

2017 LONG-TERM ENERGY PLAN UPDATE

For discussion with IESO Board of Directors

August 30, 2017



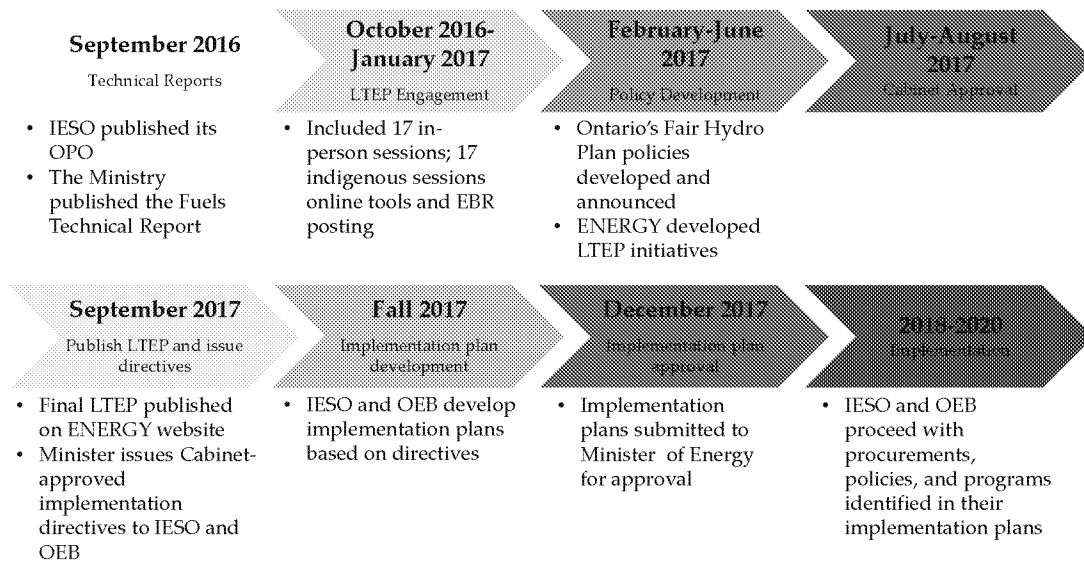
Purpose

- The Ministry of Energy is close to finalizing the next Long-Term Energy Plan (LTEP). This presentation provides an update on:
 - timeline of activities;
 - ongoing work to refine electricity system outlooks;
 - the IESO's implementation directive and amending direction; and,
 - next steps, including the IESO's implementation plan

Summary

- On July 26, the Ministry of Energy sought Cabinet approval on LTEP initiatives, and on August 31, the Ministry will seek final approvals on the fuels and electricity outlooks and on the implementation directives for the OEB and IESO
 - The IESO continues to work closely with the Ministry on developing electricity system outlooks for the 2017 LTEP, leading up to the August Cabinet date
 - Most recently, the Ministry expressed an interest in considering outlooks for even lower electricity system emissions – a summary of the analysis for this request is included in the appendix
- The final LTEP is expected to be released in mid- to late-September; the IESO's implementation directive and an amending direction for several past IESO-directed initiatives will be released concurrently
 - Outstanding decisions on LTEP outlooks and further rate mitigation measures, and Quebec-Ontario trade negotiations may postpone the release of the LTEP
- Following the release of the LTEP and implementation directive, the IESO will submit an implementation plan to the Minister for approval by December 31, 2017
- Development of the implementation plan has begun; timing of initiatives, scope of engagement and resource requirements are expected to be key considerations of the implementation plan

Updated LTEP Timeline



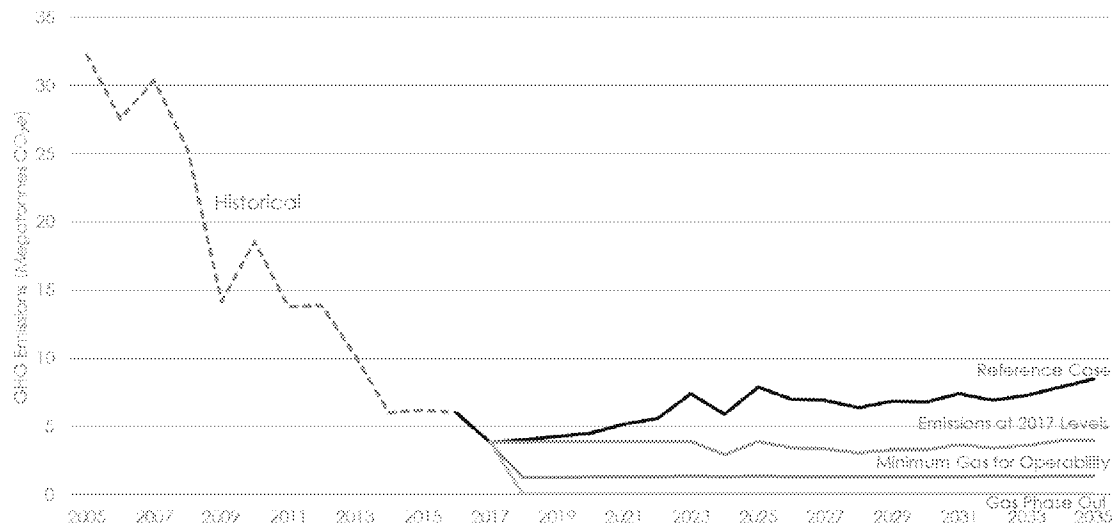
Source: Ministry of Energy, July 26, 2017

Updated Emissions Assessment

- As the ministry prepares for their Cabinet submission in late August, they have asked the IESO for updated analysis on reducing electricity system emissions further.
- Lower electricity sector emissions are reflected in the IESO's updated analysis, which considered:
 - emissions under the reference case "business as usual" outlook;
 - maintaining emissions "flat" at 2017 levels;
 - minimizing emissions while recognizing the need to maintain a minimum amount of gas facilities to meet system operability requirements; and,
 - reducing electricity system emissions to zero through a phase out of the gas-fired generation fleet
- The IESO's analysis concludes that lower emissions can be achieved through additions of non-carbon emitting resources; however, significant investments in new resources would be required and the scale and cost of deploying these new resources may pose some practical challenges
- This analysis is expected to be shared with Premier's Office to help inform their decision on electricity system outlooks in the upcoming LTEP

Emissions Outlook Across Scenarios

- Emissions are reduced by between 4.5 MT to 8.5 MT per year by 2035 across the lower emissions scenarios considered



Summary of Observations Across Emissions Scenarios

Summary of Observations Across Scenarios, by 2035					
Scenario	Wind/Storage Resources Added and Natural Gas Resources Removed (MW/TWh)	Greenhouse Gas Emissions (MT CO ₂)	Total Cost of Electricity Service (2017 \$ Billion)	Increase in Surplus Energy (TWh)	Cost of Carbon Reduction (2017 \$/tonne)
Reference Case	--	8.5 MT CO ₂	\$19.1 B	--	\$38/tonne
Emissions at 2017 levels	Wind & Storage added: 8.5 GW / 21 TWh Gas removed: 0 GW / 12 TWh	4.0 MT CO ₂	\$20.0 B	9 TWh (43% of the wind energy added)	\$215/tonne
Minimum gas for operability	Wind & Storage added: 42 GW / 90 TWh Gas removed: 6 GW / 19 TWh	1.4 MT CO ₂	\$28.2 B	70 TWh (80% of the wind energy added)	\$1,290/tonne
Gas Phase Out	Wind & Storage added: 54 GW / 114 TWh Gas removed: 9 GW / 22 TWh	0 MT CO ₂	\$31.0 B	90 TWh (80% of the wind energy added)	\$1,408/tonne

IESO's Implementation Directive Items

- Following Cabinet approval of the outlooks and the implementation directives, a final LTTP will be released; IESO's implementation directive will be issued concurrently

- The following items are expected to be included in IESO's implementation directive:

1. Review and propose options to improve energy support programs to First Nations and Metis, with the objective of better aligning programs with community needs and interests
2. Prepare a report on options to improve conservation programs, and access to programs, for First Nations and Metis. The report timing shall be aligned with the Mid-Term Review of the Conservation First Framework
3. Work with the Ministry of Energy to develop a program to support the deployment of innovative distributed energy resource projects, including near-term virtual net-metering demonstration projects
4. In coordination with the OEB, review market rules, industry codes, and regulations, in order to identify potential obstacles to fair competition for energy storage with other technologies in the delivery of services, and where appropriate, propose mitigation strategies
5. Develop a formal integrated bulk system planning process that ensures solutions are identified transparently as needs materialize. The process shall also include a coordinated, cost-effective, long-term approach to replacing transmission assets at end-of-life
6. Develop a competitive transmitter selection or transmission procurement process that is transparent, efficient and able to respond to changing policy, market and system needs.
7. Review and report on the regional planning process, taking into account lessons learned, and provide options and recommendations.
8. Review and report on technical criteria used to assess customer reliability in order to identify and evaluate options for local are enhancements

IESO's Amending Direction

- In addition to the implementation directive, IESO will also be issued an amending direction, with updates to past directive items; the amending direction is expected to be issued at the same time as the implementation directive
- Items in the amending direction include:

Conservation Amendments:	Support Programs Amendments:
• Behind the meter generation projects that use fossil fuels as a primary fuel source will now be excluded from CDM programs • Reduced electricity consumption resulting from any measures a Distributor uses to maximize the efficiency of its new or existing distribution system infrastructure will now be allowed; these measures can now be counted towards a Distributor's CDM target for the purpose of being eligible to receive their performance incentive • The IESO will continue to produce and publish an annual report on overall progress toward achieving the provincial CDM target	• References to "Aboriginal" in past directives are replaced with "Indigenous" • References to "soft" costs in past directives are deleted to allow for more flexibility in funding • References to LRP and FIT in previous directives are deleted since programs are no longer offered • References to "major transmission lines" in past directives are replaced with "transmission facilities" • References to the "Aboriginal Renewable Energy Network" are removed • References to "municipalities, public sector entities and co-operatives" are removed

IESO's Implementation Plan

- An implementation plan will be due 90-days after the directive is issued
- The IESO will be expected to outline the steps it intends to take to meet the requirements set out in the directive, and identify the necessary timing and resource requirements
- The implementation plan will require input from the broader organization, and an internal Working Group, consisting of members from each business unit, have begun to develop an outline of the implementation plan
- <<placeholder for risks/opportunities – to align with business plan presentation to Board>>

Next Steps

- The IESO will continue to work with Ministry of Energy to finalize the electricity system outlooks for the upcoming LTEP
- The IESO will continue development work on implementation plan, leading up to and following the release of the LTEP

APPENDIX

LTEP Documents

- The LTEP process in the Electricity Act identifies three tools for creating and implementing the LTEP: the LTEP document, implementation directives, and implementation plans
- The documents work together to articulate objectives and steps required to meet them; the process gives IESO and OEB flexibility to determine the best course of action

LTEP Document	Author	Approval
Sets out government's goal for energy sector and provides the narrative and rationale behind new and ongoing initiatives	Ministry of Energy	Cabinet
↓		
Implementation Directives	Author	Approval
Articulates outcomes and provides direction to IESO and OEB for LTEP implementation	Ministry of Energy	Cabinet
↓		
Implementation plans	Author	Approval
Outlines the steps IESO and the OEB will take to meet the directive; plans will identify how agencies will engage with public, Indigenous communities and councils, and key stakeholders	OEB and IESO	Minister of Energy

LTEP Initiatives

- The upcoming LTEP, *Delivering Fairness and Choice*, is expected to include a number of initiatives focused on energy affordability, innovation and customer choice
- Key policy initiatives were approved by Cabinet on July 26; initiatives are broken into the following sections:
 - Ensuring affordable and accessible energy
 - Flexible energy system
 - Improving value and performance for consumers
 - Conservation
 - Preparing for the future/innovation
 - Responding to the climate change challenge
 - Supporting indigenous capacity and leadership
 - Regional priorities