

Innovating for a Sustainable Electricity System

A Keynote Speech by

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at the

Ontario Energy Network Luncheon

October 23, 2012

Royal York Hotel, Toronto

CHECK AGAINST DELIVERY

Thank you, Brian.

I'd like to thank Gord McBrien and the Board of the OEN for inviting me back. I've attended many OEN luncheons – in the audience and as a speaker – and it's always a pleasure and a great opportunity to take part in this event.

Some of you just saw me last week at the OEA Conference and/or the AMPCO fall meeting – not APPrO, that's next month. And some of you will see me again this week at the Toronto Board of Trade. But take heart, I promise I'll be talking about different things at each one. And there's always a lot to talk about – who knows what will come up between this speech and the next one. Just look where things were at this time two weeks ago.

Premier's Resignation

Of course, one of the biggest topics of conversation is Premier Dalton McGuinty's announcement that he will be stepping down.

I would like to add my voice to those thanking Premier McGuinty for his 22 years of dedicated public service, including his nine years as Premier of Ontario.

I was a Deputy Minister in Cabinet Office at the time the government changed and he became Premier. I subsequently ended up serving in a variety of Deputy roles, including as Deputy of Finance through five very interesting budgets (that's how you measure it as Finance Deputy, not in years but in how many budgets you survived).

Very early on, Premier McGuinty put Ontario on the path to phasing out coal while jump-starting a clean energy economy – a noteworthy achievement that will benefit the people of Ontario for years to come.

As the Premier looks forward to the next chapter of his life, I wish him and his family the very best.

And while we are talking about soon to be retirees, I wanted to once again congratulate Laura Formosa, named last week as the Energy Leader of the Year by the Ontario Energy Association. Gathering up accolades as she gets ready to head out, but we still have the pleasure of her presence for a while yet and there's still a lot to do.

And in case you didn't hear it, Gord is also soon to retire.

The Merger

So aside from the Premier's, Laura's and Gord's retirements, another big topic of conversation, at least until this time last week, is the proposed merger of the Ontario Power Authority with our good friends at the Independent Electricity System Operator. Still is a big topic.

As you know, in April, the Ontario government unveiled plans to bring together the best of the OPA and IESO into a new, stronger, integrated electricity agency.

But now that the Legislature has been prorogued, Bill 75, the proposed legislation to merge the two agencies, has been suspended. It will have to be reintroduced to move forward.

So where does that leave the merger? Good question. We were certainly watching the Bill as it worked its way through the legislative process. And we were doing a lot of work together to get ready.

Now we want to capture the value of that work. Move forward with what we can, where we can.

We certainly learned more about each other, and about ourselves frankly, along the way, so regardless, we will be working better together on the way forward.

And we're going to continue focusing on our day job, as we have all along. And we have a lot of day job – almost two-thirds of our electricity supply under contract, or 21,000 megawatts, in addition to the work we do in conservation and planning.

At this point, I would like to publicly thank the employees of both the OPA and IESO for the fine work they have been doing through this period. A lot of twists and turns, but they have been keeping their eye on the ball and getting things done. Very professional, as expected, but not an easy time.

And now on to what I came to talk to you about today, a subject that's vital to our industry, our economy, and our environment...

Innovation.

I chose this topic because there is so much innovation happening in this sector. While you might not be surprised, I think you deserve to be inspired.

You can also feel proud.

Because many of you in this room will recognize at least one of the initiatives I am going to reference as something in which your organization or you, personally, have been involved. So you can appreciate the hard work, creative thinking and collaboration that go into these efforts.

I'm also a firm believer that talking about ideas and opportunities often breeds more ideas and opportunities.

Innovation drives success, efficiency, cost savings, smarter and more effective ways of accomplishing our objectives. And it's at the core of the tremendous transformation underway in Ontario's electricity industry.

You've heard me say it before, in this very room. Ontario has a good story to tell. Our diversified supply mix is one of our strengths. And we're making it greener, and cleaner and smarter. It's about being at the leading edge of innovation:

- Conservation targets that are among the most ambitious in North America.
 - The long-term target is a reduction in peak demand of 7,100 megawatts and 28 terrawatt-hours by 2030.
 - That's equivalent to taking one in five households off the grid.
- Targets for clean energy, which are being met through the first comprehensive feed-in tariff on the continent.
 - 10,700 MW of wind, solar and bio-energy resources and
 - 9,000 MW of hydroelectric resources by 2018.
- Building a smarter electricity grid that is creating opportunities for new businesses and innovative products and services.
 - Almost 4.8 million smart meters have been installed in homes and businesses across the province and 4.2 million customers are on time-of-use rates.
- Eliminating coal-fired generation by the end of 2014, which is the biggest climate change initiative in North America.
 - This is a major undertaking, especially considering that, in 2004, coal accounted for 17 percent of the province's total electricity production. In 2011, it was under three percent.
 - It will reduce the carbon footprint of Ontario's electricity sector by 75 percent.
 - And we are the first jurisdiction on the continent to completely phase out coal-fired generation. So it's pretty innovative by North American standards.

And what's particularly innovative – and certainly recognized as such when I talk to my peers in organizations around the continent – is not just that we are doing these things. Other jurisdictions are too. But we are doing all of them at the same time. And having success.

The OPA is pursuing innovations in programs, processes, and operations to achieve our objectives and deliver on all areas of our mandate more efficiently and cost effectively.

Most importantly, just about all of these initiatives are not possible without collaboration and input from you, our industry partners and stakeholders.

It's innovation that helps ratepayers. Our environment. And, in many cases, creates jobs and helps your bottom line. Which I know you care about.

Let me give you some examples. And I'll start with one of our lesser known roles, but it's one of the ones we get to have more fun with, because it's innovative, and looks directly into the future.

Innovations in Conservation

Our Conservation Fund is a test bed for new approaches to conservation.

Initially, we had two funds:

- the Conservation Fund was created in 2005 to support pilot conservation programs and other initiatives to build the market's capability to conserve electricity
- and the Technology Development Fund was created in 2006 to support innovations in technologies and processes to improve conservation or electricity supply.

By 2011, the two funds had committed a total of \$28.8 million of support to 167 projects. These projects have leveraged an additional \$101.5 million in partner support.

And the return on this investment has been significant.

Conservation Fund projects have informed the design and evolution of Ontario's saveONenergy programs. These programs are helping residents, businesses and institutions to manage their energy use and help build Ontario's culture of conservation.

The Technology Development Fund has also had a great impact. It has supported efforts to develop and commercialize a wide range of cutting-edge technologies to further energy efficiency and conservation.

Cue the slide. (I never use slides because I have a well-known techno-curse and they never work. Last month at the National Energy Ministers' conference mine were the only ones where the screen went blank for 10 minutes, and I wasn't even touching the equipment. So let's see how this goes.)

Here's a small sampling of the technologies in development:

- liquid solar cells – made from tiny particles measured in nano-particles – that can be sprayed on panels like paint
- a prototype of one of the most liveable, energy-efficient, solar-powered homes in the world
- a thermal energy storage system that uses up to 95 percent less electricity than a traditional air conditioner to cool buildings
- The world's least expensive, high-efficiency solar panels
- High efficiency LED lighting with smart controls – that are 80 to 85 percent more efficient.
- Early supporter of temporal power flywheel storage, ice bear thermal storage.

I could go on, but the slide speaks for itself.

My point is that there are a lot of brilliant people in Ontario and further afield with innovative ideas to advance energy efficiency and conservation. And the funds, with additional support from others – especially LDCs, who aren't listed on the slide because there are too many to list, have helped bring those ideas closer to commercialization.

At the OPA we're very proud of the ground-breaking work that we're supporting.

And there's more.

To maximize effectiveness, we've merged the funds and streamlined operations to move from the management of volume to management for impact. And we are already seeing the benefits.

The merged Fund now exclusively supports innovative electricity conservation initiatives and technologies that:

- Build marketplace capacity
- Test new or unique program elements
- Verify energy savings potential and cost-effectiveness of novel demand-side technologies and processes, and
- Can be scaled up to achieve significant energy savings in Ontario.

And here's my small plug to the local distribution companies in the room. LDCs are now eligible to apply to the fund. It's a great opportunity to pilot your ideas for Tier 2 and/or 3 conservation programs. I encourage you to take advantage. Some of you already have. Let the race begin. Or should I say, continue?

Please have a look at the brochure I brought along on the fund for more information.

Another innovation we're pursuing is the use of social benchmarking to foster conservation among residential consumers.

Those of you who were at the OEA last week may have seen a luncheon keynote speaker talking about something similar that IBM has been working on in the US. Well we're working on it here too. In fact, we just put out an RFP last week.

Social benchmarking compares one person's energy consumption to that of another person or group. The goal is to use these comparisons to motivate behaviour changes that reduce residential electricity consumption.

Call it suasion, call it competition. Keeping up with the Jones's. Human nature. If your neighbours are doing better, and you hear about it, chances are you'll be inspired to do more.

Studies of social benchmarking have suggested that average electricity savings of two to three percent per household can be achieved in the first year of the program. And that's a conservative estimate.

If every household in Ontario took part in social benchmarking, savings from this initiative alone could result in up to one million megawatt-hours of savings per year.

We are working with three local distribution companies – Hydro One, PowerStream, Milton Hydro – on pilot programs to test the effectiveness of social benchmarking to foster conservation in the residential market.

The results of these pilots will provide important information on the use of residential engagement tools, influence the next generation of local electricity utility residential programs, and provide insight into how best to communicate with residential consumers to drive electricity savings and conservation.

These will be among the first social benchmarking pilots in Ontario, so I expect there will be a lot of interest in our findings. Stay tuned.

Finally, before I leave the topic of conservation I should point out some good news. We can always use good news.

Our 2011 Conservation results are in. Despite a slower than expected start, we brought the year in exceeding our 2011 targets overall – and at a program cost to consumers of three cents per kilowatt-hour, our most cost effective year ever.

The programs we have been implementing with LDCs are taking hold and momentum continues to build.

Innovations in Planning

We are also innovating the way we plan the power system. Planning is a continuous process that has to respond to ever changing circumstances.

And if there's one thing that the OPA is really, really, really innovative at, it's doing scenarios. (Including scenarios about OUR OWN future, apparently.)

We are working proactively with the provincial, regional and municipal authorities during their official plan development or amendment processes.

This will help facilitate infrastructure approvals processes. It will ensure that local approval authorities and planning staff, as well as developers, residents and businesses are aware early on of the need for electricity infrastructure developments to enable future growth plans.

And ideally get as far as a “future home of Transformer Station” sign BEFORE the new subdivision gets built, for example.

We are taking a long-term view. A holistic view of various infrastructure needs. Shared utility and transportation corridors, like the work we have done with Peel Region.

Another case in point: Last week we took our entire Board out to meet with the local distribution companies in Kitchener, Waterloo and Guelph. It was a great meeting where we talked about the work we are doing together on regional plans for the area, and then saw some live examples of conservation in action, thanks to some very dedicated and enthusiastic staff.

We are also moving away from province-wide procurements by fuel type. And moving to a more regionalized approach to planning, one that develops more localized solutions, encompassing transmission, distribution, conservation and generation. We are still looking at the short, medium and longer term. And working with transmitters, distributors and the Ontario Energy Board. The priorities are Kitchener-Waterloo-Cambridge-Guelph, downtown Toronto, York Region and Ottawa.

I won't belabour this here. It's a whole other speech. A whole other speech this week, in fact. At the Board of Trade. On Thursday, where I'll be talking about the Toronto regional plan.

Integrating renewable energy

In the supply procurement area of our mandate, the FIT Program is another first of a kind. Ontario was one of the early movers on this continent.

With the FIT Program, we are incorporating a larger amount of intermittent resources into an existing system.

And these resources bring some new challenges to operating the system.

This wasn't a surprise. We knew there would be challenges; but the timing and the order of magnitude were less known.

With the IESO in the lead, the sector has been working collaboratively on a number of initiatives to address these challenges. They include:

- Increased monitoring of generation on the distribution system to provide visibility of large-scale wind and solar generators that are embedded in distribution systems
- Enhanced forecasting capability to predict output of these intermittent and variable generators
- An increased need for flexible generation on the system to deal with the variability and unpredictability of solar and wind output
- Developing tools to deal with periods of surplus energy on the system when generation exceeds demand.

And a lot of human energy and innovative thinking is going into continuing to develop ways to deal with these issues.

The bottom line is that ALL supply sources have to play their part in our evolving system. No one's off the hook, nor is any one source singled out. And load needs to play more of a role too.

So, in the works: dispatch management, market rules, contract provisions, intelligent load management, electric vehicles as distributed storage, perhaps energy storage in a variety of forms.

With the smart grid investments we've already made as a great enabler, Ontario will continue to be at the forefront of these developments.

Just look at how much our sector has changed in the last five years.

What's it going to look like in the next decade?

The customer of tomorrow will be different from the customer of today.

Consumers – those who want to – are becoming prosumers – monitoring and managing their electricity use remotely, generating clean electricity and selling it to the grid, and becoming much more aware of, and responsive to, the cost of electricity. And more actively managing their consumption and production as a result.

How we use Demand Response is going to change. Not just for addressing times of peak but for ramping, firming renewables, and regional needs.

We are also developing a vision for 2020 to guide our conservation efforts over the rest of this decade.

Key elements of the vision include:

- taking an even more customer-centric approach,
- ensuring that customers have relevant and timely information about their consumption and benchmarks for comparison,
- leveraging the creativity of the marketplace through performance-based conservation products, and
- engaging the supply chain and influencers to promote conservation through their channels.

And finally, what about our most valuable resource?

Our people.

Qualified and talented people power innovation. But we can't just assume they will be there when we need them. Let's look at electric power engineers as an example.

Ontario produces about 130 electric power engineers per year. And forecasts indicate that more than twice this number will be needed annually over the next decade. In other words, the province is facing an *annual shortfall* of at least 160 electric power engineering graduates.

In the past, the province has looked to other countries to provide incremental engineering capacity. But high demand in Europe, China and India means that immigrant electric power engineers are unlikely to fill the gap for the foreseeable future.

So Ontario needs to more than double the current graduation rate. This will require renewed teaching and laboratory capacity and cooperation among institutions.

It will also mean active promotion of the electric power engineering profession, for which the perceived appeal has declined in recent years.

Obviously, we need to do a better sell job to prospective students.

So to any of you who may know some future engineers – why not say they have a chance to come and work on something like the “Sun Simba High Concentration Photovoltaic Concentrating Solar Power Module: Optical Efficiency.”

OR

What the US national academy of engineering called the greatest engineering achievement of the 20th century – the grid. (Students in the room, tell your friends. And the OPA has dibs.)

This is another critical area where we can all work collectively to come up with ideas and solutions.

I understand that the Green Education Council is developing a solution. They plan to release more about this effort in the coming weeks, including how you can contribute. Expect me to be contacting some of you personally about this too.

In Summary

The OPA is leading and participating in a wide range of innovations as part of its mandate, as are many others in the electricity sector and in the broader community.

I hope you recognized yourselves in some of the things I talked about today.

And we’re making great progress.

But I know we can accomplish even more.

Let’s continue to share ideas, collaborate on projects, and encourage and support the brilliant minds in our sector and in other sectors – as well as those who are still in school.

Let’s find ways to work better, smarter and more cost efficiently to ensure a reliable, sustainable, cost-effective electricity system.

Continue to be proud of our sector. Continue to inspire and be inspired.

And let’s do our part for a stronger economy and a cleaner, healthier environment.

Thank you.