

What Can Energy Scenarios Tell Us About Global and Domestic Energy Future

Energy Council of Canada – Members' Roundtable

Date: Wednesday, November 1, 2017

Time: 9 AM – 11 AM

Event location: IESO's office, 120 Adelaide Street West, Toronto

Slide 1 – ~~Purpose (Deputy)~~ Cover Slide

- Good morning and –thank you to the Energy Council of Canada for inviting me to speak today.
- Dr. Frei kicked-off today's session with an overview of the energy sector's future from a global perspective...
- I will now discuss the energy sector's future – but from an Ontario perspective.
- If you've had an opportunity to review the 2017 Long Term Energy Plan, *Delivering Fairness and Choice*, you will see that it builds on the significant investments the province has already made to green the electricity system.
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- Ontario is now well positioned to use its clean and reliable electricity system to decarbonize other sectors, such as transportation.
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- The way we deliver and use energy is transforming and as a result, innovation and choice are at the core of the 2017 LTEP.
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- At the same time, the government recognizes that affordability is a priority for Ontario's energy consumers, and the 2017 LTEP highlights the work the government has already done through Ontario's Fair Hydro Plan.

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- At the same time, the government recognizes that affordability is a priority for Ontario's energy consumers, and the 2017 LTEP highlights the work the government has already done through Ontario's Fair Hydro Plan.
- Now, I'd like to turn to slide 2, which outlines our three part presentation covering the LTEP process, modelling assumptions as well as key themes and initiatives.
- And with that, my colleague Carolyn Calwell will walk through the LTEP process.

Slide 4 – Long-Term Energy Planning Process (Carolyn)

- The process for developing the LTEP is set out in the Electricity Act, 1998. This process became law in summer 2016, making the 2017 LTEP the first to follow this new legislated process.
- Our The process began with the publication of two technical reports in the fall of 2016. ~~The Ontario Planning Outlook and the Fuels Technical Report present outlooks on the adequacy and reliability of Ontario's electricity and fuels sectors, respectively to 2035.~~
- ~~These reports allowed the ministry and stakeholders to start from a common understanding in advance of the LTEP consultation and engagement period from October 2016 to January 2017.~~
- The Ministry then held extensive engagement beginning October 2016 and ending January 2017 to support LTEP development, including 17 stakeholder and public open house sessions, 17 Indigenous engagement sessions, and it received about 1,500 submissions through the Environmental Registry.
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- Now, with the government's approval of *Delivering Fairness and Choice*, ~~The~~ implementation directives have been issued to the Ontario

Energy Board and Independent Electricity System Operator have been issued to the two agencies. The and the agencies will develop plans to implement the LTEP's goals and objectives and submit these plans to the Minister for review.

Slide 5 – Engagement with Ontarians (Carolyn)

- ~~• The Ministry held extensive engagement beginning October 2016 and ending January 2017 to support LTEP development.~~
- ~~• The Ministry sought feedback through 17 stakeholder roundtable sessions, as shown on this map, which were attended by over 500 stakeholders. Hundreds more people attended one of 17 public open houses in communities across the province.~~
- ~~• The Ministry also organized 17 Indigenous engagement sessions with First Nations and Métis groups. The Ministry met with almost 100 Indigenous communities and organizations at these sessions.~~
- ~~• The Ministry received:~~
 - ~~• 1,500 submissions posted through the Environmental Registry;~~
 - ~~• a few hundred letters, emails and paper submissions; and~~
 - ~~• over 2,000 comments through an online survey.~~
- ~~• This input was critical to developing the initiatives that we will describe later in this presentation.~~

Slide 72 – Ontario's Supply Mix (Steen)

- ~~• I'll now give you a brief overview of the planning forecasts in the 2017 LTEP.~~
- ~~• In 2016, about 90 per cent of the electricity used in Ontario was free of greenhouse gas (GHG) emissions – generated from non-emitting resources such as water, nuclear, wind, solar and bio-energy, as you can see on slide 2.~~

- Our investments in these types of clean generation resources, along with the elimination of coal-fired electricity generation, mean we have taken significant steps to green Ontario's electricity sector have significantly reduced GHG emissions in the province.
- Ontario now has a robust and clean supply mix.

—This is a significant transformation compared to 2003, when one-third of all generation came from emitting resources. Ontario now has an electricity system that is well-positioned for the future.

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- ~~Ontario is unique from other jurisdictions in that it has a diverse supply mix. In 2016, Ontario produced:~~
 - ~~More than 50 per cent of its electricity from nuclear power;~~
 - ~~With renewable (or non-greenhouse gas (GHG) emitting) resources providing **about 30 per cent**; and~~
 - ~~Emitting resource accounting for **less than 10 per cent** of total generation.~~
- ~~Conservation also helped by reducing energy consumption by **about 9 per cent**.~~
- ~~This is a significant transformation compared to 2003, when one-third of all generation came from emitting resources. Ontario now has an electricity system that is well positioned for the future.~~

If pressed

- ~~This is due to investments in clean generation and the shut-down of coal-fired generation.~~

Slide **83** – Supply and Demand Outlook **(Steen)**

- The 2017 Long-Term Energy Plan (2017 LTEP) forecasts that electricity demand will be relatively steady over the planning period.

- In the longer term, the Independent Electricity System Operator (IESO) projects an increase in overall demand as electrification of the economy increases.
- Should be noted that the 2017 LTEP demand outlook assumes the equivalent of approximately 2.4 million electric vehicles by 2035 and includes demand from new electrified transit across the province (i.e., GO Rail and lite rail projects).
- As for supply, the 2017 LTEP supply outlook over the planning horizon maintains the flexibility to respond to future variations in the supply and demand forecasts.
 - While there is currently an adequate supply of electricity, a ~~shortfall in need for~~ capacity is expected beginning **in the early-to-mid 2020s** as the Pickering Nuclear Generating Station reaches its end of life, and nuclear units at Darlington and Bruce are temporarily removed from service for refurbishment.
 - In addition, 18 GW of existing supply resources will reach the end of their contract term by 2035.
 - The need for additional capacity will be met through IESO's Market Renewal.
- To ensure that our electricity system is able to respond to increases and decreases in future demand, we are maintaining our 2013 LTEP policy of "planned flexibility".

If pressed

- ~~The continued growth of distribution-connected generation is expected to reduce local demand and the need for LDCs to draw electricity from the province's transmission networks.~~

Slide **94** – Electricity GHG Emissions Profile ~~(Steen)~~

~~In 2016, about 90 per cent of the electricity used in Ontario was free of greenhouse gas (GHG) emissions—generated from non-emitting resources such as water, nuclear, wind, solar and bio energy.~~

~~Our investments in these types of clean generation resources, along with the elimination of coal-fired electricity generation, have significantly reduced GHG emissions in the province.~~

- The 2017 LTEP notes that GHG emissions are expected to remain well **below historical levels** and to **be relatively flat** over the planning period (with a range of potential emissions outcomes).
- Ontario will continue to look for ways to keep GHG emissions in the electricity sector low and work with non-emitting generators to meet the Province's emissions targets.

If pressed

- ~~Ontario's electricity sector is forecast to account for only about two per cent of Ontario's total GHG emissions in 2017 and the emissions are forecast to be more than 80 per cent below 1990 levels.~~

Slide **510** – Progress on Residential Electricity Prices **(Steen)**

- The 2017 LTEP's outlook for residential prices shows progress compared to earlier LTEP outlooks in the 2010 and 2013. The residential price outlook remains below levels projected in the 2013 LTEP outlook for the full planning horizon due to:
 - Ontario's Fair Hydro Plan;
 - Removing costs from the electricity system;
 - More efficient consumption of electricity; and
 - Anticipated benefits from implementing initiatives, such as IESO's Market Renewal project; and
- The 2017 LTEP highlights that Ontario's Fair Hydro Plan lowers typical residential electricity bills by 25 per cent and will hold any increases to the rate of inflation for four years.

- ~~Following the inflationary cap, residential electricity rates increase at an average of about **5 per cent over the 7-year period from 2021 to 2027**, levelling out by the early 2030s.~~

- ~~The government remains committed to managing electricity rates and avoiding sharp increases by driving efficiencies and taking additional costs out of the system.~~

~~If pressed~~

- ~~For example, the 2013 LTEP forecast that typical residential monthly electricity bills would be \$170 in 2017 and \$200 in 2027. The 2017 LTEP forecasts bills prices to be \$127 and \$181 respectively, including the change in average consumption from 800 to 750 kilowatt hours per month.~~
- ~~In addition, residential bills are also expected to be lower in all years due to the impact of declining average household consumption.~~
- ~~Ontario's Fair Hydro Plan also supports:~~
 - ~~Low-income customers by expanding the Ontario Electricity Support Program;~~
 - ~~Rural customers by broadening support for Rural or Remote Electricity Rate Protection; and~~
 - ~~First Nations residential customers by giving on-reserve customers a 100 per cent credit on their delivery line.~~
- ~~The outlook also considers the impacts of cap and trade and assumes that some of our generation assets will continue to be available for the duration of the planning outlook.~~

Slide ~~611~~ – Industrial Prices in-line with Inflation (**Steen**)

- The 2017 LTEP price outlook for large industrial consumers reflects average increases of electricity **in-line with inflation** over the planning period.
 - It should be noted that the actual electricity price paid by a large industrial consumer is dependent on their consumption patterns and can vary among industries and specific consumers.
- Currently, the **electricity price** for industrial consumers in Ontario is lower than the average price in the Great Lakes region (as highlighted by the U.S. Energy Information Administration).

- ~~Consumers in Northern Ontario that participate in the Northern Industrial Electricity Rate (NIER) Program can achieve even lower rates.~~
 - ~~Participants in the NIER Program, which is funded through provincial revenues, receive a reduction of 20 dollars per megawatt hour.~~

Slide ~~712~~ – Fuels Use in Ontario (Steen)

- The 2017 LTEP recognizes that fuels are an important component of the province's economy and Ontario's commitment to decarbonisation.
- Ontario's fuels use has declined from 2005 to 2015 largely due to the retirement of coal-fired generating stations.
 - Currently, about one-third of Ontario's fuel use is from natural gas and one-third from transportation fuels such as gasoline and diesel.
 - It should be noted that about 10 per cent of Ontario's fuels are used for non-energy uses such as feedstock for manufacturing.
- The future outlook for supply and demand of fuels will depend on policy and program decisions over the next 20 years and technological innovation. The 2017 LTEP highlights some initiatives, such as renewable natural gas.
 - ~~For our part, the 2017 LTEP highlights the Province's commitment to increase the use of renewable natural gas (as highlighted in the Climate Change Action Plan).~~
 - ~~The 2017 LTEP also commits to exploring the energy system benefits of using electricity to create hydrogen.~~

If pressed

- ~~Ontario's fuel supply is produced and delivered through a variety of means and markets, including from outside of the province. As such, the government does not have the same policy and planning functions as it does for electricity.~~

- ~~Nonetheless, Ontario's cap and trade program as well as initiatives in the Climate Change Action Plan will support the transition from conventional fuels to renewable and lower-carbon sources.~~
- ~~Given these uncertainties, the Province will continue to undertake modelling and analysis to identify opportunities to decarbonize the fuels sector consistent with the provincial target of reducing greenhouse gas (GHG) emissions by 37 per cent from 1990 levels in 2030.~~

~~Slide 13 – Key LTEP Themes and Initiatives (Carolyn)~~

- ~~As I mentioned before, thousands of Ontarians participated in the LTEP engagement sessions by attending in-person sessions or by sending the Ministry feedback.~~
- ~~The feedback we received was reviewed and considered in the development of the *Delivering Fairness and Choice*.~~

Slide 8 – Key Initiatives and Themes

- The 2017 LTEP covers a number of themes and initiatives. I'll discuss the following three at a high level today:
 - Responding to the Challenge of Climate Change;
 - Encouraging and Enabling Conservation; and
 - Conservation and Energy Efficiency;

Slide 918 – Responding to the Challenge of Climate Change (Kaili, then Steen)

- In terms of climate change, ~~We~~ Ontario ~~is~~ ~~are~~ aligning ~~our~~ ~~its~~ conservation efforts with the Province's climate change goals, including ~~by~~ ~~by~~ taking the following actions:
 - Phasing out the eligibility of Combined Heat and Power projects which use supplied fossil fuels for incentives under conservation programs, starting July 1, 2018; and
 - Working with our colleagues at the Ministry of the Environment and Climate Change and our respective agencies, to coordinate

existing energy conservation programs with new low-carbon technology programs being rolled out by the Green Ontario Fund.

- The 2017 LTEP also Government supports for the transition to a low-emission economy through by:
 - Analysing the of impact of electric mobility on the grid; and
 - Shifting to renewable natural gas (RNG); and
 - Committing to exploring the energy system benefits of using electricity to create hydrogen. power-to-gas and lower-carbon gasoline and diesel fuel standards.

Slide 14 – Consumer Focus (Carolyn)

- ~~Energy consumers are at the center of *Delivering Fairness and Choice*. We want to highlight 4 initiatives:~~
 - ~~Regulation of unit sub metering providers~~
 - ~~The redesign of electricity bills~~
 - ~~Ensuring quality of service provided by distributors and transmitters~~
 - ~~Improving regional planning~~
- ~~Ontario has made continuous enhancements to its energy consumer protection framework, most notably by prohibiting the signing of retail energy contracts at the door. Ontario will continue this work by providing the Ontario Energy Board with increased authority over Unit Sub-Metering Providers, those companies that provide services to bill tenants of multi-residential buildings~~
- ~~We will work with the OEB and local distributors to re-design electricity invoices for low-volume consumers. This re-design will focus on providing consumers with the information they find most useful at a glance, and ensure the bill provides clear explanation of costs.~~

- ~~With respect to reliability, we will look to the Ontario Energy Board to enhance utility accountability to their customers.~~
 - ~~We will ask both the Ontario Energy Board and IESO to review existing standards and recommend options for improving reliability.~~
- ~~Since 2013, the IESO and utilities have engaged communities in a formalized regional planning process. The first round of planning has recently been completed and we now have an opportunity to look at the challenges and opportunities.—~~
 - ~~A review will look at things like barriers to non-wires solutions such as conservation, demand response and other distributed energy resources, to better integrate regional planning with community energy planning.~~

~~Slide 15 – Support First Nation and Métis Leadership and Capacity (Carolyn)~~

- ~~Previous LTETs identified the importance of linkages between the energy sector and indigenous communities.~~
- ~~Ontario will continue to build on the direction established in the 2013 LTET and support First Nation and Métis leadership and capacity in an evolving energy sector by:~~
 - ~~Working to connect remote First Nations communities to the grid, where economical to do so, and working with other First Nations communities to reduce reliance on diesel generated power.~~
 - ~~Promoting community energy planning and supporting projects identified in those plans~~
 - ~~Working with indigenous communities on electricity affordability, conservation and barriers to partnering.~~

- ~~• We hope to advance Ontario's relationship with Indigenous communities in the spirit of the Political Accord with First Nations and the Ontario-MNO Framework Agreement with the Métis.~~

Slide ~~10~~16 – Encouraging and Enabling Innovation (Carolyn, then Kaili)

- ~~• The primary focus in this section is~~ The 2017 LTEP aims to creating the right environment for innovation to happen. Ontario has already shown leadership in this space – Green Button, smart meters, and the Smart Grid Fund – but we're now running up against barriers to further innovation.
- The government's Grid Modernization Policy focuses on addressing these barriers so utilities can innovate and make investments that improve efficiency, reduce costs, and provide more choice to customers. We will work with the Ontario Energy Board to address them during LTEP implementation.
- A renewed and enhanced Smart Grid Fund will support these outcomes, helping to stimulate technological innovation while creating jobs and business growth. We are also taking steps to better integrate electric vehicles onto the grid and remove barriers that disadvantage energy storage. This will be done by amending government regulations and working with agencies to address market rules and codes.
- We are continuing to enhance Ontario's net metering framework, giving customers new ways to participate in renewable energy generation while also reducing their electricity bills. The government intends to bring forward proposed legislative and regulatory amendments that, if passed, would enable third party providers to own and operate net-metered systems. Under the current framework, a homeowner or business must own the net metered system which generates electricity for their self-consumption, meaning that the consumer and generator are one in the same. Allowing third-party ownership of net metered systems can support greater customer choice in generating renewable energy by, for example, reducing their upfront capital costs.

- We will also work with the IESO to develop a program that will support a select number of innovative renewable distributed generation projects, including virtual net metering demonstration projects. This program will help inform future grid modernization and net metering policies, allow for increased opportunity for homeowners and communities to adopt renewable energy, help reduce load on the electricity system, and enable innovative technologies and customer-utility relationships.

Slide 17 – Conservation and Energy Efficiency (Kaili)

- Ontario's commitment to conservation and energy efficiency will be strengthened through initiatives such as:
 - Encouraging local distribution companies to pursue energy efficiency on their distribution systems, such as by reducing line losses and optimizing voltage levels. This can achieve electricity savings for consumers;
 - Enabling demand response resources to compete with other supply-side resources as part of Ontario's transition to a capacity auction. Demand response initiatives can reward electricity customers for reducing their electricity use when system needs arise. These initiatives can enhance reliability of the electricity system, while reducing system costs and greenhouse gas emissions; and
 - Expanding the Green Button initiative province-wide to improve customer access to energy usage data and tools that can help them identify conservation and energy efficiency opportunities.

~~Slide 18 – Responding to the Challenge of Climate Change (Kaili, then Steen)~~

- ~~• We are aligning our conservation efforts with the Province's climate change goals, including by:~~

- ~~○ Phasing out the eligibility of Combined Heat and Power projects which use supplied fossil fuels for incentives under conservation programs, starting July 1, 2018; and~~
- ~~○ Working with our colleagues at the Ministry of the Environment and Climate Change and our respective agencies, to coordinate existing energy conservation programs with new low carbon technology programs being rolled out by the Green Ontario Fund.~~
- ~~● Government support for transition to a low emission economy through:~~
 - ~~○ Analysis of impact of electric mobility on the grid; and~~
 - ~~○ Shift to renewable natural gas (RNG), power to gas and lower carbon gasoline and diesel fuel standards.~~

If pressed

- ~~● **Renewable Natural Gas** — which can be an innovative Ontario-made source of energy. RNG is a low carbon fuel produced by decomposition of organic materials found in landfills, forest and agricultural residue, green bins and food and beverage waste, as well as the waste from sewage and wastewater treatment plants.~~
- ~~● **Power-to-Gas (or also known as electrolysis)** — uses electricity to breakdown water molecules into hydrogen and oxygen. Hydrogen can be stored or transported in existing natural gas pipelines and used to heat homes and fuel vehicles.~~
 - ~~○ To support this technology going forward, the government will work with IESO to evaluate the development of a pilot project that explores the energy system benefits and GHG emissions reductions from the use of electricity to create hydrogen.~~
 - ~~○~~
 - ~~○ **Slide 19 – Questions (Deputy)**~~
 - ~~○ Thank you Steen.~~
 - ~~○ I'll now turn back over to Scott for the question and answer part of today's briefing.~~