

# POWERING UP

## ELECTRICITY IN THE NEW MARKETPLACE



**R**emember the blackout in August 2003 where people in Toronto actually talked to their neighbours and sat out on their decks by candlelight? It was the most severe blackout in North America's history, affecting more than 50 million people in Ontario and eight states in the U.S. It was also a wake-up call that we couldn't take our electricity for granted anymore. Now we're paying more attention to public appeals to conserve power and turn down our air conditioners on those hot, muggy summer days. We are beginning to realize that the growing gap between power supply and demand here in Ontario is a real threat to our way of life.

The "new reality" has arrived, according to key play-

ers in the electricity marketplace, and Ontario is suiting up to meet the challenges.

Keeping the lights on in Ontario is no easy feat. Without action to expand generating capacity and undertake significant demand-side measures, the province faces an electricity shortfall in the next few years. Bill 100, the *Electricity Restructuring Act, 2004*, brought sweeping changes to stabilize the market and address this critical challenge.

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"I've kind of seen it all from blackouts to price spikes, both sides of the Atlantic," says Dave Goulding, P.Eng., president and

CEO of the Independent Electricity System Operator (IESO), responsible for overseeing the operation of Ontario's bulk electrical system. "I never shout 'the sky is falling' because there's always something that

By Karen Hawthorne



Another key player is the Ontario Power Authority (OPA), created to oversee the provision of long-term adequacy with power system planning, generation development, conservation and electricity sector development to contract new generation. Coming up on December 1 is an OPA paper to advise the Ontario Ministry of Energy on what the province should do regarding sources of supply, including nuclear, hydro-electric, natural gas, coal, and renewable energy sources (all with conservation tar-

gets in mind), to determine what proportional contribution each will be making to the power system over the next 20 years. Next summer, the OPA will submit an integrated power system plan to make that supply mix happen.

to creating sufficient renewable energy sources to meet the supply needs of the future. In its September submission to the OPA consultation on the integrated power system plan, the society applauded the long lead time mandated for successful planning, and suggested re-examining Ontario's economic situation to weigh the benefits of more expensive power: "Experience in other countries has shown that public participation in conservation programs increases with electricity price, and the competitiveness of

creating through the choices they're making in the way they use electricity."

Richard Lu, MD, Toronto Hydro's chief conservation officer and vice president of environment, health and safety, says demand management programs and incentives are part of the answer, but new technologies will seal the deal: "People think that electricity has to come from a remote central location, go through the high towers of the city and then go into the ground. It doesn't have to be that way."

**The Ontario Society of Professional Engineers (OSPE) has called for the participation of professional engineers as key to creating sufficient renewable energy sources to meet the supply needs of the future.**

Lu compares the innovations to come to the early days of computers: "Now we don't have to go to the mainframe to operate a computer, we sit at our desk. So who is to say in the future that it's not

going to be possible that electricity will be generated by something in the basement of a house where we'll use the central mainframe as a back-up? Currently, it's completely the other way. So it doesn't make that much sense, especially in an urban environment."

The new paradigm the industry is working toward envisions more generation closer to loads, district energy, cogeneration facilities, small distributed generation, and micro-generation, says Butters: "But our system isn't really designed to accommodate that. So it's going to be an evolving process over many years... There are always going to be limits to physical infrastructure. Nuclear facilities or large gas-fired facilities will be located farther away from communities, or close to industrial facilities."

The integrated system power plans are to be drawn up once every three years, subject to approval of the Ontario Energy Board (OEB), the electricity regulator that licenses all electricity generators, transmitters, distributors and retailers; sets the electricity distribution rates; and sets the price for regulated price plan customers.

Another significant change was creation of a new conservation bureau within the OPA to lead the conservation charge. Outreach programs and awareness campaigns are already underway in partnership with local utilities and major retailing chains.

"One of the key things for the OPA is to step aside from being the sole channel of delivery," says Carr. "We have to delegate and bring back to the local communities, local businesses, and local householders, the responsibility for addressing their own needs that they're

getting from here to there

The situation isn't rosy. Factoring in economic growth, Ontario needs to rebuild, conserve or replace 25,000 megawatts of generating capacity over the next 20 years—more than 80 per cent of Ontario's current generating capacity, and more than the generating capacity of Alberta and British Columbia combined. Roughly 25 to 40 billion dollars in new investment is needed to make it happen.

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The Ontario government has made a commitment to promote renewable energy resources, with a target of generating 5 per cent of the province's electricity from renewable sources by 2007. It also plans to close down its five remaining coal-fired generators in the longer term. OPG generates more than 70 per cent of Ontario's electricity, but with the removal of OPG's coal operations, their market share will fall by almost 20 per cent, making room for competition among a variety of suppliers for an increasing share of the market.

Over the short-term, the province is bringing nearly 5000 megawatts of diversified generation capacity on line through three requests for proposal for new and clean energy supplies: The expansion of the Beck Tunnel project below the city of Niagara Falls, the refurbishment of the Pickering A Unit 1 nuclear power plant, and the restart of Bruce A Units 1 and 2 at the Bruce Nuclear facility near Kincardine in partnership with Bruce Power.

The real challenge is trying to do all this in a way that makes sure we have the reliability benefits of diversity, says Goulding: "You don't just need to be able to say at the end of the day, okay we've got 25,000 megawatts of demand, 26,000 megawatts of generation and such and so transmission system. It's the location and characteristics that are very important as well, not just adding up the numbers, which could be totally misleading."

A significant portion of today's power comes from coal-fired generation located at key points on the transmission system. Coal-fired generators can increase and decrease output on a fairly flexible basis to meet the demand curve. Nuclear plants are great base load facilities but have relatively little flexibility in their output. Newer technologies, such as wind power, can be used to supplement peak demand times, but can't be relied upon for meeting base power demands because of accessibility to fuel, Goulding adds:

"Wind is unpredictable. You get it when it blows. As for water, it can be variable, particularly for those stations that rely on rainfall, if there's a drought. Also for gas, if there's some problem with the gas infrastructure, for example, then you're not going to have a reliable system. So it's not going to be easy." ❖

## NEW BEGINNINGS: THE PRICE FACTOR

**C**onfused by the changes to your electricity bill? Here's why: Ontario moved from a monopoly-based electricity system to a competitive electricity market on May 1, 2002. From that point on, consumers could choose to buy electricity from their local distribution company or from an electricity retailer licensed by the Ontario Energy Board (OEB). The Ontario government opened the electricity market on the premise that market competition would ensure safe and reliable supply, increase opportunities for investment and environmental protection, and promote new electricity generation.

On December 9, 2002, the government passed the *Electricity Pricing, Conservation and Supply Act, 2002*, which set the commodity price of electricity at 4.3 cents per kilowatt hour (kWh) for low-volume consumers and other designated consumers. A year later, the government established an interim electricity pricing structure, replacing as of April 1, 2004 the 4.3 cents per kWh price cap with a two-tiered price structure. Eligible consumers paid 4.7 cents per kWh for the first 750 kWh consumed per month, and 5.5 cents per kWh for consumption above that level.

Further revisions to the market were introduced with the passage of Bill 100, the *Electricity Restructuring Act, 2004*, in late 2004, including the directive for the OEB to develop an electricity plan to better reflect the price paid to generators by May 1, 2005. The new prices, which took effect April 1, 2005, are based on an OEB forecast of the cost of electricity over the next 12 months; the prices are intended to stay the same for one year.

All of these market changes created another hurdle to making the new market work: lack of confidence in the system and overall confusion.

"That lack of confidence is derived from the fact that our energy policy has changed very frequently over the last five years or

so, with sometimes quite dramatic changes. For example, all of a sudden a price freeze was imposed," says Jan Carr, PhD, P.Eng., CEO of Ontario Power Authority, the new body established to ensure long-term adequacy in Ontario. "We have to ensure people understand that we now have a system where the full cost of supply is being paid by users—there is no subsidy—and that this arrangement is going to stay for the long run."

The new rates are based on a hybrid structure where customers who use less than 250,000 kWh annually are on a regulated rate option, which is more like a fixed rate. Customers who use more than 250,000 kWh are on a more market-based, variable rate.

Bill 100 gives the OEB the authority to set the price for regulated price plan customers—residential, small business and "MUSH sector" (municipalities, universities, schools, and hospitals), explains George Vegh, general counsel with the Ontario Energy Board: "We set the price; to be clear, we forecast the price and then have a mechanism to smooth out the forecast to let the price flow through to customers. It's a large new role," he says, and one the board has been carrying out for the natural gas industry for a number of years.

While the OEB has added more staff and board members to keep up with the increased workload, many of the companies that the OEB now regulates are new to regulation. "A big part of our focus is on getting people to understand what our rules require. We want to let people know how they can comply with our rules," says OEB board member Robert Betts, P.Eng. "In many ways, we're really just discovering the implementation issues as we're trying to establish the process. In Ontario, unlike many of the other jurisdictions, there's a much larger number of participants, so that broadens the process problems to deal with."