

Electricity conservation on Ontario farms



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Harnessing the sun by the 401

For Kitchener-area farmer Tim Barrie, “electricity is a crop,” like the other crops – asparagus, rhubarb, hay and lumber – grown on the family farm. It is the combined economic benefits and his forward-looking view of energy that encouraged Tim to invest in solar energy to produce electricity to sell to the Ontario power grid and generate revenue for his farm.



Tim Barrie (c.), his wife Libby (l.) and daughter Emily (second from r.) discuss the proposed 2,400 solar panel farm with the OPA’s Victoria Gagnon (second from l.) and Terry Rothwell.

Since May 2006, the Barrie farm has generated about \$2,000 a year in electricity from 18 solar panels installed on the farm’s produce store. The Barrie farm is now also the site of a proposed 2,400 solar panel energy farm designed to produce electricity for 100 homes.

Tim is the fourth-generation Barrie to operate the 125-acre farm located in North Dumfries Township, near Kitchener. The farm’s main production crop comes from 25 acres of asparagus. In addition, the farm produces rhubarb, hay as a cover crop and lumber for heating.

Under a 20-year Renewable Energy Standard Offer Program contract with the Ontario Power Authority, the Barries receive a guaranteed price of 42 cents per kilowatt-hour for the solar energy produced by the roof-top panels.

The contract price makes the project economically viable. With the accelerated capital cost allowance for solar panels and the 20-year guaranteed price contract, “It is close to carrying itself in the first 12 to 13 years. The final seven years, the economic return increases significantly,” says Tim.

The guaranteed contract price is the major incentive behind Tim Barrie’s decision to invest in solar technology. The price guarantee is higher than the average customer price for electricity. But much of the solar electricity will be produced in the summer months during peak-demand periods when the province must otherwise import higher-priced electricity. The revenue generated is taxable and produces economic benefits to the community and the province.

Tim sees increased energy generation and financial payback for solar technology as energy costs in Ontario and elsewhere continue to rise. He points to the large price increases in non-renewable energy in such commodities as uranium in just a few years. In January 2003, uranium sold at US \$10 per pound, and in mid-May it was selling at US \$122, an increase of more than 1,000 percent.

“We will get to the point where the government will not have to offer incentives for renewable energy generation. People will save money by producing their own power.” Solar technology is on a development curve similar to that experienced in the computer fields, with the efficiency increasing while the cost goes down, he says.

“Ontario is the leader in solar power generation in Canada. But on the world scale, Canada has a long way to go.”

Cambridge and North Dumfries Hydro Inc., the local power company, now buys the electricity produced from the Barrie farm’s solar panels. The panels, manufactured by Arise Technologies Corporation of Kitchener, cost \$34,000 and generate about \$4 a day in electricity on a cloudy day and as much as \$20 on a sunny day.

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The efficiency of solar panels has increased immensely over the past decade, Barrie explains, to the point “where purchasing solar panels represents a investment with a reasonable return.”

Tim points to his large barn, which he has considered for additional solar panels. “If we were in Germany – the world’s leader in solar power – someone would have already offered to lease the roof to produce solar power.”

A solar inverter – which converts the solar electricity to AC form so it can be transported to the power grid and displays the amount generated by the collector system – is located inside the Barrie farm produce store, where hundreds of customers come every week during the season to buy Barrie farm asparagus and rhubarb. Customers are intrigued by sun-generated power, he says. “I tell them that solar power is another farm diversification – asparagus, rhubarb, hay, lumber and now electricity.”

But the Barrie family’s enthusiasm reaches even higher levels when they discuss the proposed 2,400 solar panel project planned for a four-to six-acre site on their farm.

The electricity generated by the project is designed to produce up to 400 kilowatts of electricity – enough to supply power to 100 homes. The project is estimated to cost about \$3.2 million. Unlike stationary roof panels, the project will use trackers to follow the movement of the sun, increasing efficiency of the solar panels by about 30 percent.

Tim points out that the proposed project will not take any productive land out of production. Farmland used for growing asparagus must be taken out of production and left fallow for 20 to 25 years. “The solar project makes perfect sense since we will be moving asparagus production onto land that has been unproductive.”

The project’s biggest supporter is Tim and his wife Libby’s second oldest child, Emily, who admits her father can occasionally become obsessed about solar power. But she’s all in favour of her father’s passion. “What are we going to do when the oil runs out? He’s the motivator to get everyone more involved. We’re going to be dealing with it in the future.”

The local township is currently considering the proposed project. Emily Barrie says she anxiously waits for the approval. “If the economy and the environment benefit, then why can’t we move ahead?”

Considering a renewable energy project?

The Ontario Power Authority’s Renewable Energy Standard Offer Program makes it easier for Ontario farmers to produce and sell power to the electrical power grid. There are, however, a number of items to consider before committing to a generation project, including determining a business structure, municipal approvals, municipal taxes and property assessment, financing and connection to the electrical power grid. The following information summarizes key facts to know before committing to a renewable energy project.

Connecting the project to the electricity distribution system:

Contact your local distribution company (LDC) to determine that a connection can be made from your site to the distribution system – and what the cost might be. For information about your LDC, contact the Ontario Energy Board (www.oeb.gov.on.ca).

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Zoning by-laws and tax assessments:

Each municipality has an official plan with allowable land-use designations. Before proceeding, you should ensure your project meets these local requirements. The Association of Municipalities of Ontario maintains a municipal database that can help (www.amo.on.ca).

Tax assessments: Municipalities assess property taxes and rules can differ. Applicants should contact their local municipality for advice.

Securing financial resources:

There are a variety of ways to finance a small renewable energy project. In addition to conventional debt or equity, additional financing avenues may be available including federal and provincial incentive programs and grants. (see REDO, Renewable Energy Development in Ontario at www.energy.gov.on.ca).

Connection Impact Assessment:

This required document details the technical specification for the connection and determines its impact on the LDC and the Independent Electricity System Operator (www.ieso.ca). Details of the project’s generator and transformer characteristics and expected peak and base production are required.

Environmental assessments and screenings:

Some electricity generation projects will be subject to environmental assessments or environmental screening. For more information, see the *Guide to Environmental Assessment*.

Requirements for electricity projects are available from the Ministry of Energy (www.energy.gov.on.ca) and Ministry of the Environment (www.ene.gov.on.ca). Federal approvals may also be required.

Municipal approvals: Each municipality has its own approval and permit process, and you should check with the municipality where your project will be located.

Licences and fees: The Ontario Energy Board issues licences to electricity generators and defines the terms and conditions of these licences. All potential generators are required to contact the Ontario Energy Board’s Market Operations at market.operations@oeb.gov.on.ca, prior to generating electricity.

Information about the Standard Offer Program is available at www.powerauthority.on.ca/sop.

Delegates hear conservation and generation message

The four watchwords that delegates to the Growing The Margins energy conference in April 2007 in London, Ontario, heard most frequently were: **conservation, generation, education and efficiency.**

Education is an essential element in successful energy generation and conservation...

As Ontario's agribusiness owners know – and conference speakers emphasized – there are two main ways to grow the margins: reduce the cost of production (conservation) and increase sales revenue (generation). Energy conservation and generation are two sides of the same coin. Good business managers must pay attention to both.

Attendees came away with enhanced knowledge of what they need to do to cut electricity consumption (and costs) and what they need to do if they want to generate and sell electricity.

The conference demonstrated where electricity is used on farms and where it can be saved. All electricity uses should be examined – in large, critical operations as well as in smaller, non-critical uses – to identify cost-savings opportunities. Benchmarking data from other operations can be helpful in targeting areas of improvement.

Delegates were also reminded that education is an essential element in successful energy generation and conservation, especially for the energy managers of today and tomorrow. BioDimensions' Peter Nelson spoke about students doing energy simulations and tests using computers supplied by energy education programs in the U.S. The students learned how to save electricity and why it is important, both financially and environmentally. The electricity conservation ethic is now second nature to many of them.

Peter Nelson also reported that investments in North American solar, wind and water-power projects more than tripled from 2005 to 2006.

Farmers heard about making effective conservation decisions, implementing the improvements and the financial incentives available from the local Ontario distribution companies such as Hydro One. (More about incentives can be found in earlier editions of OPA's *Electricity Conservation on Ontario Farms* at www.ontariopowerauthority.on.ca).

Conference attendees were also reminded of the importance of efficiency and following long-established principles when designing energy systems. Thomas Bohni from Switzerland's Energie & Umwelt GmbH discussed the comparative efficiency of gasoline versus diesel reciprocating engines in electricity generation. Diesels are much more efficient, and, according to Bohni, combusting a blend of four percent biodiesel and 96 percent biogas in a pair of 265 kilowatt diesel cycle engines will significantly improve your electricity generation efficiency (and revenues), compared to using 100 percent biogas fuel in a single large gasoline-cycle engine/generator set-up.

Ontario Power Authority representatives participated in both the farm and food processing tours and took part in discussions relating to the OPA's role in planning and ensuring an adequate, long-term supply of electrical power for the province. Jill Medley, director of program administration, presented an overview of the Renewable Energy Standard Offer Program and described its challenges and opportunities. Ontario's Chief Energy Conservation Officer, Peter Love, spoke on the expanded role for electricity conservation in the future.

Conference presentations are available at http://www.gtmconf.ca/2007_presentations.htm

