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Gas Phase-Out Impact Assessment

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Webinar Participation via Microsoft Teams

- Registration Link
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- This webinar is conducted according to the IESO Engagement Principles

Agenda

- Background
- Engagement Objectives
- Current Role Natural Gas Plays in Maintaining a Reliable Electricity Supply Across Ontario
- Challenges to be Considered if Phasing Out Gas Generation
- Assessment Scope
- Request for Stakeholder Input and Next Steps

Background

- The future of gas generation in Ontario has become a focus of discussion for a number of municipalities as they consider efforts to tackle climate change, raising questions and concerns from stakeholders about the challenges and opportunities these discussions have raised
- The phase-out of natural gas would require a comprehensive plan to develop and invest in suitable replacement supply and reorient the system around the new supply mix in order to maintain the reliability of the system

Background (2)

- The IESO will seek to help inform this discussion by considering electricity sector emissions and analyzing the opportunities and impacts of reversing upward trends from the perspective of the system operator
- The IESO has committed to a comprehensive assessment to examine the implications of phasing out natural gas
- A qualitative narrative has been developed, as outlined in the letter to Toronto City Council.

Engagement Objective

- The objective of this engagement is to seek stakeholder input on the scope of the IESO assessment related to the reliability, operability, timing, cost and wholesale market issues that would need to be addressed should the phase-out of natural gas be considered.

*Please see the feedback form posted on the engagement webpage.

Final Product

The final product will be an assessment that will:

- Outline the current role natural gas plays in maintaining a reliable electricity supply across Ontario
- Provide insights on the reliability, operability, timing, cost and wholesale market issues that would need to be addressed in reducing emissions on the electricity system

Final Product (2)

The assessment will not include:

- IESO recommendations for policy decisions
- Demand impacts from decarbonization of the economy
- Consider emission impacts resulting from other jurisdictions

Current Role Natural Gas Plays in Maintaining a Reliable Electricity Supply Across Ontario

Summary: Role of Natural Gas in Ontario Today

- Ontario's natural gas-fired fleet is comprised of about 50 transmission and distribution connected stations across the province
- Today, natural gas-fired generation provides:
  - intermediate and peaking capacity
  - energy production capability
  - other reliability services including operating reserve
  - local supply reliability

Services that Natural Gas Provides

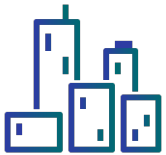
- Ontario's current gas-fired generation installed capacity is about 11,000 MW, accounting for about 25% of total installed capacity in the province and about 7% of energy production
- Over the long term, energy production from gas fired generation is expected to increase, driven by the retirement of the Pickering nuclear generating station, increasing demand, and Darlington and Bruce nuclear refurbishment

Services that Natural Gas Provides (2)

- Natural gas is a reliable provider of operating reserve, especially during spring freshet when fewer resources are capable of providing operating reserve
- Availability of gas generation provides flexibility to respond quickly to system conditions
- Gas generation supports provincial transmission security and provides voltage stability
- Some strategically located gas units are critical in supplying regional load centres and communities

What Does the Gas Fleet Provide?

- In addition to contributing to reliability province-wide, gas provides:
  - additional flexibility by filling in gaps to address short-term supply and demand variability
  - insurance for risks associated with longer-term demand forecast uncertainty, nuclear refurbishment delays and aging generation resources
  - flexibility with their high ramp rates and load following capability



- Some are integrated with industrial facilities, greenhouses, and institutional facilities such as hospitals and universities, providing them with space heating, hot water or industrial process heat and in some cases carbon dioxide for plant production

- Many gas generators provide local and regional reliability and were developed in lieu of major transmission upgrades

Questions?

Challenges to be Considered if Phasing Out Gas Generation

Summary: Challenges to be Considered if Phasing Out Gas Generation

- A number of natural gas plants are under contract
- Useful economic life remains in the gas fleet after 2030
- Much of what the IESO expects could be replacement supply with capability to meet reliability needs are either not developed or are unproven at this scale
- Locational importance - some gas plants provide local and regional reliability
- Gas generation was heavily relied on to make the transition to off-coal as gas generation was a known, proven technology with similar operating characteristics

Gas Generation – Contract Term

Contract Term

- Much of Ontario's current natural gas-fired generation is under contract
  - 8,000 MW will reach contractual term by 2030
  - The balance of gas-fired generation contracts will expire by 2040
- Absent a contractual termination right, it is difficult to estimate the costs of early termination of a contract
- Once the contractual term ends, natural gas generation is expected to compete with other resources to meet system needs

Gas Generation – Economic Life

Economic Life

- Gas plants typically have an economic life of 30-40 years
- Shutting down plants early that have useful life left removes a cost effective source of capacity from competitive acquisitions

Equivalent Services of Gas Generation

- New resources or combinations of resources with equivalent characteristics (e.g. effective capacity, energy, other reliability services, etc.) would be required to replace gas facilities if decommissioned
- Depending on the type of replacement supply, a significantly higher amount of installed generation, and transmission, would be required to obtain the same level of service – reliability, operability, flexibility – to the system the gas fleet currently provides
- Much of what the IESO expects to be replacement supply with capability to meet reliability needs are either not developed or unproven at this scale. Therefore, a conservative approach would be needed to ensure reliability.

Locational Importance

- Some gas plants are strategically located to provide local and regional reliability
- Majority of the province's natural gas capacity is located in or around the GTA. Replacing that important local source of electricity supply would require land to build alternate generation or reinforcement to the transmission infrastructure to deliver capacity and energy

Assessment Scope

Defining the Intent and Scope

- The IESO has committed to a comprehensive assessment to examine the implications of a natural gas phase-out from the perspective of the system operator.
- The intent of the assessment is to examine the reliability, operability, timing, cost and wholesale market issues that would need to be addressed in reducing emissions on the electricity system.

Defining the Intent and Scope (2)

- The assessment is not intended to:
  - Identify a plan for electricity sector resources
  - Provide recommendations for policy decisions
  - Assess demand impacts from decarbonization of the economy
  - Consider emission impacts resulting from other jurisdictions
- The IESO will develop three scenarios to understand the implications of reversing the trend of emissions increases by 2030

Depth and Focus of Analysis

The three scenario's will use the following:

- Base case: will leverage the 2020 Annual Planning Outlook
- Emissions baseline: an average of electricity sector emissions from 2016 to 2020 will be used to avoid single year fluctuations from external factors like weather
- Diverse supply mix: diversity of supply has historically been the foundation for a reliable system. A diverse supply also helps manage risks from a cost perspective

Depth and Focus of Analysis (2)

The three scenario's will also use or include:

- Existing/established technologies and the need to "pass" an operability assessment
- An illustrative model portfolio to provide insight into the technical and operational challenges, as well as costs
- The zones new supply will be located in to allow the IESO to identify what transmission reinforcements would be needed to deliver that supply to the load centers

Defining the Three Scenario's

Scenario 1

- Complete phase-out of gas by 2030 with a supply mix approach of new resources, in response to municipal city council resolutions

Scenario 2

- A market-based approach that examines the potential for higher gas prices to reduce the utilization of the gas fleet to reduce emissions by 2030 and to provide market signals to clean energy projects

Scenario 3

- Reduce emissions by 2030 with a supply mix approach of new resources

Areas of Assessment for 3 Scenario's

Area of Assessment	Analysis
Reliability	• Energy, Operating Reserve, and Capacity needs • Locational requirements for siting resources, or transmission required to offer alternatives • Ancillary Services requirements
Cost and Wholesale Market	• From a cost perspective, the goal of the analysis will be to provide a coarse range of potential costs. Due to the significant assumptions built into the analysis, figures will be rounded to avoid a false sense of precision. • The assessment will use established costs for known supply technologies and transmission. • Impact on wholesale market pricing how market value of system needs may change
Operability	• Commentary on operability will be largely qualitative. Where possible, the assessment will quantify attributes (e.g. load following requirements) • Impact to wholesale market design (e.g. day-ahead and real-time energy, Operating Reserve, and Ancillary Services) and confirmation that the market can operate the supply mix
Timing	• The assessment will provide an overview of typical timelines associated with construction of generation or transmission (e.g. environmental assessments, regulatory proceedings, construction, commissioning, etc.)

Questions?

Request for Stakeholder Input and Next Steps

Request for Stakeholder Input

Stakeholder input on the scope of the assessment is being sought. The IESO is asking stakeholders to comment on the following question:

- Are there additional considerations the IESO has not identified in defining the scope of the assessment to examine the reliability, operability, timing, cost and wholesale market implications of reduced emissions on the electricity system?

Stakeholder Feedback Form

- The IESO is seeking input on today's presented questions
- A stakeholder feedback form is posted on the engagement webpage
- Stakeholder feedback is due June 17
- An IESO response to stakeholder feedback document will be posted in early July and an email notification will be sent to all registered stakeholders

Next Steps

Timing	Engagement Activity
June 17, 2021	Stakeholder feedback due (see engagement webpage for AODA compliant form)
July, 2021	IESO to post response to stakeholder feedback
Q3	Publish assessment
Q3	Engagement Session 2: present assessment, answer questions, close-out engagement

Thank You

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