
2017 LTEP: Innovation and Customer Choice

Premier's Office Briefing
June 15, 2017 v2

CONFIDENTIAL DRAFT

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Part 1 – Innovation

1a) – Distribution System Innovation

Distribution Grid Modernization

Expansion of the Smart Grid Fund Program

Opportunities for Energy Storage

Electric Mobility

Distribution Grid Modernization

- The Ministry would articulate in the LTEP a vision for Grid Modernization. This would include graphics to enhance general literacy of the topic, a set of principles and expected outcomes to guide a policy framework, and some reference to how Ontario differs compared to other leading jurisdictions like New York and California.
- To enact this policy framework, the Ministry would provide direction to the OEB to investigate and/or remove market and regulatory barriers to innovation, to encourage optimal investment, and to promote culture of innovation in the distribution sector. Direction options would include:
 - Providing clarity to LDCs on the treatment of smart grid and grid modernization investments, and address the diffusion of benefits problem that inhibits non-wires alternatives. Actions include, but are not limited to:
 - Establishing a formal framework for evaluating the costs and benefits of grid modernization activities, which accounts for the positive externalities generated by grid modernizing activities that accrue to other actors in the sector, and;
 - Establishing a means for LDCs to be compensated for the positive externalities that grid modernizing assets provide.
 - Requiring that LDCs include long-term system / business modernization plans in future cost-of-service filings.
 - Exploring means to encourage and fund research and development activities for LDCs, considering the possibility for:
 - A pooled fund focused on deployable smart grid technologies, which would include regulatory oversight and mandatory information sharing; and/or
 - LDC specific research and development activities focused on customer-centric innovations.
 - An information sharing mechanism on grid modernization activities among LDCs.

Expansion of the Smart Grid Fund Program

Several Ontario-based innovators credit the SGF for their growing international success. Our learnings from SGF to date have revealed where are the barriers to innovation and what's needed to take modernization to the next level.*

- The SGF could be renewed with an expanded scope and more targeted investments that will move the yardstick on modernization. While continuing to support technology demonstrations, SGF would expand to support deployments (potentially via equity funding) as well as more targeted capacity funding.
- Through the renewed SGF, the Ministry would like to pursue several key projects / initiatives:
 - i. **EV data gathering deployment** – project that will generate critical data for EV policy.
 - ii. **Non-electricity demonstration / deployment** – this would broaden the SGF scope. Initiatives could include power-to-gas and district energy solutions
 - iii. **Turn-key grid solutions** – encourage innovators to collaborate and develop complete smart grid solutions that align with utility needs and demonstrate a clear business case that would pass the OEB sniff test.
 - iv. **LDC collaboration on modernization plans** – this would help change the ‘innovation aversion’ culture.
 - v. **Transactive energy deployment** – innovative jurisdictions are deploying models that enable highly advanced customer choice options.
 - vi. **International demonstrations** – showcasing successful Ontario technologies internationally. (see sections on Exporting Expertise for further details)

Opportunities for Energy Storage

- Storage technology is very unique from anything else on the system – it both generates and consumes power. Because of this characteristic, it doesn't fit neatly into existing regulatory and market rules.
- Ontario is taking steps to update these rules so energy storage can be introduced onto the grid where it makes technological and economic sense. These measures include:
 - Regulations are being amended to address the “double counting” issue with global adjustment (GA), which is levied on storage providers when the system is charged up, but also on the end customers after the storage system puts the power back into the grid.
 - The OEB could be directed to investigate a very similar issue that arises with network charges to energy storage facilities.
 - The IESO could review charges in the application of wholesale market charges for storage.
- The recently released independent study on the value of storage showed us that there are significant opportunities for storage behind-the-meter. However, to capture the full value of the storage, we need to overcome barriers to new and innovative relationships between utilities and customers to share and benefit.

Electric Mobility

- Transportation is one of the largest contributors to GHG emissions. To curb climate change, Ontario is moving forward on a range of initiatives that move us to a low-emission transportation economy.
- Electrification of transportation means grid impacts. These will be felt most at the edge of the grid – most personal EV charging happens at home, and more EVs means more grid upgrades.
- There is a lack of information and data related to how EVs will impact the grid. LDCs do not have the information to know how best to utilize EVs as part of their systems or how EVs will directly impact their systems.
- Working with its ministry and agency partners, the Ministry of Energy would:
 - Help to remove regulatory barriers for utilities in investing in residential smart charging. The Ministry will need to work with OEB and other entities (Plug n' Drive) to identify the barriers and cost effective solutions. Regulatory solutions could include LDCs ratebasing some of the infrastructure related to EVs.
 - LDCs are already testing unique commercial arrangements with customers to provide this service, reducing costs for customers and avoiding the need for transformer upgrades.
 - Further, jurisdictions with high EV penetration are already seeing the effects of “clustering” on the grid, and some are making the investments to avoid these problems.
 - Develop a strategy for integrating vehicles to the grid. Smart charging provides a critical foundation to achieving this goal, which ensures that the full benefits of EVs are realized.
 - Share EV information across government and with utilities so they can provide better services and ensure that costly grid problems are avoided before they happen.

2b) – Sector-Wide Innovation

Exporting Expertise

Nuclear Innovations

Exporting Expertise

- LTEP 2017 is an opportunity to commit to develop initiatives to support Ontario companies to export their products and services.
- Exporting can help companies build on their successes at home and also expose them to global competition and best practices, which in turn incents further innovation to remain competitive.
- In the LTEP, the section on exporting expertise could include two streams.
 1. **Profiling Trade Supports** that highlight the Ministry's support for energy companies to reach new markets.
 - This showcases existing work undertaken by the Ministry including producing market intelligence, participating in energy missions led by the Ministry of International Trade (MIT), and promoting Ontario's technical expertise at international forums.
 2. **Commit to develop an International Demonstration Fund** that would support the demonstration of Ontario technologies abroad.
 - Grant programs run by the Ontario or Federal Governments do not typically consider international projects to be in scope.
 - With this fund, ENERGY would help to fill the current program gap by considering the potential benefits of supporting the demonstration of Ontario technologies abroad in collaboration with the Federal Government.

Exporting Expertise

- In developing its current suite of trade supports, ENERGY has already built relationships with federal and provincial trade leads, including Global Affairs Canada and Ontario's Ministries of International Trade and Economic Development and Growth.
 - These partnerships have supported the Ministry in identifying potential opportunities for the Ministry to promote Ontario's energy expertise abroad (e.g. market intelligence, joining missions, B2B facilitation), existing trade supports for Ontario energy companies, and alignment with the Province's Going Global and Cleantech strategies.
 - ENERGY is continuing to develop market research, facilitate inbound and outbound missions, and identify international forums where Ontario can showcase its expertise.
- ENERGY would deepen its engagement with the federal government, including NRCan, in particular on an International Demonstration Fund to support proposed program design and potential funding or program delivery.
 - NRCan has indicated openness to this collaboration following the release of the 2017 Federal Budget, which included several funding announcements, e.g. the \$1.26B Strategic Innovation Fund, which includes technology demonstration for Cleantech.
 - ENERGY continues to consider the most appropriate mechanism to administer and deliver proposed international demonstration funding.
- ENERGY has continued to keep its finger on the pulse of companies' needs as well, through regular engagement with industry associations and local trade organizations such as the Toronto Region Board of Trade.

Nuclear Innovation

- The 2017 LTEP could highlight Ontario's continued interest in nuclear innovation which includes monitoring and researching the evolving energy landscape as it relates to new technologies and opportunities to support Ontario's nuclear industry.
- The Ministry will continue to collaborate with the federal government in the promotion of research and development to support both energy and non-energy applications of nuclear innovations. These could include small modular reactors (SMRs), nuclear fuel research, nuclear fusion, hydrogen and nuclear technology spin-offs.
- The Ministry will continue to build relationships with key industry stakeholders to:
 - Foster innovation across the nuclear sector and maintain Canada's world-class science and technology capabilities; and
 - Promote Ontario's nuclear expertise domestically and globally.
- The Ministry will continue to assess the policy and regulatory considerations for nuclear innovations in Ontario, as well as exploring various forms of support for potential demonstration projects.

Nuclear Innovation

Nuclear Innovations:

- **SMRs** – SMRs are a new generation of compact, factory-built and expandable nuclear power reactors with advanced safety features. SMRs can potentially provide benefits compared to current reactor designs such as a smaller footprint, more passive safety features, potential for economies of scale through mass production and reduced project/overbuild risk. SMRs can serve off-grid load to replace diesel power (e.g., 2 to 30 MW range) or provide grid-scale electricity generation (e.g., 30 to 300 MW range) on an incremental basis to adapt to changing energy demand.
- **Nuclear Fuel Research** – There may be opportunities in the future to pursue alternative nuclear fuels with the aim of reducing the volume and radioactivity of waste products. This could include technological innovations in recycling and reprocessing of used fuel or alternatives to uranium fuel for nuclear reactors (e.g., thorium).
- **Nuclear Fusion** – Fusion energy research has the potential to produce massive amounts of clean energy with minimal radioactive waste. Today, there are small-scale fusion energy research organizations in Canada: University of Alberta, University of Saskatchewan, General Fusion, Sylvia Fedoruk Canadian Centre for Nuclear Innovation, Alberta/Canada Fusion Technology Alliance.
- **Hydrogen** – Hydrogen is a low-carbon energy source that in the future could replace gasoline for transportation or natural gas for heating. Research is ongoing into applications for Ontario's nuclear technology in the large scale production of hydrogen (e.g., work is underway at the Hydrogen Laboratory at Canadian Nuclear Laboratories).
- **Technology Spin-offs** – Nuclear technology has other scientific applications such as the production of isotopes for medical diagnosis and treatment of life-threatening diseases (e.g., Cobalt-60), as well as for use in space exploration (e.g., heat and power for Mars rovers). Research is ongoing into opportunities for Ontario to expand its role in production and novel uses for isotopes.

Nuclear Innovation

Federal Government and Industry Interest:

- The federal government recently signalled its continued interest in innovative nuclear technologies and their potential role in meeting Canada's climate change goals.
 - Canada's Mid-Century Long-term Low-Greenhouse Gas Development Strategy – The strategy, submitted as part of Canada's commitment to COP21, provides a basic framework for addressing challenges and opportunities for achieving deep emissions reductions in the mid to long-term with a focus on meeting climate-change objectives and enabling growth.
 - Among the proposed tools to help meet demand and GHG reduction targets, the strategy highlights a number of emerging nuclear technologies as discussed on the previous slide.
- The Canadian Nuclear Association (CNA) is also interested in exploring emerging nuclear technologies through the creation of a Nuclear Innovation Council.
 - Nuclear Innovation Council – To further explore the role emerging nuclear technologies in reducing GHG emissions, the CNA has proposed the creation of a Nuclear Innovation Council which would be a forum through which industry can talk with government practitioners and policy-makers in the area of industrial innovation and technology.
 - The aim of the Council would be to inform government policies relating to nuclear technology and to develop and support a Canadian Nuclear Innovation Agenda.

2a) Providing Greater Electricity Rate Choice

- Regulated Price Plan (RPP) - Residential and Small Business Customers
- Non- Regulated Price Plan Class B - Commercial and Small Industrial Customers
- Class A - Large Industrial Customers

Regulated Price Plan (RPP) – Residential and Small Business Customers

- ENERGY is working with the OEB to give customers more choice in their electricity price plans.
- The OEB is testing innovative Time-of-Use (TOU) price structures through pilots across Ontario, including price plans with flat rates, very low overnight rates and seasonal TOU rates, which introduce a flat rate during spring and fall. Pilots are expected to be in market by November 2017.

Key Information:

- The OEB issued a multi-year “Regulated Price Plan (RPP) Roadmap” in 2015 that outlines a comprehensive review of the RPP, and aims to ensure that the RPP better responds to policy objectives, improves system efficiency, and gives consumers greater control.
- Implementing price pilots are a component of the RPP Roadmap. The OEB launched a call for RPP pilot applications in July 2016 and received five applications from LDCs across Ontario, proposing to involve nearly 27,000 customers.
- As of May 26, 2017 two pilots are approved and two more are in advanced stages of review.
 - Pilots are expected to be in market by November 2017, with results available in 2019.
- The pilots will provide value by delivering reliable results at a manageable scale. Changes to RPP price plans in the absence of evidence about customer understanding and price responsiveness can lead to cross-subsidies between customers and jeopardize cost recovery – which, under the Ontario Fair Hydro Plan, could add refinancing costs beyond those forecast.

Non-Regulated Price Plan (RPP) Class B – Commercial and Small Industrial Customers

- OEB will report back with further analysis and a proposed implementation plan for regulating GA recovery for non-RPP Class B consumers by giving them similar incentives as a TOU structure. Note: this would require amendments to O. Reg. 429/04.

Key Information:

- Currently, non-RPP Class B electricity consumers pay HOEP and a flat volumetric GA rate.
- As part of the RPP Road Map, OEB has proposed to offer a time-sensitive GA to non-RPP Class B which they believe would provide a stronger time-shifting incentive and enhance system efficiency by providing a better alignment between the cost and value of power in each hour.
- **Improved alignment with system cost:** Selectively allocating certain GA costs into different time periods could be contentious as peak rates would likely increase. As well it would provide an additional price signal for demand shifting.
- **Cost impacts:** Customers that chose to opt-in to new programs would do so because of the potential benefit. Costs are likely to rise for customers who cannot shift/reduce demand. Further study and analysis is required to understand the price responsiveness of non-RPP Class B consumers.

Class A – Large Industrial Customers

- The LTEP will reference existing industrial price mitigation initiatives, and that government will continue to monitor industrial electricity prices for further opportunities. Reference future report on ICI expansion uptake/effectiveness.
- ENERGY will assist in providing greater awareness of available energy efficiency programs for Class A customers.

Key Information:

- Class A electricity consumers pay HOEP and GA based on their contribution to peak demand during the top five peak hours of a year as part of the Industrial Conservation Initiative (ICI).
- All consumers over 1 megawatt (MW) of monthly average peak demand are eligible for the program. Consumers with more than 500 kilowatts (kW) and less than 1 MW of monthly average peak demand in the manufacturing and greenhouse sectors are eligible for the program.
- There is a high degree of differentiation amongst consumers within the commercial and industrial sectors in terms of size and consumption patterns which is reflected in the prices they pay.
- **Cost impacts:** Participants in the ICI program can reduce electricity bills by one-third by reducing their electricity consumption during peak demand periods. Since electricity system costs must be fully recovered, what Class A would otherwise would have paid absent of ICI will be shifted to all non-ICI participants. Providing further relief to Class A would increase costs for all other electricity consumers.

2b) Widening Customer Energy Choices

- Broadening Opportunities for Net Metering
- Energy Efficiency and Low-Carbon Technology Programs
- Natural Gas Expansion

Broadening Opportunities for Net Metering

- Ontario's 2013 LTEP committed the Ministry to "examine the potential for microFIT to transition from a generation purchasing program to a net metering program" and recognized the opportunity to expand and enhance the existing net metering framework.
- In February 2017, Ontario filed an amended Net Metering Regulation (O.Reg. 541/05), which will come into force July 1, 2017. The updates include amending the carryover period for bill credits from 11 months to 12 months, removal of the 500 kW project capacity size limit and enable pairing of energy storage with renewable energy systems.
- The Ministry is also examining potential additional program updates to enable third-party ownership of net metering facilities and virtual net metering. Policy options and recommended actions for additional updates were presented to the Minister of Energy on June 1, 2017.
- The intent of the updated net metering program is to support customer choice in generating clean, renewable energy, help reduce load on the electricity system and enable innovative technologies and customer-utility relationships.

Key Information:

- ENERGY would be 1) recommending legislative and regulatory actions to move forward with updates to the net metering framework to expand regulatory authority and eligibility for third-party ownership arrangements, and 2) supporting virtual net metering demonstration projects to better understand impacts and inform potential future decisions.
 - Third-party ownership arrangements would involve third parties owning and operating renewable generation systems located at electricity customer sites and selling power to the customer for the customer's participation in net metering.
 - Virtual net metering would involve net metering of generation that is not located at the customer site and could be of larger utility-scale sizes selling power "virtually" to participants in "community net metering" projects.

Broadening Opportunities for Net Metering

Key Information cont'd:

- Policy approval for the proposed net metering updates will be sought in the LTEP Cabinet Submission planned for this summer, and policy intent will be communicated in the LTEP.
- A full regulatory proposal as well as plans for any non-regulatory measures that may be needed to support implementation and would be posted to the Environmental and Regulatory Registries following the release of LTEP.
- ENERGY is supporting MOECC and IESO on design of GreenOn Fund vouchers for solar PV that are anticipated to drive net metering uptake in the near term.
- ENERGY has initiated a cost-benefit analysis, including outreach to utility companies on implementing Time-of-use pricing for net-metered customers.

Expected Stakeholder Reaction:

- Ministry analysis of third-party ownership of net metering facilities and virtual net metering considered internal research and feedback from engagement with stakeholders and Indigenous groups in early 2017.
- The majority of stakeholders indicated third party ownership as the most important update to achieve flexibility for innovation and efficiency in the market.
- It is anticipated that industry will be supportive as the proposed changes to expand the market potential for third-party participants.
- Several project proponents are seeking Ministry support to pursue pilot or demonstration projects involving virtual net metering models.
- More progressive LDCs will be able to participate as net metering providers through their affiliates and explore opportunities for virtual net metering through demonstration projects. LDCs who may not be ready to accommodate more complex virtual net metering models would not be required to do so.

Energy Efficiency and Low-Carbon Technology Programs

- Ontario offers a suite of conservation and energy efficiency programs that offer choice and help customers manage their energy use and costs. New programs and pilots, and enhancements to existing programs, continue to be introduced under the electricity and natural gas utility energy efficiency frameworks.
- ENERGY and IESO have worked with MOECC to build on the success of existing programs in supporting the launch of the Green Ontario Fund and its initial programs. The Fund intends to provide a 'one-window' customer interface, offering low-carbon technology programs that are coordinated with efficiency programs.

Key Information:

- Under the electricity Conservation First Framework (CFF), customers have access to approximately 50 province-wide, regional and local programs, and 20 pilots are in market or under development, such as:
 - The Save on Energy Multi-Site Pay-for-Performance Program streamlines program applications for businesses with multiple locations, and offers incentives for achieving savings over multiple years.
 - The Save on Energy Heating and Cooling Initiative is expanding to include Air-Source Heat Pumps and smart thermostats as eligible measures for electrically-heated homes (expected to launch July 2017).
- Under the natural gas Demand Side Management (DSM) Framework, the gas utilities offer new and evolved programs to help customers with the installation of energy saving measures, like smart thermostats, and complete energy assessments and energy efficiency improvements in the home.
 - The Green Investment Fund (GIF) is enhancing existing home energy audit and retrofit programs offered by the gas utilities, by expanding the programs to homes heated by oil, propane, and wood.
- On May 29, 2017, the IESO, Enbridge Gas Distribution and Union Gas launched the province-wide Whole Home Pilot, which integrates electricity incentives with existing GIF-enhanced home retrofit programs.
- MOECC's May 30, 2017 Treasury Board submission identified a number of new programs that would be offered through the Green Ontario Fund. For example, Low Carbon Technologies Incentive programs would offer rebates for a variety of low carbon technologies (e.g. solar PV, geothermal) to homes and businesses.