

THE ELECTRICITY exchange



Power to Ontario.
On Demand.

Future Reliability Requires Coordinated Effort



Canada's largest combined-cycle natural gas facility is under construction near Sarnia (story, Page 2)

Additions to Ontario's generating mix, transmission constraints and the planned phase-out of coal are changing the way the IESO looks at future reliability needs.

"Ontario is undergoing the largest electricity infrastructure upgrade in over a century," explained Derek Cowbourne, Chief Operating Officer at the IESO. "We're seeing new clean energy projects, including wind turbines, across the province and the launch of some major conservation and demand response programs."

The IESO is accommodating these developments through reliability assurance functions that maintain focus on these challenges. Internally, the IESO identifies and manages any

associated business risks. Externally, this entails co-ordination with the Ontario Power Authority (OPA) on their Request For Proposal (RFP) process, transmission infrastructure needs and integrated power system plan as well as publishing the *Ontario Reliability Outlook*, a progress report on the interrelated generation, transmission and demand management projects underway to meet future reliability requirements.

As coal is phased out from Ontario's electricity system and other sources of energy fill the gap, there may be requirements to modify aspects of the market to accommodate the operating characteristics of new generation. With generation additions

in the short term coming primarily from gas-fired sources and renewable sources such as wind, the IESO is looking at ways to manage their unique operational characteristics. Over time as penetration levels increase, each fuel type's operational characteristics will have a greater impact on the power system. For example, gas-fired generation may have limited dispatchability and high minimum load levels while wind power, given its intermittent nature, often has a very low and limited capacity value.

"Understanding these limitations is key and the IESO conducts studies to evaluate their impact and factor them into planning assumptions," said Dan Rochester, Manager of Reliability Standards and Assessments, whose responsibility is to review planning assumptions for Ontario's power system.

Along with evaluating the operational characteristics of generators, the IESO needs to consider transmission system constraints when reviewing the location of

Continued on next page

IN THIS ISSUE:

- Future Reliability Requires Coordinated Effort
- Sarnia Area Greenfield Energy Centre Project Underway
- LDCs Roll Out Peak Reduction Programs

- Emergencies do Happen
- The Bottom Line on Energy Management

FUTURE RELIABILITY*Continued from page 1*

new generation. The IESO conducts an in-depth power system analysis to assess the transmission needs and verifies Ontario Power Authority (OPA) proposals to meet those needs. This analysis can also help determine the need for additional transmission to accommodate new generation. The recently proposed Bruce to Milton 500 kilovolt line was a result of this kind of analysis and demonstrated a coordinated response by the IESO, OPA and Hydro One to address a major challenge to the incorporation of new and refurbished generation and the assurance of reliability.

OPA's target of 2,500 MW savings through conservation projects by 2010 adds forecasting complexity to the management of Ontario's electricity system. Prior to the introduction of these programs, IESO assessments only included the contribution of market-based demand response, for

example registered dispatchable loads or the transitional demand response program (TDRP). With the addition of new conservation projects, the IESO has started to include the anticipated results and impact on the system once participants have been approved to join by the OPA.

Despite all the activity, the IESO control room operators and the processes that support them will be ready. "The IESO's market and system operations are robust and adaptable and are accustomed to accommodating the changes necessary to reflect the characteristics of new generation," said Mark Wilson, Manager, Shift Operations.

With great challenges come great responsibility and market participants and industry stakeholders are helping the IESO to continue reliable operation of Ontario's electricity system. New working groups and stakeholder initiatives have been created or planned to identify and discuss the complex issues that have emerged as a result of this activity including:

- Wind working group – discusses issues related to capacity contributions, wind forecasting, connection issues, and other operability issues.
- Gas-electric interface working group – created to discuss communication requirements between the IESO and gas pipelines as well as reliability studies required to determine the cross industry impacts between the two systems.
- Load following stakeholder initiative – studies the potential impact of proposed supply mix changes on the 'load following' capability of dispatchable resources in Ontario.
- Distributed generation stakeholder initiative – discuss operational issues related to embedded generators.

While there is much complexity in the challenges facing the industry as a whole, there is a co-ordinated effort in which the IESO and industry stakeholders aim to sustain a reliable supply of electricity for Ontario. •

What Was Said...

"What's interesting is that when you look at 2006, we surpassed the 25,000 MW mark in only 32 hours of the year. All of those hours occurred during a hot summer day when air conditioning was no doubt running flat out."

Paul Murphy, IESO President & CEO
Toronto Board of Trade speech

"Tomorrow's supply from traditional or non-traditional sources will likely cost much more than today's. The only sure way to curb rising costs is to try to reduce demand by encouraging consumers to participate in utility demand response programs."

Branko Terzic, Global Regulatory Policy Leader, Deloitte Services LP
Editorial, *Power* magazine

Sarnia Area Greenfield Energy Centre Project Underway

First of Four New Clean Energy Supply Contracts for Ontario

Rising up among the cornfields of Courtright Township, near Sarnia, is what promises to be the largest combined-cycle natural gas power generation facility in Canada. Once synchronized to Ontario's grid in the first quarter of 2008, the \$600 million Greenfield Energy Centre LP will generate more than 1,005 megawatts (MW) of electricity.

Greenfield is one of the first of four new energy supply contracts selected by the Ontario Power Authority as part of a 2004 Request for Proposal to replace 2,500 MW of coal-fired generation in the province. Successful applicants enter into contracts with the OPA for new, cleaner generation for a 20-year term. Under the terms of the contract, Greenfield

is considered a dispatchable resource that will primarily run during peak hours, but turndown to minimum load or shutdown overnight. Intermediate load units, like the Greenfield units, will be used as part of a broader "smart gas" strategy, which seeks to maximize efficiencies by using gas only for high value applications and to alleviate transmission bottlenecks in major load centres.

Ted Baldwin, Greenfield's general manager, says Courtright Township was selected as the location for the centre because it provides close access to gas storage facilities and a strong transmission grid. Gas will be supplied

Continued on next page

GREENFIELD ENERGY*Continued from page 2*

Ted Baldwin, Greenfield Energy Centre's general manager examines the exhaust end of a 200 MW Combustion Turbine.

through a two kilometre line from Vector Pipelines, while a new 4.2 kilometre transmission line will connect Greenfield's switchyard to the Lambton substation. "We are also impressed with the high calibre of local contractors who could build the plant and the large pool of skilled workers to choose from for operating the facility," added Baldwin. About 800 workers are involved in the construction of the facility and 23 operational staff have been hired in anticipation of the plant coming on line.

Greenfield's combined cycle generation involves producing electricity in three combustion turbines and utilizing the combustion turbine's hot exhaust to create steam which is used to generate additional electricity in a single steam turbine. A water cooled condenser and a fourteen cell evaporative cooling tower then condense the steam so that it may be recycled back to the heat recovery steam generators.

Greenfield Energy Centre LP, is a joint venture between subsidiaries of Calpine Corporation and Mitsui & Co., Ltd. Calpine is a San Jose based power company that owns, leases and operates integrated systems of plants in 21 U.S. states. Mitsui is a leading Japanese trading firm, providing a full range of trade and industrial development services including power project developments. Mitsui, through its subsidiaries participates in the ownership of 25 power plants all around the world. ●

Local Distribution Companies Roll Out Peak Reduction Programs

Positive customer response to four summer programs

When you're building what the Ontario Power Authority (OPA) calls "a culture of conservation," it's helpful to start at the grass roots level. Ontario's local distribution companies are taking this approach with their customers as they roll out a series of summer peak reduction programs with assistance and funding from the OPA.

"We're really pleased that 77 of the province's local distribution companies (LDCs) have joined with the OPA in one or more of the programs planned for this summer," said Peter Love, Chief Energy Conservation Officer at the OPA's Conservation Bureau. "That means that more than 94 per cent of Ontario's electricity customers will be exposed to the programs."

This year's summer programs (the Summer Savings program, the Great Refrigerator Roundup, peaksaver™ and the Electricity Retrofit Incentive Program) are building on last summer's efforts when the OPA reported that LDCs helped to directly or indirectly achieve a reduction in the summer peak demand of approximately 110 megawatts (MW). The programs are being driven by the Ontario Government's call for a reduction of peak electricity demand of 6,300 MW by 2025.

Last year (2006) was the first full year that the OPA facilitated the design and delivery of province-wide conservation programs. These programs are designed

to reduce overall and peak electricity demand as well as increase awareness of the opportunities for improving consumer energy efficiency." In Ontario, we're fortunate to have LDCs as a valuable asset to make programs work at the grass roots level," explained Love.

This year's Refrigerator Roundup program is a good case in point. Now in its second successful year, the program's primary goal is to reduce demand during the summer months when air



Horizon Utilities, Canadian Football League (CFL) celebrities and the Ontario Power Authority helped launch the Great Refrigerator Roundup program in Hamilton. From left are: current Tiger Cat player George Hudson, former CFL great Angelo Mosca, Ontario's chief energy conservation officer, Peter Love, Horizon Utilities CEO Max Cananzi and CFL legend Ron Lancaster.

conditioning and related loads put an excessive strain on the electricity grid.

From July 9 through December 31, homeowners can give up their old power-hungry refrigerators or freezers for disposal in an environmentally responsible way. Homeowners who replace their old refrigerator with a new Energy Star rated model will enjoy electricity savings of up to 33 per cent and about \$150 annually.

The old appliance is picked up at

LOCAL DISTRIBUTION...*Continued from page 3*

no charge and shipped to a centralized recycling depot. Most of the appliances' material is recyclable, except for the rubber gasket surrounding the door and a handful of other materials. The program also includes secondary appliances such as smaller refrigerators, freezers and window air conditioners.

The Conservation Bureau has worked closely with LDCs to ensure the Refrigerator Roundup program enjoys a high level of recognition and acceptance among residential customers. Many LDCs use local celebrities and politicians to help promote the program and raise awareness at public and media events.

The Roundup has generated a strong positive response from customers across all of Ontario. "People like the program for two reasons," explained Stephen Perry, Manager of Regulatory Affairs & Conservative and Demand Management (CDM) with Barrie Hydro. "They're happy to see their inefficient refrigerator off the system and they're equally happy that the appliance is being disposed of in an environmentally friendly manner. If they had to hire someone to do that, it would be an expensive and time-consuming proposition."

Figures for this year's Roundup are still being tallied but Hamilton-based Horizon Utilities had a high participation rate with last year's "Don't be a Fridge Magnet" program. "We retired 830 fridges in St. Catharines and 619 in Hamilton, along with 11 freezers," said Eileen Campbell, Horizon's Vice-President of Customer Services. "That represents almost 1.6 million kilowatt-hours of electricity saved and 1,115 fewer tonnes of carbon dioxide emissions." Perry reports that Barrie Hydro customers offered up 850 refrigerators for retirement over the same period of time.

Other OPA supported programs are also off to a promising start. In south western Ontario, customer interest is building for the peaksaver™ program, a program that was developed by Toronto Hydro Corp. Under the program, summer peaking LDCs such as Windsor-



Enwin Utilities raised customer awareness for its peaksaver™ program during a week-long kick-off at Windsor's Devonshire Mall.

based Enwin Utilities Ltd. will install a peaksaver™ thermostat on central air conditioners in homes and businesses that sign up. During critical times, such as hot summer days, a signal can be sent to cycle down the air conditioners to reduce electricity consumption. Homeowners can also elect to have their electric hot water tanks controlled as part of the program. Everyone who signs up receives a new programmable thermostat and a \$25 rebate on a future utility bill as part of the program.

The peaksaver™ program has generated a lot of interest in a city that experiences more than its share of hot, humid days. Lawrence Musyj, Enwin's director of Conservation and Energy Management, said the utility hopes to sign up 1,500 customers to the program this year. "The peaksaver™ program takes more time to explain than the other programs, especially the concept of Enwin controlling their air conditioner from a remote location. However, customers are very conscious of the need to conserve electricity while helping the environment. We've signed up about 500 customers to date," explained Musyj.

Enwin held a week long peaksaver™ kickoff in Windsor's largest shopping mall complete with live radio broadcasts and have set up a 1-800 number for

customers who wish to sign up.

Back at Barrie Hydro, the utility promoted the culture of conservation through the school system. "Since elementary schools include energy conservation in their Grade Five curriculum, we included a classroom visit as part of our Summer Savings kickoff," said Perry. "We extolled the virtues of the program to the children, gave them a conservation quiz and asked them to go home and encourage their families to cut their use of electricity by ten per cent. Over the summer, they can submit an essay on what they would be able to do to save energy with prizes for the best essays.

As this summer's programs roll out, and the results begin to come in, Love says the OPA is most pleased with conservation partnerships that are being formed with various groups within the province, particularly the LDCs. "It's gratifying to see them use their experience and expertise for such important work," said Love. "At the end of the day, we'd like to see energy conservation become a way of thinking in everyone's daily life. Ontario did it with the Blue Box program and I know we can do it in other areas, including electricity conservation." •

Emergencies Do Happen – Be Aware, Plan and Prepare

The anniversary of the August 14, 2003 blackout is an annual reminder for all of us of the need to prepare for emergencies that affect the electricity sector.

“Be aware, plan and prepare for all threats and hazards to ensure the continuity of business operations and electricity service,” advised Stuart Brindley, Manager of Training and Emergency Preparedness at the IESO.

Unforeseen events that affect the power system require timely response, both by the IESO and market participants. During the morning of June 12, Ontario demand was trending higher than forecast and the IESO was already purchasing emergency energy when one of the 500 kV circuits that connect southern Ontario to northern Ontario suddenly tripped out of service resulting in a loss of 744 MW of generation.

“The IESO immediately took a number of actions to replace the lost generation and prepare the system for the next contingency,” Brindley said.

Transmitters and distributors were directed to implement a five per cent voltage reduction across all of Ontario, with the exception of the Niagara region, providing 440 MW of relief to the system. Prompt response from participants minimized the impact of the event on the Ontario grid, our customers and the broader interconnection. The IESO released a June 12 incident report in early August containing further details.

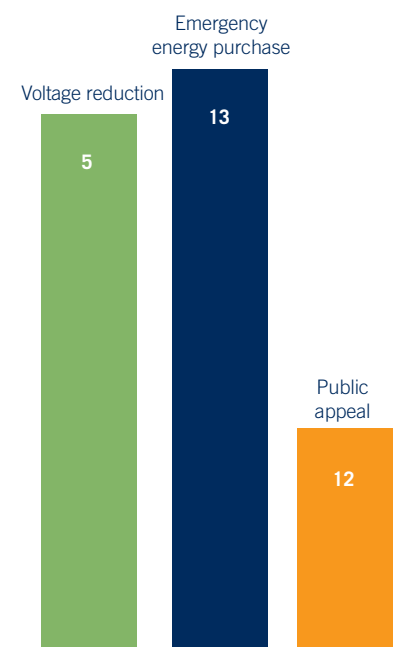
According to Mark Wilson, Manager of Shift Operations, “Proper planning, clear documentation and regularly scheduled training prepares the control room to manage these types of events when they occur. It all contributes to a reliable interconnected power system and is a very practical demonstration of the benefits of being prepared for the unexpected.”

As part of ensuring reliable operation of Ontario’s electricity system, each market participant submits an emergency preparedness plan to the IESO that describes:

- Emergency response activation processes.
- Actions to mitigate the impact of extended outages on public health and safety.
- Participation in emergency drills and exercises to test plans.
- Internal and external communications processes.
- Coordination of restoration and recovery actions with others outside the company.

“Emergency preparedness plans proved essential when market participants and the IESO responded to the August 2003 blackout,” said Brindley. “Confidence in our collective ability to respond to emergencies is enhanced

The IESO responded with 30 actions over 16 days, since the August 2003 Blackout, to manage Ontario’s electricity system and avert potential emergency situations.



through regular practice of these plans in the form of workshops, tabletop drills and exercises.”

Equally important to operational response is managing the potential consequences of an emergency from a public health and safety perspective. The Crisis Management Support Team (CMST) provides a forum for key Ontario electricity industry representatives to provide early warnings of events that may have an impact on the reliability of the electricity system. During emergencies, the CMST is an essential source of information to the Ministry of Energy and the government’s Provincial Emergency Operations Centre. •

For more information on how to plan and prepare for emergencies, please contact emergency.preparedness@ieso.ca

EVENTS CALENDAR

August – September 2007

More information on these and other events is available at: www.ieso.ca/events

All events are in the Greater Toronto Area (GTA) unless otherwise noted.

Aug 20

> Wind Power Integration in Ontario Meeting

Aug 22

> Stakeholder Advisory Committee Meeting

Aug 23

> Market Pricing Working Group Meeting

Aug 28

> Reports Site Transition Meeting

Sept 11

> IT Standing Committee Meeting

Sept 12

> Baseline 18.0 Released

The Bottom Line on Energy Management IESO Customer Education Program Enters Third Year

Increasingly, smart companies are beginning to understand that electricity costs are actually controllable costs. They are even finding that energy efficiency is good for business, good for the environment, and is particularly well-received by their company's shareholders. For some companies, a 20 per cent reduction in energy use is roughly equivalent to a five per cent increase in sales.

Over the past three years, the IESO has been working to educate those 50,000 Ontario businesses that use more than 250,000 kilowatt hours per year (kWh/year) and not on a fixed price plan. The goals of the Customer Education Program are to:

- Educate customers about how the electricity market operates;
- Empower customers exposed to the market price to better manage their electricity costs; and
- Demonstrate how customer actions can contribute to system reliability and benefit the environment.

As part of the Customer Education Program, the IESO has partnered with a number of industry and trade associations as well as the provincial and federal government to develop a series of educational brochures and workshops.

"In addition to information about how the market operates and how to better manage your electricity costs, the brochures and workshops also contain case studies on how Ontario businesses

are taking the information and putting it into practice," said Terry Young, IESO Director of External Relations and Communication. "We've heard from a number of companies that seeing real-life examples are key to helping them get started."

As part of the Customer Education Program, the IESO recently partnered with the Ontario Ministry of Small Business and Enterprise (MSBE), the Federal Department of Natural Resources Canada (NRCan) and several local distribution companies to deliver the *Dollars to Sense* workshops to manufacturing consumers across Ontario.

"In the *Dollars to Sense* workshops, participants learn ways to reduce energy consumption and cut costs across the organization," said Monique Caouette, NRCan Senior Program Manager. "Since 1997, over 13,000 representatives of industrial, commercial and institutional organizations from across Canada have enrolled in the *Dollars to Sense* workshops, proving that educating the greater public pays in the long run."

Shifting production times, shutting off unused processes and retro-fitting lights are some of the actions taken by industrial, commercial and institutional organizations that participated in these workshops.

"After attending the workshop, we started looking at the big picture, focusing on macro measures to

determine where we were going and what we needed to do to reduce our use of electricity," said Dirk Bylsma from Canal Block who participated in the workshop.

Survey results from the 70 companies that had attended the workshops to date indicate that 87 per cent of companies said that session gave them a better understanding of how to control their energy costs and 84 per cent said that they had a better understanding of how their company was billed. Most importantly, two thirds of the companies said that they had initiated energy management strategies that they had learned about in the program.

"Our objective in these workshops is to demonstrate practical solutions to better manage energy use," said Caouette. To date, total energy savings from the workshops approach \$200 million.

Of the 25 companies who have not already made improvements, 84 per cent plan to start working on changing their electricity efficiency to see improved results. Of the 45 companies that had already made energy improvements, 87 per cent planned to continue improving their energy procedures. •

Future workshops and brochures are being planned by the IESO and its partners for this fall. For more information or to sign-up for the workshops, visit the Business and Industry section of the IESO website at www.ieso.ca/business.

Sept 13

- > 2007 Power System
Emergency Workshop

Sept 18

- > Technical Panel Meeting

The Electricity Exchange is mailed to subscribers on a quarterly basis and is also available on the IESO web site at: www.ieso.ca/ElectricityExchange

We welcome your comments, feedback or suggestions. Please send us an email at: electricity.exchange@ieso.ca or contact the editor, Rayhan Malik at 905.403.6958.

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