OPA
Ontario Power Authority™

Electricity conservation on ONTARIO FARMS

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Key financial parameters for renewable energy projects

Before a farm family invests in a renewable energy project for generating electricity to sell to the Ontario power grid, a basic cost-benefit analysis that fairly sets out the project's financial performance should be in place.

Even before beginning their financial analysis, farmers first need to check with their local distribution company (LDC) to ensure there is still sufficient electricity transformation, distribution and transmission capacity available in their area. In a number of regions in the province, the connection capacity at specific locations is now fully subscribed for renewable generation projects.

If, after the connection capacity has been confirmed with their LDC, the family decides to proceed, the cost-benefit analysis should centre on six to eight basic financial parameters to determine the project's viability.

These parameters include power capacity, capacity factor (the average actual output from the generating system as a percentage of its peak capacity), electricity export rate under the Standard Offer Program, project life, availability of incentives and grants, and payback period. The payback period tells how many years it will take to recover costs – taking into account annual revenue and initial investment costs.

Project life is a critical number. If a piece of equipment can pay for itself in only two years, this would seem to be a potentially viable investment. But would this investment still be as viable if the equipment only lasts for one year? Conversely, if it takes 10 years to recover your equipment costs on another type of product, would that be an attractive investment? What if that equipment lasts for more than 30 years?

Long-term cost-benefit comparisons can become critical when considering renewable generation.

The Ontario Power Authority looked at two types of renewable energy generation – solar photovoltaic (PV) and biogas – using calculations from several jurisdictions, including Ontario, to develop a representative sample of financial data to serve as possible benchmarks in your project evaluation.

For more information
www.powerauthority.on.ca

Representative (small-scale) solar PV project

	Physical & Financial Parameters
Power capacity	3.0 kW
Capacity factor	4,400 kWh annually – 16.5% capacity factor
Electricity export rate	$420 MWh
Project life	20 years
Incentives – grants	PST exempt, GST refund only
Project cost	$10,000 per kW (peak) power output capacity
Simple payback period	15 years (excludes debt service costs and inflation)
Annual income	$1,850 based on 4.400 kWh/yr @0.42/kWh

Representative biogas project

	Physical & Financial Parameters
Power capacity	200 kW
Capacity factor	90 percent
Electricity export rate	$0.119 blended annual kWh price (includes peak power revenues)
Project life	Minimum 20 years (with dedicated maintenance); engine overhaul and replacement will be required during this period
Incentives or grants	Up to $280,000 (Ontario – 2008, while available)
Project cost	$4,500/ kW output @ 200 kW
Simple payback period	5–6 years, not including grants (excludes debt service costs and inflation)
Annual income	$164,000, based on 1,576,800 kWh/yr @ $0.119/kWh minus $0.015/kWh allowance for engine replacement

Renewable energy contracts in 2007 approach 1,000 megawatts

Supply contracts for more than 900 megawatts of electricity from renewable energy sources were executed in 2007 under the Ontario Power Authority's Standard Offer Program, says an OPA progress report.

The report outlines 241 contracts executed between January and December 2007 with a total capacity of 914,974 kilowatts (kW) from wind, solar photovoltaic (PV), water and biomass sources.

Wind projects represented over 50 percent of the total with 572,827 kW, followed by solar PV with 252,140 kW, bio-energy with 58,178 kW and water with 31,829 kW. More than 80 other potential projects are currently under review.

In the first year, 67 projects reached commercial operation – generating over 26,500 kW of electricity.

The Renewable Energy Standard Offer Program, introduced in November 2006, is designed to help Ontario meet its renewable energy supply targets by providing a standard pricing regime and simplified eligibility, contracting and other rules for small renewable energy electricity generating projects.

Ontario farmers George Heinzle and Tim Barrie – who generate electricity from renewable resources on their farms and transmit to the provincial power grid under Standard Offer contracts – were featured in earlier editions of *Electricity Conservation on Ontario Farms*.

Two other farm-based operations are making significant contributions to the province's renewable energy supply. In Cobden, Paul and Fritz Klaesi's dairy farm produces electricity from farm-based organic material and manure from a 50 kW biogas generator. On the solar side, Ag Energy Co-operative in Guelph operates a 9.9 kW solar power system. Both operations sell power to the Ontario power grid under the Standard Offer Program.

"The Ontario Power Authority is pleased with the response to the Standard Offer Program in its first year of operation based on the total number of contracts executed," says Jim MacDougall, manager for the OPA's Standard Offer Program.

"There is often a lag between the time a supply contract is first executed and the time when a project goes into actual commercial operation," explains MacDougall.

The Standard Offer Program will require refinements in the future to address the uncertainty caused by the gap between the number of contracts the OPA executed and the number of projects that go into commercial operation. "The difference between contracted generation and actual production of electricity significantly impacts reliability of planning," he explains.

For some renewable energy projects such as wind generation, it can take two to three years before generation starts. The start-up time depends on a number of factors, including the time required to get local municipal approval as well as to secure financing. In some cases, an executed contract may not proceed for a variety of reasons, including changes in market conditions.

Under the current Standard Offer Program contracts, electricity generators receive the price that reflects value for the Ontario ratepayer for renewable electricity power, says MacDougall.

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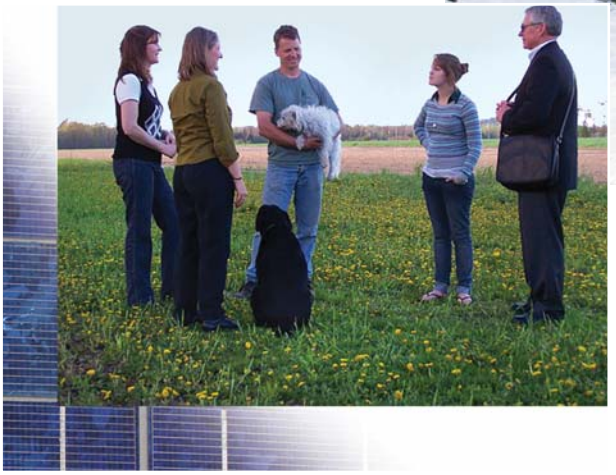
(L. to r.) Linda and George Heinzle speak with the OPA's Terry Rothwell and Victoria Gagnon about their farm's 1,000 cubic metre biogas digester.



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.

Renewable energy contracts in 2007 approach 1,000 megawatts

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Financial assistance is available through provincial financial incentive programs that increase the economic viability for renewable generation projects.

MacDougall points to the Ontario Biogas Systems Financial Assistance Program funded by the Ontario Ministry of Agriculture, Food and Rural Affairs for Ontario farmers and rural businesses to construct and install biogas systems. The program provides up to $400,000 for biogas systems.

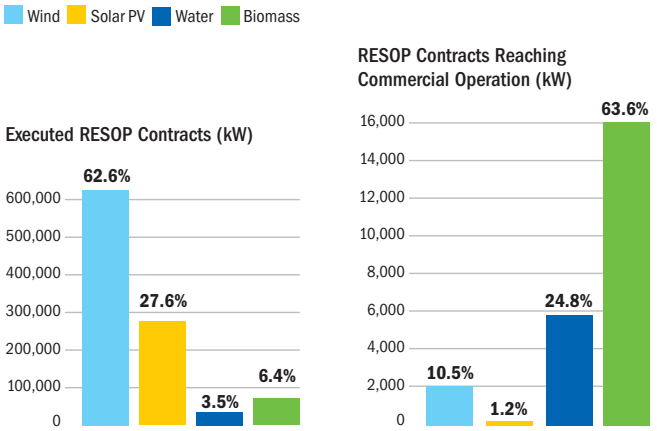
In a number of regions in the province, the electricity connection capacity at specific locations is now fully subscribed for renewable energy projects, says MacDougall.

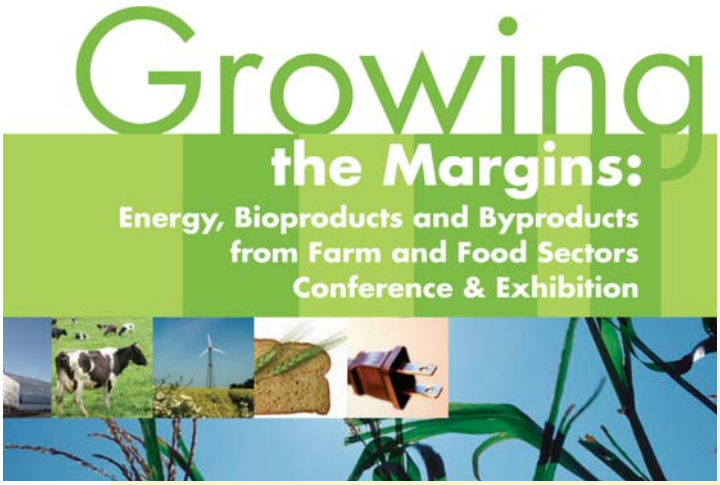
"We are advising project proponents planning for 2008 and beyond to check with their local distribution company before starting a generation project, even in the initial planning stages to ensure there is sufficient connection capacity."

The Ontario Energy Board established a non-discriminatory first-come, first-served application process for potential electricity generators. The limitation does not apply to generation of under 10 kilowatts.

The Progress Report on the Renewable Energy Standard Offer Program is available at **www.powerauthority.on.ca**

Total Capacity of RESOP Contracts per Fuel Source (%)





Farm energy conference April 2-5

Growing the Margins: Energy, Bioproducts and Byproducts from Farm and Food Sectors – one of Canada's leading farm and food sector energy conferences – will be held April 2 - 5, 2008, at the London Convention Centre, London, Ontario.

Keynote speakers from Canada, Europe and the U.S. will address the opportunities and challenges facing the farm and food-processing sectors.

More than 90 farm energy experts will speak on a range of energy-relevant subjects in the farm (livestock, field and horticulture crops), greenhouse, and food and beverage processing sectors, including:

- energy conservation and demand management
- renewable fuel production and energy generation
- energy production from processing byproducts
- mixed waste diversion and utilization
- barriers and opportunities for project development
- development partnerships.

Conference delegates will also be able to participate in special pre-conference technology tours on Wednesday, April 2 – entitled Biogas and Biomass Revisited and Renewable Energy Mix: biogas, wind, solar and more.

Conference program and registration information is available at **www.gtmconf.ca.**

Electricity conservation on Ontario farms is produced by the Ontario Power Authority to provide information about energy conservation and efficiency and innovative applications to help Ontario farmers better manage their electricity costs. This publication, available online at **www.powerauthority.on.ca**, examines a variety of technologies and best practices that improve farming operations and reduce energy costs. Your comments and suggestions are welcome. To have your name added to the mailing list, send an e-mail note to info@powerauthority.on.ca.