Ontario Power Authority

The Innovator

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INSIDE THIS ISSUE

The Innovator is published twice a year by the Ontario Power Authority with news and information about the Technology Development Fund. To subscribe or manage your subscription, enter your e-mail address on the lower left-hand side of the **www.powerauthority.on.ca** home page. Select Technology Development Fund from the list of available topics.

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WELCOME to the first issue of *The Innovator*, the e-newsletter of the Ontario Power Authority's (OPA) Technology Development Fund. Since 2006, we have provided $1.2 million in funding for 20 innovative technology projects that will help save energy or generate it more efficiently. The purpose of the Fund is to support the development of pre-commercial renewable energy, conservation or generation technology that requires testing or demonstration prior to market. For 2008, we have $1.5 million in funding available.

The Innovator will update you twice a year on how projects are progressing, newly funded projects and trends in emerging energy technology, as well as keep you abreast of Technology Development Fund news, upcoming deadlines and events, and regularly showcase exemplary projects.

Since the restructuring of Ontario's electricity market, there has been limited research and development activity in the sector. Policy uncertainty has severely curtailed capital investment and, as a result, technology progress is limited at a time when Ontario is embarking on an unprecedented system planning and reinvestment period.

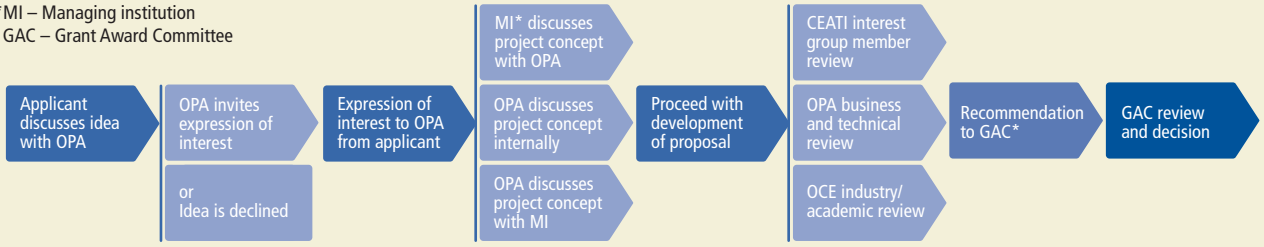
The need for innovation has never been greater. Technological innovation will continue to be a major force in the future, much as it has been in the past. To get there, we need to support the work of entrepreneurs in business and academia by funding the research, development and commercialization of innovative conservation and generation technologies that support our mandate to ensure an adequate, long-term supply of electricity for Ontario.

We invite your comments and feedback on this e-newsletter. Tell us what you think. As practitioners, we want to hear from you. **E-mail us at techfund@powerauthority.on.ca.**

What's New for 2008

We've made some changes to the Technology Development Fund for 2008. First of all, we have increased the maximum allowable funding for projects from $100,000 to $250,000. Secondly, the OPA has established its own internal review process, in addition to our existing relationships with the Ontario Centres of Excellence (OCE) and the Centre for Energy Advancement through Technological Innovation (CEATI). Thirdly, all project proposal ideas should first be submitted to the OPA instead of one of the managing institutions. If the proposal shows merit and meets the OPA's objectives, we will then determine which of our three processes the proposal should go through – the OPA's, OCE's or CEATI's.

*MI – Managing institution
GAC – Grant Award Committee



For more details on how the Fund works, download our new 2008 Guidelines, available at **www.powerauthority.on.ca/tdfund**.

APPLICATION SCHEDULE FOR 2008

Expression of Interest Deadline	Proposal Deadline	Project Approval Date
Round 2 - Wednesday, May 28, 2008	Wednesday June 25, 2008	Wednesday, July 30, 2008
Round 3 - Wednesday, September 24, 2008	Wednesday, October 22, 2008	Wednesday, November 26, 2008

Approved Projects

The Technology Development Fund is pleased to announce that 10 new projects were approved by the OPA's Grant Award Committee in the three funding rounds in 2007.

Nanowire-based Solar Cells – This project uses nanostructures to enhance the efficiency of plastic solar cells while maintaining the attractive cost advantages. The nanostructures of interest are nanowires that can offer efficient energy-absorbing media as well as electron-transport media, two of the critical factors in improving plastic cell performance. If successful, such cells can be fabricated as low-cost, large-area, flexible cells for widespread deployment.

Improving Technologies for Deployment of Energy Conservation and Demand Management Programs – To promote lower levels of energy consumption, several industrial energy conservation and demand management programs, similar to conservation programs being implemented in other jurisdictions, have been launched in Ontario recently. Given the potential financial benefits that the new conservation programs present, there is clearly a need and an opportunity for the development and deployment of technologies and services provided by a performance contracting industry.

High-Pressure Prototype of Marnoch Thermal Power Apparatus – This project involves a thermal energy conversion technology, with a novel heat engine that operates over a broad range of environments, including those where only a small temperature differential exists. This project will design, analyze and optimize the proof-of-concept prototype and mathematical models of the Marnoch heat engine for various applications.

Infrared Solar Cells made by Solution Coating – The project will investigate scalable technologies, including spray-coating, to fabricate infrared solar cells; they will target the demonstration of a solar cell, made in this fashion, that exhibits one-percent power conversion efficiency. This efficiency will bring them into the regime where further final enhancements – those that can take the efficiency of a combined infrared plus visible flexible solar cell well above the five-percent threshold – can make it commercially viable.

Energy-Efficient Mechanical Pulping – To ensure the long-term competitiveness of the Canadian mechanical pulping industry, the University of British Columbia has developed a five-year, $2-million, multi-disciplinary research program to reduce electricity consumption in mechanical pulping by 20 percent. This will be achieved through scientific discovery and the development of new technology while maintaining or improving product quality and production.

Variable Frequency Drive (VFD) Performance Testing – This project will perform a benchmark study to establish a common test protocol for determining the efficiency of VFDs. The proposed test procedure will form the basis of a new standard, CSA C838: Variable Frequency Drives. The project is part of a coordinated strategy on VFDs.

Residential Micro-Combined Heat and Power (CHP) – The project will focus on developing a micro-CHP system with domestic hot water, automatic back-up power and dispatch capabilities by the 2009/2010 winter season. The development will be validated in two stages – prototype testing and field performance monitoring.

Solar Canopy – The ultimate purpose of the canopy assembly is to redirect incoming light rays so that they enter the light guide at the most efficient angle. A dramatic reduction in the weight of the interior components also means that the support structure can be substantially reduced. The reduction in size and weight of the components in the canopy module will not only reduce the material cost, but it will also substantially reduce the embodied energy of the system, which is critical to the ultimate cost-effectiveness, since the embodied energy is a key factor in the total life-cycle cost.

The Effects of Electromagnetic Interference (EMI) on Farm Stray Voltage (SV) – The possible connections between EMI and SV or potential effects of EMI and associated SV on day-to-day farm operation are still unknown. The project will research the issues that could affect farm performance that may be attributed to EMI and associated SV. Where applicable, it will note the appropriate measuring protocol for monitoring EMI and related SV levels, and suggest levels that could potentially be considered of "no concern" with respect to impact on farm herd health and productivity.

Lightsavers – The project will recruit municipal governments and agencies throughout the Greater Toronto Area (GTA), as well as other interested public institutions, private lighting end-users, lighting companies and utilities. Participants will collaborate to test pre-commercial white LED technology and intelligent control systems in four specific outdoor application sectors throughout the GTA, especially in municipal infrastructure: roadways, pedestrian pathways, parking areas and garages, and architectural decoration (RGB lamps).

CASE STUDY

WHALEPOWER - TUBERCLE AIRFOILS ON ROTATING PLATFORMS

Wind turbines only generate their maximum electrical output above a certain minimum wind speed. The trick in siting a wind turbine is finding a wind regime that is near to or above this minimum speed, enough to make the wind turbine economical. As the best wind regimes become exploited, profitable wind regimes become scarcer and the potential contribution of wind energy to the province's electricity system diminishes.

Whalepower's tubercle technology allows variable-pitch turbine blades to be pitched to a steeper angle of attack before stalling, increasing the potential lift at any given wind speed. This reduces the minimum wind speed at which the turbine can generate its maximum output, effectively increasing a turbine's capacity factor. All other factors being equal, the higher the capacity factor of a turbine, the lower the cost per kilowatt-hour of generating electricity. By shifting a turbine's power curve to the left, tubercle technology may allow for the exploitation of wind regimes in Ontario that were previously thought to be uneconomical. With tubercle-enhanced blades, already exploited wind regimes will become more profitable as their capacity factors increase.

This project is testing whether tubercle-enhanced airfoils work as well on rotating platforms as they do on static airfoils, such as an airplane wing. Whalepower has retrofitted commercial turbine blades and is testing their performance at the Wind Energy Institute of Canada, Canada's leading testing and research institute for wind energy systems, on Prince Edward Island.

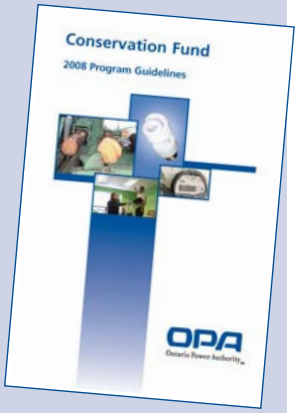
At the end of this project, Whalepower will have documented whether tubercles on turbine blades have the same effect as they do on static airfoils and how that translates into rotation at lower wind speeds.

The results to date have been promising, and WhalePower is already in discussions with more than 10 manufacturers, large and small, that have indicated an interest in the tubercle leading edges for testing on their own products. **For more information, please visit www.whalepower.com.**

Download the newest version of our Guidelines from our website!

We have launched a new website at www.powerauthority.on.ca/tdfund. Along with an updated design, the site's functionality has been improved with:

- greater search capability within the list of Technology Development Fund-supported projects
- case studies of Fund projects
- updated information on the Fund, its funding criteria, application deadlines and other sources of funding
- the 2008 Technology Development Fund Guidelines for download.



We will also be housing an archive of *The Innovator* newsletters for your reference on the site. But you don't have to wait to find out the latest Fund news – sign up to be added to our mailing list by entering your e-mail address on the left-hand side of the OPA home page, and you'll automatically be sent the latest edition of *The Innovator* as soon as it's available.

Ontario's First-Ever Energy Conservation Week Announced

Ontario's first Energy Conservation Week – May 25 to 31 – will build on previous conservation awareness events and challenge Ontario power-users to embrace conservation in their day-to-day lives – both at home and at work.

Each day of Energy Conservation Week will focus on a different aspect of energy conservation – residential, institutional and business – and how each sector can help achieve the province's targets. The initiative primes Ontarians to more effectively manage their demand for electricity in advance of the summer peak and ultimately over the long term.

Spearheaded by the OPA, Energy Conservation Week brings together a wide variety of organizations from Ontario's electricity sector in a unique partnership that will highlight what Ontarians can do everyday at home and in the workplace to reduce energy consumption.

For more information, visit **www.energyconservationweek.ca.**