



Notes for Remarks:

EUCI Women in Energy Leadership conference

April 13, 2017

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Check Against Delivery

Good morning! I am delighted to be included in this event and to be in the company of so many accomplished women.

The theme of my talk this morning is “leadership and adapting in an evolving sector.” Much of what I plan to cover is tied to the theme of change. So I thought I would start with a bit about my organization, where it fits in and how it is leading some the changes we have seen in the electricity sector, with more exciting initiatives to come. Then I will share some of my own career path, which was a little out of the ordinary, and finally, I will close with some personal thoughts on the general theme of the conference – Women in Energy Leadership.

The IESO

My current role is Vice-President of Market and Resource Development at the Independent Electricity System Operator or IESO. Those here from Ontario may know this, but for those here from outside of our province, I can tell you that when it comes to the electricity sector, Ontario is a very unique province. And, not surprisingly then, the IESO is a very unique system operator.

We have roles and responsibilities that extend far beyond some other ISO’s roles.

Together with our partners, the IESO ensures that electricity needs are met for the benefit of Ontario, now and in the future. We procure electricity supply from diverse resources (that’s my job) and facilitate measures needed to achieve ambitious conservation targets. The IESO reliably operates the electricity system in real time and plans for a dependable, sustainable system for the long term. The IESO does not own or operate any electrical generation or transmission facilities but through our contracts, we enable third-party companies to build, own and operate these facilities to supply us with the electricity we need.

Supply mix transformation

So all those wind turbines and solar panels, nuclear plants, gas plants and hydroelectric plants across the province were mostly procured under my watch and by my team. Our supply mix has literally been transformed over the last five to 10 years to where we now have a system that is both reliable and cleaner, with significantly lower emissions.

Coal phase-out

There's one change in particular that should be apparent to everyone: the elimination of coal. Ontario is now free of coal-fired generation. We've replaced that capacity with natural gas and renewable sources of supply. Ontario is the first province or state in North America to eliminate coal-fired electricity.

Conservation

Another change is that conservation and energy efficiency have become important contributors to the reliability of Ontario's electricity system. Energy conservation is a key component of Ontario's energy plan going forward. Conservation is our first priority when planning the electricity system. And it's the most cost-effective resource available. It also lowers peak demand, enabling the IESO to defer or avoid the need to build new infrastructure.

Over the last decade, Ontarians have saved almost 10 billion kilowatt-hours, which is enough to power the cities of Mississauga and Windsor combined for an entire year.

And I can't speak about conservation without mentioning the great strides the IESO is making in demand response. For those who may not be familiar with this term, demand response is when consumers reduce their electricity consumption in response to prices and system needs. Think of a manufacturing plant that can ramp down its production when electricity demand, and therefore electricity prices, are high

Nuclear energy

In our current supply mix, nuclear energy continues to play an important role in meeting Ontario's energy needs. However, we've seen some significant changes on this front as well.

One of the biggest is a renegotiated agreement with Bruce Power to secure its supply until the 2060s. The new agreement locks in 6,300 MW of long-term, low-cost, emission-free and reliable generation from the Bruce site in Kincardine, Ontario, and is the culmination of more than two years of negotiations between the IESO and Bruce Power. In addition, Ontario Power Generation has begun the refurbishment of its units at the Darlington facility, with the first unit coming offline last October. And plans have been

announced to continue the operation of the Pickering Nuclear Generating Station. Nuclear continues to be the backbone of Ontario's electricity system, last year supplying about 60 percent of our electricity.

Renewable Procurement

While all of these changes I have mentioned are significant, perhaps the most visible change that has taken place over the last 10 years is the increase in renewable generation in Ontario's supply mix.

Solar, wind, bioenergy and even additional hydroelectric resources have come online in a big way, and we have seen a significant increase in installed capacity as well as output from these facilities. These types of resources used to represent less than one percent of Ontario's installed capacity in 2005, but they now make up 18 percent of our supply mix.

That's an astonishing rate of growth.

Needless to say, this transformation in our supply mix has also changed the way we operate the grid, particularly to accommodate the increased amount of these variable resources. These changes include new tools and processes that help us to manage the variability and unpredictability of these resources – because, as we know, the wind doesn't always blow and the sun doesn't always shine.

Energy storage

Other changes we are seeing have to do with energy storage. Storage has the capacity to benefit the system in many ways: by smoothing out fluctuations of variable generation resources, for example, or by helping to move clean energy to peak demand periods.

The idea that energy storage is holding water behind a reservoir during off-peak times for use in a generator during peak hours is now changing. We are seeing the emergence of new, more cost-effective energy storage technologies, like batteries and flywheels that allow electricity to be captured and dispatched to the grid whenever required.

What's coming for the sector

So those are some of the ways that we have seen the electricity system in Ontario really transform itself over the last few years. A system that was basically the same for the past 100 years has seen more change in the last 10 years than it has since it was developed. Ten years of transformation is not an end game, however. Like many jurisdictions, Ontario is managing a number of factors impacting the shape and structure of its electricity sector.

Role of the consumer

For example, another trend that we expect to see more of in the future is the expanding role of the consumer. Accustomed to a high degree of service from companies such as Amazon and Apple, customers today expect more from their utilities.

Customers have always expected reliable and affordable electricity. However, today they also expect electricity to be produced from clean resources and to have more control over their energy choices. Not only are expectations higher, but the lines between consumers and producers is blurring – some call them “prosumers.”

Other examples of trends impacting the sector include cities that want to have micro-grids to be more resilient. These are local mini-grids that can disconnect from the broader grid. Large commercial customers want renewable energy to meet their corporate sustainability goals. Tesla introduced the Powerwall residential storage unit last year. Residential customers want to have rooftop solar so they can generate their own electricity like the “Power House” Project in Southern York Region where a number of residential home owners have rooftop solar connected to a battery or the grid – essentially a virtual power plant; and customers are also installing smart thermostats, such as the Nest or ecoBee, and other devices in their homes to manage their energy use.

The empowered and smarter customer – whether it be through greater literacy, market demand or the desire to respond to price signals – will help accelerate the creation and adoption of innovation.

Distributed energy resources

The expansion of the role of the consumer is going hand in hand with another trend – that of increasing amounts of distributed energy resources – those connected to the distribution system – not on those high-voltage transmission lines criss-crossing the countryside. New resources are increasingly being located closer to loads and demand centres on the lower-voltage distribution wires.

Three years ago, not even the most optimistic forecasts could have predicted how fast roof-top solar would grow. This has been fueled, in part, by the fact that solar is approaching retail grid parity – that is, approaching the same price as you can get from the transmission grid – in many jurisdictions around the world, especially places where electricity costs are high and the solar irradiance is good. This includes parts of the U.S., Middle East, Latin America, China and Europe. Not quite yet in Canada though.

It is anticipated that soon everything that connects to the grid will have an Internet address. The electricity system will be the top industry using the Internet of Things, and its infrastructure will continue to be modernized to allow two-way, network flow.

The traditional utility business model is being challenged by more complex grid and the dramatic growth of distributed energy resources. Regulators are just starting to respond to address this trend.

Climate change

In Ontario, the *Climate Change Action Plan* will drive further energy innovation in an effort to reduce emissions. Most jurisdictions are grappling with this challenge in one way or another.

Greenhouse-gas emissions from electricity in Ontario have been significantly reduced since 1990, largely due to the phase-out of coal-fired generation in the province. But there is more to do. Every action area described in the *Climate Change Action Plan* has implications for Ontario's electricity sector. The cap and trade program will make cleaner, more efficient generation more competitive because emitting resources will be exposed to carbon pricing.

So those three trends of where the sector is headed, can be captured with these 3 D's – Distributed, Digitized and Decarbonized – and Ontario's electricity future will be more complex, more dynamic and less certain than what we have experienced to date.

Market Renewal

And that leads me to what I am the most excited about and my next challenge. As you have just heard, this is an exciting and challenging time to be working in the electricity sector. The days when a few large nuclear, fossil fuel or hydroelectric power plants delivered power to a region of largely unresponsive consumers are long gone.

Amidst all of this change, energy markets have an essential role to play.

In our view, properly designed energy markets are the most efficient tool to organize such a radically different world. Effective markets provide clear signals for the value of needed services, and they enable all resources – whether new or existing – to compete to meet those needs. Effective markets also enable individual resources to make informed decisions, minimizing unnecessary costs and risks.

And that brings us to the Market Renewal Project. This project is about enhancing the foundations of Ontario's existing wholesale electricity markets to provide greater transparency, promote competition and deliver more efficient outcomes.

The project is currently underway, and with a compelling business case to proceed, we are working with our stakeholders all along the way as we head into the design phase. It will have a broad reach, addressing the way we schedule energy, procure capacity and meet operability needs in the province. Most importantly, it will position us to more efficiently meet demand both today and in the future as well as prepare us for new innovation and technologies.

Career Path

So that has been a quick synopsis of the sector – change all around – and another big personal challenge for me.

So let's talk about why I feel ready to accomplish Market Renewal.

Leadership means embracing opportunity, busting myths and learning from your mistakes. I have had 39 years in the energy business – as I like to say – from seismic to burner tip – and I learned a lot about myself and what I could do along the way. In fact, “character building” pretty much epitomizes what I have done and endured. So let’s go back – way back – to 1978 and the choices awaiting me as one of a handful of female Civil Engineering graduates from Queen’s University.

At the time, I recall being driven by two overwhelming desires. First, I was very keen to master my chosen field. I wanted to continue to test myself and prove to myself and to my peers that I was in the right career. I have to admit there was also a small amount of gender pride.

Unlike arts, law, and medicine, engineering was, and largely still is, a male domain. And I was good in math and science and wasn’t really thinking about a secondary degree, so engineering looked like the right profession.

And secondly, I was seeking adventure.

I wanted to see and work in different lands and I was prepared to make the sacrifices to do so. So I left Ontario and began a career that took me to northern Alberta, Calgary, Houston, the United Arab Emirates, Mexico, and finally to Toronto.

Along the way, I met some great people, compiled some fantastic memories and achieved what I set out to do in 1978 – which was to find opportunity and adventure. But just as important for all of us here today, I broke a few myths regarding women in the workplace.

The first of these myths is that men prefer working with men.

In my early 20s, I was working for Amoco in Houston as a young petroleum engineer. I was single and building my career and looking to learn all I could. During that time, I established a number of productive mentoring relationships with older male colleagues. The one thing all these men had in common was that they all had daughters around the same age as I was – just getting started in life and in their careers.

It was very easy for them to see their own daughters in me and natural for them to want their daughters to enjoy similar opportunities.

By helping me, they were really helping their own daughters as well.

Myth number two is that the Middle East is no place for a woman, particularly a western woman.

In 1982 I was transferred to the United Arab Emirates – the first female engineer ever expatriated to the Middle East by Amoco. Many felt I was being set up to fail.

Conventional wisdom was that the Middle East with its history of male dominance, intense religious feeling and sheer danger would conspire against female success.

They were wrong again.

My five years in the Middle East remain one of the highlights of my career. I was treated with respect, professionalism and graciousness at all times. And that's how I treated my colleagues – mostly Arab males I might add – in return.

I became the go-to person for the Minister of Energy, on orders directly from the Sheikh of the Emirate of Sharjah, to find out what was really happening with the new high pressure gas condensate discoveries. They asked directly for my expertise.

My experience in the Middle East made me eager for another international assignment.

So, after an interlude in Calgary where my three children were born, it was on to Mexico and time to bust myth number three, which says Latin America is backwater and assignments there are career killers.

Nothing could be further from the truth.

I spent six and half fabulous years in Mexico overseeing the building of a sustainable business, during the construction and then operation of two combined cycle power plants, together over 500 megawatts.

Mexicans are some of the most dedicated, spirited, hard-working and innovative people I have ever had the pleasure to deal with. I found Mexican men charming without being chauvinistic.

And Mexico itself is an opportunistic and vibrant society on the rise, there is simply no room for the old chauvinism. At one point in my stay there, half of the top executives in electricity were women. And contrary to a backwater theory, I found Mexico was great for my profile.

I was President of various Mexican companies for almost seven years and I also served as President of the Canadian Chamber of Commerce in Mexico for my last two years there.

In that role, I hosted prominent Canadian visitors, including John Manley, Peter Mackay, Ralph Klein, Jean Chretien, even Pinchas Zukerman. I was also on a first name basis with many Mexican leaders, including former Presidents, Vicente Fox and Felipe Calderon.

And then over nine years ago, I began my post as Vice President of Electricity Resources at the Ontario Power Authority here in Toronto and now after the merger with the IESO, I have also assumed the added responsibility of the electricity market.

So that's about embracing opportunities and busting myths, but most importantly, what did I learn.

The first is that I firmly believe talent will win out.

If you're good, people will respect you and you will succeed, whether you're a man or a woman. And to be good at what you do, you need to have a solid operational base. Don't be afraid to get your hands dirty and understand the nuts and bolts of the

operation. Good solid operational experience will always serve you well – work in the mines, the manufacturing plants, the on-site laboratories. In life, problems are best solved at an operational level. And engineering is a great career choice – it has never let me down – and we need to continue to encourage young women, our daughters to keep their maths and sciences.

But to get that operations experience, mobility and flexibility are required. We live in a very small, competitive global world now. We need to explore and encourage others to do the same. In my view, to have a successful career, you need to thrive on change, not permanence, and while there are many places that cannot hold a candle to the quality of life that we have here, there are also many fascinating places in this huge, wonderful world for you to enjoy! So speak up and make your aspirations known!

Thirdly, you need to adapt...and do it quickly.

After my five years in the Middle East and with only about ten words of Arabic, I made a pact with myself that if I ever got a future international assignment, I would learn the native language. And I did in Mexico – I can read, write, and speak Spanish, although my children humble me with their mastery of the language and lack of accent.

It was a monumental effort on my part in my mid-forties, and many days after a long day in Spanish, my head hurt, but my effort to adapt and become part of the culture endeared me to my counterparts and gave me even more prestige and respect.

And finally, I have learned that we all have to support each other in our journeys. This is essential. Wherever your career takes you abroad or not very far away from home at all, it is tough to do it on your own. By this I mean family, friends, significant others, but I also mean mentors and colleagues and supervisors. Let others help you along the way. Help others along the way. Having a good listener, a grizzled veteran, to talk to and listen to is invaluable. We all need a village; it's not just for raising children.

Combine all this with a “can-do” attitude and you will be unstoppable.

So to conclude, I've been blessed to have had some really exciting assignments and a chance to contribute to some great initiatives. And oh, the stories that I could tell! So I

like to characterize my career and the character building that has been so much a part of it, like this – I have worked in four countries, with three companies, in two sectors and I still have that one husband!

Leading change and being a change agent like I have done throughout my career and what I am now inspired to do with Market Renewal is never easy – but it is necessary when we examine, as I have tried to do this morning, the changes we have seen and will experience in the electricity sector in the coming years. Women can and need to be a part of this leadership.

I thank you for your time and attention, and I'm happy to take any questions.