

Notes for Remarks
To the Demand Response
and Energy Efficiency Canada Conference

System Reliability Requires Reliable Demand Response

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October 9, 2008

Thank you for that kind introduction. I'm delighted to be with you here today.

I'm hugely impressed by the program that EUCI has put together – and particularly by the on-the-ground experience of the panellists who will be sharing their learnings with all of us. It's a great opportunity to hear from the people who are driving the success of energy efficiency and demand response in Ontario.

In this session Sheldon will be outlining the market analytics that are the foundation for the OPA's demand response programs, and Sean will outline how those programs can be profitably integrated into end-use businesses.

As the system and market operator in Ontario, we have a huge interest in supporting both energy and market efficiency – and in my remarks I want to focus particularly on the role we see for demand response in meeting both these objectives.

Why are we so focused on Demand Response now?

There is a fundamental change taking place within the province's electricity sector, as we proceed with plans to eliminate coal-fired generation by 2014 and dramatically increase the role of renewable generation. Added to that are significant investments in transmission and distribution improvements and a drive to engage consumers across the province in efforts to reduce Ontario's demand for electricity.

Minister Smitherman recently emphasized the government's commitment to renewable generation and conservation. He announced plans last month to have the Ontario Power Authority review certain elements of the Integrated Power System Plan, known fondly as the IPSP. And his challenge is clear – to further increase the already ambitious provincial targets for renewable generation, conservation and demand response initiatives.

At the same time that we are trying to reduce demand, we are also preparing for the elimination of coal-fired generation by 2014. At 30 megatonnes, replacing coal represents the single largest greenhouse gas reduction in North America. That is equivalent to taking nearly seven million cars off the road.

The coal phase-out is an integral component of the Province's action plan on climate change. This plan sets ambitious targets to reduce Ontario's greenhouse gas emissions to 15 per cent below 1990 levels by 2020 – a reduction of 99 megatonnes relative to "business as usual."

But from where we sit, there is no such thing as "business as usual" anymore. Electricity generation, distribution, transmission and regulation have become considerably more complex as our industry comes under increasing financial, environmental and operational scrutiny.

And as energy resources around the globe become more scarce, as the environmental impacts of electricity generation come more sharply under the microscope, and as we take action to reduce our collective carbon footprint, we will need every tool available to ensure that electricity service meets our reliability criteria as well as social criteria.

These systemic changes will have a profound impact on the province's electricity infrastructure over the coming years. Demand response is one of the tools we need – and it's a key tool in engaging consumers as full partners in our evolving electricity network.

The way we see it, it's not enough to address the supply side of the equation – we need to connect the customer to the control room.

What do we see as trends and direction affecting Demand Response developments?

While the definition of demand response can be quite fluid, especially as it pertains to different customer classes, demand response typically splits into two categories: price-based and program-based.

The former usually entails dynamic pricing including, on occasion, critical peak pricing. Programs, on the other hand, are typically contractual, and are often managed by the grid operator in partnership with large-volume consumers, local distribution companies and demand response aggregators. They are usually implemented at times when the market price is high, the system is strained, and/or operating reserves are at unacceptably low levels. Participants are generally compensated financially for being available to reduce demand on command.

Both approaches produce benefits for direct participants, for other electricity consumers, for grid and market operators, and for society overall.

Participants are rewarded twice over: first, by seeing a drop in their electricity bills when they reduce consumption or shift it to lower cost times; and second, by receiving incentive payments for their participation, where applicable.

Other electricity consumers benefit, even if they do not engage in demand response themselves. Load curtailments by some customers can have a ripple effect, resulting in lower wholesale electricity prices and, ultimately, lower prices across the board.

Demand response is also closely aligned with system reliability. If it's dependable, it's one more tool that the IESO can use to keep the system in balance and respond to sudden, unplanned events – contingencies, in our language.

And finally, avoiding or delaying the construction of new generation, transmission and distribution infrastructure by showing that consumers can readily respond in tight supply situations has positive financial and environmental impacts for all of society.

Where do customers fit in?

There has been considerable research done to prove that electricity consumers can be price sensitive. In Ontario, for example, several recent pilot projects using time-of-use rates have demonstrated that there is considerable willingness on the part of residential consumers' to adjust their electricity consumption according to price.

What comes through loud and clear is that consumers will change their behaviour if there is an economic benefit to doing so.

Although there were differences in the methodologies, pilot projects undertaken by Milton Hydro, Newmarket Hydro , Veridian Connections, Oakville Hydro, Hydro One, Peterborough Distribution and Hydro Ottawa Hydro show that consumers responded to tiered pricing by shifting some of their consumption from on-peak periods to mid-peak and off-peak times. There were disparities in the bottom-line impacts on customers' bills. But enabling technologies such as remotely controlled programmable thermostats, in-house energy monitors and displays, and load control devices for water heaters and other appliances significantly increased the effects. Even simple fridge magnets that clearly displayed the off-peak times were enough to significantly influence customer behaviour.

Importantly, after a load reduction or shifting pattern was established, most participants reported that the new consumption patterns had become entrenched habits, and very little additional education was required.

Ontario is certainly not alone in its efforts to encourage residential demand response. And what we're learning from other jurisdictions is that demand response programs do not need to be overly complex. One of my favourite programs was run by CNT Energy of Chicago, which has implemented an innovative program known as Power Smart Pricing. In the program, residential consumers were charged an hourly electricity price based on wholesale market prices. The program uses day-ahead prices, meaning the hourly prices for each day are set the night before. And each evening, that price information is available online and by telephone. During 2007, participants exposed to this hourly price saved an average of 16 per cent on their electricity bills.

CNT also provides high-price alerts by telephone or by e-mail if the next day's prices will be higher than 13 cents per kilowatt hour for any hours. What CNT has shown is that providing customers with the information they require to make informed decisions about their electricity consumption doesn't need to be complicated. Even a simple e-mail alert can prompt consumers to reduce their consumption when prices are high, the grid is strained, and reliability may be threatened.

Another benefit is that consumers learn that reducing demand is just as effective as increasing supply – plus it's more environmentally and financially responsible. It results in less pollution, fewer greenhouse gas emissions, and greater system reliability.

So to again demonstrate one of our themes these days: by giving customers the information required to respond to time-based electricity costs or changing grid conditions, demand response turns customers into fully engaged partners with the bulk power system operators and suppliers – not only in system operations, but in our electricity market as well.

How the Market Can Facilitate Demand Response – and Demand Response Can Facilitate the Market.

Substantial gains in wholesale market efficiency can be expected from a relatively small percentage of demand response. This is because the supply curve is steep at high price levels, which means small reductions in demand can cause a large decrease in price.

But the fact is that after having market pricing in Ontario for six years, we are only just starting to get time-of-use and hourly price information into consumers' hands on a wide scale. We've had some stops and starts, since the market opened, with how consumers are exposed to price. In many respects, the role of price has been neglected in the evolution of demand response in this province. This holds especially true for residential customers, small business owners, and designated customers in the public sector: municipalities, universities, schools and hospitals.

While some of these groups are now moving from Ontario's Regulated Price Plan to the hourly price, they have been insulated from price volatility for long enough that true demand response behaviours have not been fully realized.

In my opinion, the transition to time-of-use and hourly prices will create a new opportunity in Ontario. As this transition proceeds, I predict we will see a new interest in conservation and demand response initiatives, from which the province will derive significant benefit.

At the same time – and if I can take a small diversion – demand response also offers the chance to demonstrate the benefits of paying attention to price, and the importance of improving the quality of our price signal. Stakeholders have urged us to take early action on improving the current real-time pricing model. This will be part of our market evolution focus, and over time should also broaden the opportunities for effective demand response initiatives.

Meanwhile we shouldn't look only to provincial programs to drive the necessary behaviour change, build consumers' knowledge and awareness, and grow the market for enabling technologies.

Some of the most exciting and successful demand response projects I hear about are ones that have been developed by customers themselves. The York Catholic District School Board, for example, has a demand response program in three of their schools. A real-time energy monitor in the lobby displays the school's demand using data from its interval meter. When the school is coming close to reaching its peak demand of 82 kilowatts, a "Save Energy" light starts blinking. Then the students and teachers get to work, turning off lights and computers. The program has been so successful, and they are so energy conscious, that they've had to lower the demand threshold to 73 kilowatts – as they never come close to hitting the original target now that they've changed their behaviour.

Technologies are already available to automate the process of demand response. I'll speak more about technology in a few minutes when I address smart grid developments in Ontario. But let me just say that technology is starting to enable considerably more demand response than in the past.

As consumers become more aware of demand response, and start demanding those devices that can help them reduce their consumption – like timers for their washing machines, clothes dryers and dishwashers – manufacturers will see the value in expanding their current offerings.

From the system operator's perspective, a megawatt reduced is usually as good as a megawatt generated. As long as they have a proven level of availability, both options serve our immediate purposes as we balance supply and demand in the province.

However, I think we have a lot to learn about the operational flexibility and price sensitivity of our loads. I know considerable research is being done in this area, and hopefully the results will help the industry to add flexibility in accommodating the operational realities of our loads. As we understand these consumers' demand response capabilities, and quantify how they can contribute to the system, we should be able to offer better integration into the market.

Meanwhile, to help provide some additional confidence for customers in making decisions as to when to consume power, the IESO launched the Day-Ahead Price Forecast this past July.

The new model uses information available a day ahead to provide a forecast for the next day's hourly prices, Monday through Friday. It produces upper and lower price thresholds which, in turn, provide a 95 per cent confidence band around the forecast.

I was a strong supporter of putting our Day-Ahead Price Forecast in place. It provides additional information for customers who can adjust their usage to avoid high-demand/high-cost periods.

And as an industry, we are expanding the tools available to reach residential consumers and small business owners. By providing them with the tools to become more energy efficient, and by demonstrating tangible results, we stand to make a real and lasting impact on demand in this province.

Smart meters will help to get us there. By tracking energy usage on an hourly basis, smart meters provide consumers with a powerful tool to manage their consumption – and their costs.

When consumers do not see time-differentiated prices, they have little or no incentive to reduce or defer consumption. Like seeing the posted price of a litre of gasoline at the gas station, smart meters and time-of-use rates will allow consumers to understand the cost of their usage – and adjust their usage pattern accordingly.

With a deadline for installation of 2010, Ontario is really at the forefront of smart metering. While some of the Europeans are ahead of us in other areas of industry evolution, especially with respect to financing and integrating renewable generation, most of the EU countries lag far, far behind when it comes to smart metering.

A report prepared earlier this year by Capgemini indicates smart meter penetration in Europe is considerably less advanced than it is in North America. In fact, their findings suggest there is some interest in smart meters, but there has been very little action to date beyond Italy and Sweden.

But even with the smart meters going in across Ontario, it will take education and imagination to capture the full potential benefits available.

The Smart Grid

Smart meters are one of the cornerstones of the smart grid, a concept that is high on the radar of governments, utilities, technology vendors, system operators and, increasingly, consumers as well.

There is no universally accepted definition of a smart grid. Its ultimate goal is to use advanced information and communications technologies to increase grid efficiency, reliability and flexibility.

In partnership with other industry representatives, the IESO launched the Ontario Smart Grid Forum earlier this year. The Forum has brought together leaders from across the sector, to develop a vision for a provincial smart grid that will provide consumers with more efficient, responsive and cost-effective electricity service.

Ontario is certainly not alone in its efforts to conceptualize – and plan for – a smart grid. The smart grid is built on a decentralized, digital model. It will have the capacity to identify and repair faults before they cascade; and support the two-way flow of information among appliances, control devices, small generators, LDCs, grid operators and others.

It's difficult to predict exactly how the electricity grid will look in 20 years, but one thing is certain: the functionality of the smart grid will bear relatively little resemblance to today's grid. The technology to support "prices to devices" and other smart home controls is well advanced right now – and integration into that "smart home" is not far off.

Demand response, dynamic pricing and the smart grid are related concepts – but they all reinforce my theme of connecting the customer and the control room. And that will move us, gradually, from a utility-controlled environment to one where the consumers themselves will hold the balance of power.

These changes call for a new approach – and a new electricity architecture. And by thinking now about how to plan and develop a smart grid, Ontario will be well-positioned to deliver new results.

So in closing, I've surveyed a range of factors that, at least from the IESO's perspective, will influence how Ontario can capture the benefits of demand response. Other speakers here will add their issues around compensation, program triggers, contract terms, measurement and verification of response, and delivery mechanisms. All of these will affect whether we achieve the behavioural changes we are looking for.

Behavioural changes don't always come easily, but Ontarians are starting to think twice about their electricity use – for environmental as much as cost reasons.

If we, the industry, are to achieve better levels of demand response, we will have to do a first class job of communicating and coordinating our efforts. And those efforts are well underway. For example, the IESO is the appointed dispatch manager for the OPA's DR 3 program, which should yield some new economic and operational efficiencies. It's a great partnership.

So despite the challenges, I believe we can capture the benefits for the province offered by paying attention to demand response opportunities.

Thank you.