



Notes for Remarks:

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Check Against Delivery

Good morning, and thank you for having me here today. Taking a look at the agenda for today and tomorrow, I'm amazed by how many impressive speakers there are. So it's an honour to be up here, and I'm really excited for what's sure to be a great conference.

It has now been just over four months since the merger took place, and I already have a much greater appreciation for the sector through my expanded responsibilities – I now oversee market and electricity resource development. This includes continuing procurements like FIT, the Large Renewable Procurement and storage, but new to me, are the market-based initiatives like the Demand Response pilot and auction.

I think it's fair to say my new role has given me a more well-rounded perspective on what Ontario's electricity needs are and the potential solutions available. And it's from my new vantage point that I want to talk to you today about the current state of Ontario's electricity sector and some of the trends we're seeing.

The topic of my speech today is "Meeting the transformation challenges in Ontario's electricity sector." This is a bit of a different speech for me....I am out of my normal comfort zone of talking about numbers of contracts, megawatts contracted and other contractual matters....so in effect, I am also transforming myself with these remarks. And I prefer to use the word "opportunities" not "challenges".... but I will let you be the judge when I am done.

There is certainly transformation taking place, and at the center of this transformation is the electricity consumer. Fast-advancing technologies, environmental policy and a stable supply outlook are all leading to a larger role for the consumer. The result is a move away from the traditional top-down management of the sector toward more dynamic relationships between the IESO and its stakeholders.

Conservation and demand response are providing clean, cost-effective alternatives to generation, and technological advances are leading to new possibilities through energy management tools, low-cost solar panels and energy storage.

I'd like to talk to you today about how the IESO is supporting and enabling these changes, what the implications are for our industry and what challenges we will need to face collectively in the years ahead.

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For the past decade or so, our focus has been on investing in the system—first to make it more reliable and resilient, and in recent years to offset the retirement of coal-fired generation. There’s no doubt we are better off now than a decade ago.

Ontario currently has a robust system and clean, diverse supply mix. We have around 34,000 MW of installed transmission-connected capacity and are completely free of coal-fired generation. Our wind fleet continues to grow, is getting well integrated into our system and is remarkably dispatchable – in 2014, we avoided 18 nuclear shut downs as a result of wind dispatch, utilizing our interties and taking advantage of Bruce Power’s nuclear manoeuvring abilities.

We are not only able to withstand emergency scenarios here in Ontario, we are also providing assistance to neighbouring jurisdictions when they need it. For example, last December two transmission lines tripped in Quebec, causing approximately 200,000 customers to lose power. Ontario provided 1,250 MW of emergency energy over the evening peak, helping Quebec to restore power much sooner than they might have otherwise.

So we are on firm footing here in Ontario. We can now afford to turn our attention to finding efficiencies, enhancing the value of our system and developing demand-side resources.

Our first priority is putting Conservation First.

The province has set an ambitious conservation target of reducing energy consumption by 30 terawatt-hours by 2032. This is the first resource considered in our planning, and as with everything else I will talk about today, the consumer is at the center. The success of conservation will depend on the buy-in of consumers, and this will require a collective effort from the IESO, LDCs and innovative vendors.

The possibilities with conservation are endless. Companies across Ontario continue to surprise us with innovative ways to engage consumers and incent conservation. We’ve certainly come a long way from simply asking people to turn off their lights when they leave home.

One thing we’re seeing is conservation programs tailored to specific customer

segments. For example, Niagara-on-the-Lake Hydro has a pilot program for wineries and agricultural facilities that focuses on refrigeration. Targeted conservation programs like this one reflect a more sophisticated understanding of energy.

Pay-for-performance programs are another example of innovation. These programs encourage consumers to identify areas for potential energy efficiencies through improvements focusing on daily operations, systems and equipment upgrades. A baseline is established for participating companies' energy consumption, and the company is paid for every kilowatt-hour saved. We currently have a pilot program underway—funded by our Conservation Fund—that Loblaws is participating in.

Sector-specific and pay-for-performance programs provide opportunities for savvy businesses to use conservation to their advantage. But the great thing about conservation is that everyone wins. Businesses can cut costs, Ontario's electricity grid and its ratepayers benefit, and greenhouse gas emissions are reduced. That's why conservation is our first choice to manage demand—and an example of how the consumer is impacting our system planning.

When we look at innovation in conservation, a key component is the use of data. One of the IESO's responsibilities is to manage Ontario's Meter Data Management and Repository, which manages the processing of retail smart metering data for Ontario's 4.8 million residential and small commercial customers. We currently have a stakeholder engagement underway to explore how we can extract further value from this data while continuing to safeguard the privacy of the consumers to which the data belongs.

This project is exciting because there is significant potential value in this data for the design of conservation and demand response programs. There is also potential value for system planning, development of third-party products and services, policy development and academic research. So we look forward to our ongoing work with stakeholders on this topic.

Another example of how the consumer is impacting our electricity system is demand response or DR. This is truly a remarkable year for DR. The DR3 program transitioned into a market-based program this March, now rebranded as Capacity-Based Demand Response; we launched an RFP for DR pilot programs last month; and we continue to

finalize design details on auctions for DR, with the first to be held later this year.

Demand response takes consumer-level participation a step further than conservation, essentially asking the consumer to become an active player in the operation of the electrical grid. DR providers are increasingly performing functions for which we traditionally relied on generators. According to the latest 2013 data available from our fellow U.S. System Operators and Regional Transmission Organizations, demand response capacity now holds the potential to reduce peak demand by 6.1 percent.¹ By the year 2025, Ontario's "*Long Term Energy Plan*" aims to place demand response in a position to reduce peak demand by 10 percent, and we are working earnestly to achieve that target.

It began with regulation service, which sees participants match electricity generation on the grid with demand that is not met by regular market dispatch by responding quickly to all the fluctuations around the 5-minute dispatch schedule. Now, our DR pilot program RFP is looking for participants that can provide load following and unit commitment – two more services typically provided by generators and other suppliers.

Load following involves responding to real-time or hour-ahead market prices and adjusting power consumption in five-minute or hourly blocks. This is similar to how a generator operates in the market every day.

Unit commitment, which is an optional service in the RFP, is when DR providers agree to curtail their load four hours or a day in advance. In certain instances, this commitment could give us an alternative to starting up generating facilities. In the bitterly cold month of January 2014, our U.S. counterparts at the New England and the PJM system operators called upon demand response capacity to get them through a difficult period of extreme demand and waning natural gas supplies. Having a variety of options is always good policy.

So we're very excited to better understand the capabilities of DR in providing these services.

As for DR auctions – we continue to work with stakeholders on the detailed design. Auctions will seek out the lowest-cost DR providers, creating a market-based mechanism that will allow expiring Capacity-Based Demand Response providers, as

¹ FERC Assessment of Demand Response and Advanced Metering, December 2014

well as new providers of DR, to contribute. It's important to us that we have stakeholder input, and this engagement will continue into the summer.

As we progress on our initiatives, the province is progressing on a major climate change initiative through its announcement of a Cap and Trade program for reducing greenhouse gas emissions. We still don't have many details at the moment, but there is sure to be implications for our sector. Fortunately we have already made a lot of progress in making our industry cleaner, including eliminating all coal-fired electricity generation. Ontario is already at the leading edge of a major change in the make-up of our continent's electricity supply.

Our neighbours south of the border are also seeing a transformation -- clean air policies and inexpensive natural gas are already having an impact on our sector. Just four years ago, there was a net gain in coal-fired capacity on the North American continent. More recently, 3,700 MW of coal capacity has retired from the U.S. fleet in just the past 12 months. In the next 12 months, over 12,000 MW of coal-fired generating capacity is estimated to retire.²

We can see a growing role for conservation and demand response providing opportunities for large consumers to not only save money but also to meet emissions targets.

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Everything I've talked about so far has been about how consumers are increasingly contributing to our electricity system—whether by reducing consumption through conservation programs or managing consumption through demand response. These developments are being enabled and propelled by our actions: through our funding, programs and initiatives.

However, there are changes taking place that are requiring us to adapt. The speed of technological advancements in particular is keeping us on our toes. One example is the remarkable drop in solar panel costs and increased panel efficiency. We are also witnessing growing investment in energy storage technologies, resulting in more viable products that can complement solar.

² U.S. Energy Information Administration, "Electric Power Monthly," April 2015

I'm sure everyone here has heard about Tesla's in-home battery pack that was announced earlier this month. Behind this announcement, Tesla has been working on its "Gigafactory," which is now taking form in the Nevada desert to expand its production capacity and realize economies of scale. Tesla is not alone in that regard. Worldwide battery production capacity will easily more than double in the next five years. It may be debatable just how far and how fast this will reduce energy storage costs, but I certainly have not seen anyone predicting those costs will go up.

What we do know is that technology will increasingly enable the consumer to become more self-sufficient. And the rate of technological advancement is so fast that analysts can't even keep up.

The United States Department of Energy found that solar price projections for 2020 are approximately half of what analysts projected just five to 10 years ago.

Meanwhile, a report from Deutsche Bank has found that, in coal-dominated power regions across the world, the cost ratio between coal and solar has dropped from 7:1 to 2:1, and the bank predicts it will fall to parity within 12 to 18 months. As you all know, Ontario is now coal-free, but these statistics illustrate the dramatic decline in solar prices around the world.

Ontario currently has more than 1,500 megawatts of distribution-connected solar and we expect to have more than 2,000 megawatts by 2017. This trend is being driven by consumers who are finding it is increasingly cost-effective to self-generate. Presently, most consumers who are generating their own power still rely upon the utility's infrastructure – infrastructure that provides reliability and a market for energy produced by the customer, regardless how energy is delivered. The traditional method of applying distribution rates on the basis of energy consumed is beginning to break down. More and more, the distribution system is increasingly acting as a two-way conduit between the customer and the utility. Basing the distributor's revenues on a 90 year-old model predicated on the one-way delivery of energy to the customer is no longer reflecting context of today's distribution infrastructure.

Also contributing to the need for a new distribution revenue model is conservation and energy efficiency. Ontario's average consumption per customer has dropped significantly over the last 10 years or so. This is great news for Ontario's ratepayers – and the environment – and it shows how successful we have been at

changing consumer behaviour. But it also exacerbates revenue concerns for LDCs since part of their revenue comes from variable charges based on consumption. So this was creating an awkward situation where LDCs were being asked to promote conservation at the expense of their own business.

We've seen two significant decisions made recently to address this problem. The first is the proposed merger of Hydro One Brampton, Enersource, Horizon Utilities and PowerStream. Together, these distributors would form the second largest LDC in the province. And the Premier's Advisory Council on Government Assets report mentioned that there are others who have expressed interest in consolidating as well. The idea is that larger, consolidated companies will have more resources and gain efficiencies that will help them cope with the changing landscape.

The second was a recent decision by the OEB to introduce fixed fees for distributors – often referred to as revenue decoupling. This change is being phased in over the next four years. Fixed fees are being introduced to help distributors ensure they recover the costs needed to maintain the system and remove any disincentives to the Conservation First framework. LDCs can now encourage conservation and energy efficiency among their customers without having to worry about not being able to recover their infrastructure costs.

LDC consolidation and the OEB's fixed fees decision provide further evidence that the transformation of our electricity sector is being driven by the consumer. And while these changes are positive signs of our industry adapting to change, we will need to do more in the years ahead.

As distributed energy resources get better, cheaper and their rate of adoption accelerates, our electricity system could become more decentralized. This has also given recent prominence to the topic of microgrids, which is currently being examined by the Ontario Smart Grid Forum and its Corporate Partners Committee.

Across this province some local distribution companies have begun conducting pilot projects to better understand the technical capabilities of microgrids. In some cases, projects have also raised the possible future implications of microgrids. A project under consideration in Ottawa serves as an example. The project, named "Zibi," will be a self-sufficient community right in the downtown core. It is interesting because the project has been initiated by a third-party developer – not a utility company.

The project combines advanced distribution management, green generation and storage, home energy management and monitoring, and innovative customer interaction. While the project is not initially intended to run autonomously from the Hydro Ottawa grid, it does raise interesting questions from a utility's standpoint: What role should the utility company play in facilitating an energy campus within its service territory that could evolve to become an autonomous microgrid? What is the status of a customer that lies within the boundaries of that project? What precedent will it set for future projects? What is the governance model? A recent study by the California Public Utilities Commission regarding such questions concluded that microgrids will change the role of the local utility company and shape it more into a distribution system operator with functions not unlike those of the IESO. We note with great interest that a similar debate is also currently playing out in front of the New York State Public Service Commission.

It is far from clear when or how such transformative changes might play out. But we need to recognize that our world needs to evolve to one of a more coordinated or integrated model of distribution and transmission decision making, resulting in more intelligent solutions for the consumer.

This is something we will need to address collectively. Collaboration between stakeholders will be key.

Stakeholder engagement is a core aspect of our operations at the IESO. Last time I checked, we had about 20 active engagements. Stakeholder input leads to more informed decision-making and it lends legitimacy to everything we do. So as we look ahead at the developments that may reshape our electricity landscape, it's imperative that we work together.

About two weeks ago, the IESO announced the members of our new Stakeholder Advisory Committee. We believe that every segment of our industry should have a voice, and the new SAC should provide that opportunity. Members will provide policy level advice on behalf of five broad-based constituencies, which include generators, consumers, transmitters and distributors, related businesses and services, and Ontario communities. Our Board of Directors also approved of Terms of Reference to guide the new SAC, which is available on the IESO website.

On behalf of our executive leadership team I want to say thank you to all the members of the former OPA and former IESO SACs for their contributions.

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So I've touched on a wide variety of topics today, but the key takeaway is that the consumer is at the center of transformation in our industry. Technological advances, environmental policy and a stable supply situation are some of the contributing factors.

Conservation and demand response are clean, low-cost options. They are providing great value to our system, and we will continue to leverage them for the benefit of Ontario's ratepayers. The IESO looks forward to our ongoing work with LDCs to help them achieve their conservation targets, and we're excited to get our DR pilot program off the ground and to launch a DR auction later this year.

We will continue to explore how to enhance the value of our data so that it can be used for conservation and DR programs – again with the help of our stakeholders.

We will also continue to monitor developments as consumer-level technologies—such as home automation, solar panels, storage, and others—become more prevalent.

Our industry is never stagnant, and I look forward to seeing what's next.

And when I say next, not only do I mean the next year or five years, I also mean the next panel on the agenda. Although I did say I won't talk about the stuff I usually talk about, I just couldn't resist. Many of you know that I am a huge fan of the nuclear sector, and this is why I say that I expect great things from the nuclear sector over the next decade. You have a huge role to play as you embark to refurbish one of every two megawatt hours of electricity that we consume – we have to get it right this time!

Thank you for your time.