by 440 electronic-ballasted 600-W HPS lights. The main electricity gains included:

- a 75-kilowatt (kW) reduction in monthly peak power (demand) usage
- energy savings of 75,000 kilowatt-hours (kWh) for every 1,000 hours that the lights are on each winter.

At eight cents per kWh of energy (used on-site) and \$9/kW of demand – costs roughly equivalent to those paid under general service arrangements with some of Ontario's local distribution companies – the greenhouse saved a total of \$10,000 per year in combined energy and power costs.

New electronically ballasted HPS growing lights offer a host of other additional advantages over their older magnetic counterparts, such as:

- lower heat loss from the ballast itself
- longer lamp lifetimes – as much as 30 percent
- light output levels don't drop off as much as the lamp ages
- improved light colour
- high power factor (99 percent) and low harmonic distortion
- smaller size and weight.

**Information on high-efficiency ballasts is available from a number of sources, including the Office of Energy Efficiency ([oee.nrcan.gc.ca](http://oee.nrcan.gc.ca)).**

# RISING ENERGY COSTS CONCERN GREENHOUSE INDUSTRY

**The ever-increasing cost of heating greenhouses is the main issue facing the Ontario greenhouse industry, according to a recently released study of the industry.**

The study, completed last fall, was funded by the Ontario Power Authority (OPA) and other energy industry sponsors including The Ontario Greenhouse Alliance, Flowers Canada (Ontario), Ag Energy Co-operative, Ontario Greenhouse Vegetable Growers, Enbridge Gas Distribution and Union Gas.

Agviro Inc. and AMEC Geomatrix Limited conducted the study. To gather the required information, surveys were developed for greenhouse growers and various stakeholder groups.

The objectives of the study were to project the net change in energy consumption over the next five years, to understand where and when changes in the industry will occur and to recommend options to increase the adoption of efficiency measures.

The greenhouse growers project growth of less than four percent over the next five years (0.8 percent annually), according to the study. Growers predict that another 300,000 square metres of vegetable growing areas and 90,000 square metres of flower growing will be added within the next five years. Equipment suppliers tended to be more optimistic and projected the growth over the next five years to be about 10 percent, according to the study.



While pinpointing rising fuel costs as their main concern, growers and other stakeholders also identified labour costs, the U.S.-Canada exchange rate, the cost of electricity and overproduction.

The survey participants represented 19 percent of the total greenhouse area in Ontario and included 28 flower growers and 22 vegetable growers.

Thirty percent of the respondents have greenhouse production of less than one hectare, 30 percent between one and three hectares, and 40 percent have production greater than three hectares.

The study found that energy-efficiency technologies would be likely to produce a 10-percent reduction in energy demand. Small, distributed co-gen and tri-gen facilities may emerge in response to rising electricity and reliability concerns.

Ninety-seven percent of growers surveyed thought incentives would help improve the adoption of energy-efficient technologies and should consist of grants, preferred rate loans and guaranteed loans.

The OPA offers a wide range of financial incentives to assist farmers and the agricultural industry to improve the energy efficiency of their operations. These include the Electricity Retrofit Incentive Program and High Performance New Construction Program. The OPA programs provide funding to replace inefficient lighting systems and fans with cost-saving equipment as well as financial support for customized electricity cost-saving projects.

Information on OPA incentive programs is available at [www.everykilowattcounts.ca](http://www.everykilowattcounts.ca).

The greenhouse study is available at [www.theontariogreenhousealliance.com](http://www.theontariogreenhousealliance.com).



## Third Annual "Growing the Margins" Conference March 9 to 13

**The 3rd annual conference, called Growing the Margins: Energy, Bioproducts and Byproducts from Farm and Food Sectors, will be held March 9 to 13 in the London Convention Centre, London, Ont.**

The conference this year has been expanded to include the launch of 1st Annual Canadian Farm and Food Biogas Conference and Exhibition.

The four-day conference will cover a wide range of agricultural energy topics including:

- European Union/Ontario Biogas Networking Forum: Developing Knowledge and Business Relationships in the Agriculture and Food Processing Sectors
- Biomass Heat Networking Forum: Growing the Value Chain in Agriculture and Rural Biomass Heat Businesses
- Building Your Biogas System Workshop: Introduction and Basic Training for Biogas Projects
- Air Quality in Rural Ontario Workshop
- Technology tours of renewable energy, energy conservation and other operational projects.

Registration and conference details are available at [www.gtmconference.ca](http://www.gtmconference.ca).