

**Independent Electricity System Operator (IESO)
GTA and Central Ontario Regional Electricity Forum
Meeting Minutes
December 11, 2017
Vaughan, ON**

Introductory Remarks

Opening remarks were provided by Declan Doyle, Manager of Direct Customers, IESO, as the emcee for the day, and Chuck Farmer, Director, Stakeholder and Public Affairs, on behalf of the IESO.

Declan Doyle provided words of welcome and outlined the agenda for the day. The IESO has a broad set of accountabilities, and looks at energy use on both a provincial and a regional level. As part of its commitment to engage broadly with energy consumers across the province, the IESO held regional forums this year in Thunder Bay, Sudbury, London, Ottawa, and Vaughan, with the intent to host regional meetings annually. In the interim, the IESO is always available to carry on the discussions within communities, said Chuck Farmer.

The Evolving Provincial Electricity System

Ontario's Evolving Electricity Sector: Provincial Keynote Address delivered by Peter Gregg, President & CEO, IESO

A key provincial initiative is to encourage homeowners, businesses, and industries to conserve energy. Since 2006, Ontarians have conserved 68 billion kWh; comparable to the amount of energy Toronto Hydro customers would consume in 2.5 years. It is a huge achievement.

Conservation does more than save customers money. By lowering peak demand, it helps to defer the need to spend on costly infrastructure. Through the Conservation First Framework, the IESO offers programs to help consumers of all sizes reduce their energy use. For example, through the Save on Energy programs, Ontario's local electricity utilities have achieved almost half of their target to save 7 TWh by the year 2020. A grocery store in Vaughan took advantage of a lighting upgrade program and is saving \$11,000 per year. A North York arena complex took part in a refrigeration and lighting retrofit program to achieve \$35,000 per year in savings. A steel producer realized savings of \$10 million per year through retrofits available through the Industrial Accelerator Program.

Coal has been retired as a fuel source during the past decade and replaced with renewable resources such as wind, solar, and biofuels. More than 90% of the electricity produced in Ontario is free of greenhouse gas emissions. Innovation is coming as the province attempts to decentralize its electricity supply. In south York Region, Alectra Utilities launched Canada's first virtual power plant - POWER.HOUSE - allowing customers to generate their own renewable solar energy while reducing their costs significantly. Mr. Gregg said that this is the kind of innovation the IESO works to enable.

A new word has appeared in the sector: PROsumer; meaning consumers who both produce and consume their own energy. To enable PROsumers, the IESO works with Local Distribution Companies (LDCs) to expand the use of distributed energy resources (DER). These typically involve wind, solar, water power, bioenergy, combined heat and power facilities, and battery and storage solutions. PROsumers are

encouraged to engage with the Green Ontario Fund (GreenON) and the Save on Energy programs to take advantage of the program benefits.

First Nation and Métis communities are also finding ways to reduce their consumption and costs, and are developing community energy plans.

The IESO is creating a wholesale electricity market through its Market Renewal project that is preparing Ontario's electricity sector for tomorrow. It has the potential to provide net benefits to consumers and generators of \$3.4 billion to \$5.2 billion over a 10-year period.

The IESO also oversees the meter data management repository, or MDM/R. This smart metering entity offers opportunities to extract data while ensuring confidentiality.

Ontario's Long-Term Energy Plan and the IESO's Implementation Plan, presented by Usman Syed, Director of Conservation and Energy Efficiency, Ministry of Energy, and Chuck Farmer, Director, Stakeholder and Public Affairs, IESO

Usman Syed shared highlights of the newly released Long-Term Energy Plan (LTEP), which sets the policy framework for Ontario's energy sector with a 20 year outlook. The LTEP is not just an electricity plan, and serves as an energy plan. Currently, about one-third of Ontario's fuel use is from natural gas and one-third is from gasoline and diesel. The LTEP highlights the provincial commitment to increase the use of renewable natural gas.

Ontario's clean and reliable electricity system is well positioned to join other sectors, such as transportation. Energy demand will remain steady over the planning period as electric vehicles and rail projects are increasingly introduced to the market. Initiatives within the Market Renewal project will address an anticipated supply shortfall in the early to mid-2020s when the Pickering Nuclear Generating Station reaches its end of life and refurbishment is conducted at the Darlington and Bruce stations.

The LTEP contains nine initiatives that will spark renewable energy pilot projects while ensuring transparency in the bulk system planning process. They will also improve capacity and promote energy planning within First Nation and Métis communities. The LTEP is available on the Ministry of Energy's website; and key themes include:

- Consumer focus
- First Nations and Métis leadership and capacity support
- Innovation
- Conservation and energy efficiency
- Challenge of climate change

Chuck Farmer said that the IESO is developing the LTEP implementation plan that will lay out key pilot projects, milestones, and timing. The plan will be submitted to the Ministry of Energy by January 31, 2018 and address the follow nine directives:

- Options for energy support programs to First Nations and Métis
- Options to improve conservation programs, and access, for First Nations and Métis
- Renewable distributed generation projects
- Ways to mitigate barriers for energy storage
- Options for pilot projects to evaluate the use of electricity to create hydrogen
- Develop a formal transparent bulk system planning process
- Develop a competitive transmission procurement process

- Review of regional planning process
- Review technical criteria to assess customer reliability

Once the initial proposed implementation plan is approved by the Ministry of Energy, the IESO will move into the next phase of engagement of how it will implement the initiatives outlined in the LTEP. More information will be provided in the IESO weekly Bulletin and on the IESO's LTEP Engagement webpage.

The Power to Connect: Advancing Customer-Driven Solutions, presented by Teresa Sarkesian, President & CEO, Electricity Distributors Association (EDA)

Teresa Sarkesian spoke to how consumers are the drivers of change in Ontario's new clean energy economy, and how LDCs are well positioned to respond to these changes and empower consumers as LDCs know their customers better than anyone.

LDCs are developing smart microgrid projects that integrate clean energy sources and storage solutions. They are also using customer data to deliver targeted conservation programs and to apply new tools to improve power restoration, lower system expansion costs, and improve power flows over long distances. Ms. Sarkesian said that LDCs see themselves as integrated network orchestrators. As the transformation of the energy sector proceeds, LDCs will be there to offer a platform for distributed energy resources, promote the strategic use of those resources, and focus on new energy solutions.

The EDA is looking at ways to leverage market developments and remove regulatory barriers while remaining focused on customer needs and expectations. Importantly, the association and LDCs will assist government with its climate change targets.

In response to a question from a participant, Ms. Sarkesian acknowledged there are potential benefits to integrating electricity and gas systems to improve on energy efficiency.

Planning for Today and Tomorrow: Panel Discussion

Panel Moderator: Chuck Farmer, Director, Stakeholder and Public Affairs, IESO

Panelists: David Short, Director, Power Systems Assessments, IESO

Ahmed Maria, Senior Manager, IESO

Angelo Boschetti, Supervisor, Engineering Department: Generation and Capacity

Planning, Toronto Hydro-Electric System Limited

Robert Reinmuller, Director, System Planning, Hydro One Networks

Chuck Farmer introduced the panelists, and the panel discussed the operational roles of the IESO, Hydro One Networks, and Toronto Hydro-Electric System Limited in transforming the energy grid. Because some regions are growing faster than others and some must replace their aging assets, a regional focus is imperative.

David Short said the IESO's job is to ensure the reliability and security of Ontario's bulk power system and to manage power flows. To meet this challenge, the IESO does real-time monitoring of the province's electricity grid, looking for efficient and cost-effective delivery.

The IESO also forecasts how energy use will change in the next 20 years, particularly on the bulk and regional planning levels, said Ahmed Maria. Demand forecasts inform provincial, regional, and municipal plans. Local Achievable Potential studies are being carried out in Toronto, York Region, Barrie, Parry

Sound/Muskoka, and Ottawa to understand the feasibility of conservation and storage solutions in those areas.

Angelo Boschetti said that Toronto Hydro's top challenge is to learn how its customers plan to use electricity and how their needs can best be met. Investment is not just about installing new poles and wires. Distributed energy resources are now a part of the hydroelectric system's distribution tool set. The goal is to develop business opportunities with new resources and to remove barriers to new technologies.

Robert Reinmuller said that Hydro One Networks owns 98% of Ontario's power distribution and transmission system, and engages with stakeholders to understand customer's needs and educate them as they develop their bulk and regional plans. Recent projects include new generation connections in York Region and transmission upgrades in Guelph. The Clarington and Copeland stations will come into service in early 2018.

Mr. Farmer asked the planners how they deal with uncertainty. Developing scenarios is key, Mr. Boschetti said. It is also important to ensure that investment decisions made today are not overly expensive and do not preclude future investments. Mr. Maria added that planners try to delay decisions in order to have time to gather as much information as possible to make the right decisions.

A participant asked how distributed energy resources, with their flexibility and rapid deployment capabilities, could be used to manage unpredictability. Mr. Maria said this notion is of great interest to the IESO, which is studying how to take advantage of distributed energy resources. Mr. Reinmuller added that Hydro One is scrutinizing distributed energy resources to ensure their reliability.

The Local Perspective

The Local Evolving Electricity System: Local Keynote Address, delivered by Brian Bentz, President & CEO, Alectra Utilities

Alectra Utilities is one of the innovators in the evolving electricity sector, said Brian Bentz. By joining the utilities together, Alectra is trying to lower costs by \$50 million per year.

The drivers in the energy sector include changes in the delivery model, consumer choice, and the perceived value of these choices. Integrating behind-the-meter generation with the grid is a key issue for operators and regulators, and it necessitates a new way to operate and manage the system. Thus, utilities have become energy solution providers, looking to make investments beyond just poles and wires. Regulations that create barriers to investment are being addressed through the IESO's Market Renewal project.

It is estimated that York Region will welcome 614,000 new residents and 305,000 new jobs, and develop 1,700 acres of land in Markham by the year 2041. Some 6,000 to 8,000 new customers are being connected to the electricity grid every year in York Region. Due to the short deadline to meet the growing demand, it was determined a new transmission station will be needed in this region. However, in the future, innovative solutions to meet growing demand will be found that will not include new transmission stations.

Alectra is working with IBM and Interac on block chain technology that will allow consumers to optimize behind-the-meter generation and to trade energy within their communities and with the grid. The technology is coming, according to Mr. Bentz, and the price points will come down, especially for batteries.

In 2018, Alectra will work on giving customers more choice in their energy plans, rewarding them for managing their energy well, and it will begin offering electric vehicle charging incentives.

Local Spotlight: Canlan Ice Sports, presented by David Stewart, Director, Energy Management, Facilities, Assets and Equipment; North America, Canlan Ice Sports

David Stewart said that next to salaries, energy use is the biggest cost for Vancouver-based Canlan Ice Sports; a public company that owns 20 facilities and 57 sheets of ice in Canada. In 2005, the company implemented an energy conservation program, reducing consumption just enough to offset the rising cost of electricity. In total, the company spent \$5.6 million to reduce its energy use of 42 million kWh per year.

In 2015, energy prices were on the rise, particularly in Ontario, prompting a more aggressive conservation strategy. The company was faced with the challenge of reducing its consumption by 10 million kWh per year.

Using its Oakville facility as its focus site, Canlan reduced the number of compressors required and upgraded the software that manages the refrigeration system. This translated into a 30% reduction in energy consumption. Canlan also learned that it could drive its ice temperatures down in a few hours when power is less expensive, then turn the power off when it gets more expensive, allowing the ice temperature to rise again. This translates into additional savings for the company.

According to Mr. Stewart, you need to set big goals around energy management to get big gains.

Local Spotlight: FleetCarma, presented by Matt Stevens, CEO, FleetCarma

The electric vehicle (EV) market is growing, and as EVs add load to the provincial grid, questions about whether and how to manage that additional load have to be addressed, said Matt Stevens. Waterloo-based FleetCarma has teamed up with nine utility partners across Canada to learn how and when EV owners are charging their batteries. These include plug-in hybrids, and the short-range and long-range EVs, which differ in their load profiles. The company is also looking at consumer behaviour around time-of-use charging.

Mr. Stevens said there are two options that are available to shape the load: add a price signal, or actively manage the load. In terms of price signaling, FleetCarma provides customers with the capability to track their EV statistics and reduce costs by charging when the price of power is less expensive. Alternatively, FleetCarma can interface with the local utility to deliver the charging at whatever times the customer requires. This is called paired smart charging.

EV sales have been up 56% year over year in Canada during the past three years. With provincial investment in charging stations, EV adoption in Ontario is outpacing the rate of adoption in the rest of the country, according to Mr. Stevens. As well, the cost of battery-charging packs has decreased substantially in recent years.

Engagement at the Local Level

Panel Moderator: Carrie Aloussis, Senior Manager, Customer, Stakeholder and Community Engagement, IESO

Panelists: Graham Seaman, Director, Sustainability and Asset Management, City of Markham
Brian Shifman, President, Vaughan Chamber of Commerce
Ian McVey, Project Manager, Ontario Climate Consortium Secretariat

Carrie Aloussis introduced panelists, and the panel explored what the electricity discussions should be like at the local level and who should be leading these discussions.

Graham Seaman said that municipalities are well positioned to bring about real change because many energy-related decisions play out in city councils.

Brian Shifman said chambers of commerce bring the business community together and are a strong voice in federal taxation, labour, and infrastructure issues. The chambers also engage with experts who can interface with politicians to bring about change.

The Ontario Climate Consortium Secretariat was established in 2011 to promote energy retrofits and assess their impacts, said Ian McVey. It has partnered with five universities (York, Guelph, Ryerson, Western Ontario, and McMaster) and connected with municipal governments to work on mitigation and adaptation.

When Ms. Aloussis asked panelists about the importance of energy literacy, Mr. Shifman said some business owners do not understand their electricity bills, and there is a need to improve on this. Mr. Seaman said people in the community might not know what a kilowatt-hour is. Promoting behavioural change should be the priority so that people can reduce their costs. Mr. McVey added that literacy and empowerment go hand in hand.

Ms. Aloussis asked about the importance of partnerships, and the panelists agreed they are paramount. Partnerships with community colleges, municipal government, and private developers have proven to be valuable. It was suggested that municipalities could work more closely together with each other.

Mr. Seaman stated that it's important to be part of the solution, and the solution is to make it easy for customers.

Forum Wrap-Up, delivered by Chris Henderson, Director, IESO Board of Directors

Tying in the local spotlight on Canlin Ice Sports, Chris Henderson used the analogy of a hockey game to describe the present electricity sector. During the first period, you identify the players; establishing the team and the game. During the second period, you build the infrastructure and the framework. Currently, the electricity sector is in the third period; heading into the direction of the unknown but it is very exciting.

Mr. Henderson described that to be effective stewards of innovation in the sector, we need to work together. He noted that there are great opportunities on the horizon that will let us meet our reliability needs, while also achieving our sustainability goals. Support is needed to turn these plans into tangible actions and results. By taking part in today's session and by continuing to participate in local engagements, participants are playing a critical role in helping the IESO do that.