SEPTEMBER 24, 2024

Quarterly Bulk Planning Studies Update

South & Central Ontario

Eastern Ontario

IESO Transmission Planning
Independent Electricity System Operator

ieso
Connecting Today. Powering Tomorrow.

Agenda

- Provide updates on the status of the **South and Central Bulk Study**
  - Discuss generation assumptions, and Eastern module in greater detail
- Introduce the **Eastern Ontario Bulk Study**
- Provide a preview for the Niagara area
- Next Steps

IESO Feedback

- Please submit your written comments via email to IESO Engagement at engagement@ieso.ca by **October 15, 2024.**

Questions for participants to help inform feedback on the Bulk Studies:

- What feedback do you have regarding the content delivered today?
- Are there specific areas of urgency that should drive the studies to prioritize one need or area above others?

Background – Bulk Plans Engagement

- Public engagement on the South and Central and Northern Ontario Bulk Plans commenced on **June 19, 2024**
- A recording of that session with meeting materials and participant feedback has been posted: https://www.ieso.ca/Sector-Participants/Engagement-Initiatives/Engagements/South-and-Central-Bulk-Planning
- That session also included an introduction to the IESO's electricity and transmission system planning for those interested

Our Commitment to Engagement

The IESO's approach to community engagement is based on these key principles:

- Strengthening processes for early and sustained engagements with Indigenous communities, local governments and the public
- Providing Indigenous communities, local governments and the public with greater voice and responsibility
- Bringing communities to the table
- Linking local and provincial planning, and reinforcing the link between planning and procurement
- Enhancing electricity awareness and improved access to information

Communities Have a Key Role

Significant electricity system needs are expected over the next decade, and communities have a key role, including:

- **Informing** electricity planning to ensure a reliable and adequate supply
- **Shaping** the province's energy transition by ensuring the system is prepared for future needs
- **Hosting** new generation, transmission and storage
- **Working** with project developers on the applicable approvals, and partnerships, where applicable

Your Input is Important

Indigenous communities are amongst the most influential voices to advance, manage, and shape the ongoing energy transformation. Through our engagements we've heard that it is important to:

Inform and engage with communities in a timely manner

Consider design requirements that incentivize developers to better understand, interact and collaborate with communities

Keep economic development top of mind to meet future needs

Continue to provide support and guidance for communities on how to work with developers

Support innovative technologies and programs

South and Central Ontario Bulk Study Updates

Recap - Scope of Study

Use of Modules

- Given large scope of study, including range of geography and types of needs under consideration, study will be carried out as a series of independent modules studied in parallel
- Options and recommendations will be integrated back from the modules into a full system snapshot, and module/system studies iterated, as required, before final recommendations are made

Forecast Scenarios

- Two forecast snapshots will be considered, using assumptions as in the IESO's Annual Planning Outlook (APO) and Pathways to Decarbonization (P2D) study:

1. A 2035 Summer peak scenario
    - Demand forecast based on assumptions used in the preliminary 2025 Annual Planning Outlook
2. A 2050 Winter peak scenario:
    - Demand forecast based on higher rates of electrification assumed in the P2D forecast

2035 Generation Assumptions

- The 2035 forecast requires assumptions for ~8600 MW of net additional effective peak capacity beyond present day
  - This includes a net reduction of ~6500 MW of gas generation, with 2400 MW still contracted
- Generation additions have been made according to zone and generation type consistent with the 2024 APO
- These values consist of existing and committed resources, including resources committed through actions undertaken by the IESO and/or informed by government policy, until their contract or commitment period ends, as well as impacts of nuclear policy decisions, and estimates of future uptake based on cost effectiveness of technologies and locations
- If the 2025 APO generation assumptions differ significantly from 2024 APO assumptions, the bulk plan will be updated accordingly

2050 Generation Assumptions – Technology type

- The IESO's 2022 P2D provided a possible pathway comprised of new generation by technology type, but in many cases may no longer be aligned with more recent assumptions of future supply mix
- Aligning with the 2022 P2D 2050 assumptions would require over 28,000 MW of new effective capacity, to meet total provincial demand near 60,000 MW. This includes:
  - 14,500 MW of Hydrogen – technology is not in current APO outlook
  - Remaining 2400 MW of gas removed from service
  - 9,000 MW of new nuclear, in excess of Bruce C and SMR at Darlington – locations to be informed by discussions with stakeholders
  - No new solar (winter peak)

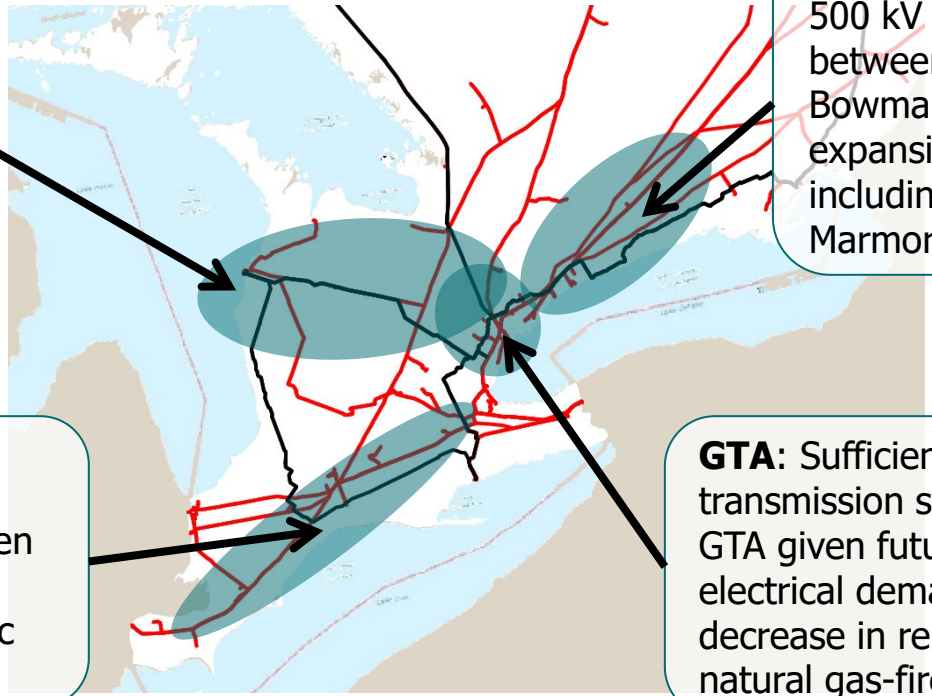
2050 Generation Assumptions - Location

- Unlike the 2035 (APO aligned) case, where generation forecasts were provided by zone, the 2050 P2D aligned case requires a determination of location of new generation
- Given the large amount of uncertainty, several generation scenarios will be created with different weightings throughout the province
- Proposed weighting scenarios (note – increase/decrease relative to existing % share):

1. Aligned with **existing Resource % share** by zone.
2. **Higher Flow North and East conditions.** Increase new generation in the East, Essa, and Ottawa zones. Reduce in the North and Southwest zones.
3. **Higher Flow North and Southwest conditions.** Increase new generation in the Southwest, West, Bruce, Niagara, and Toronto zones. Reduce in the North, East, and Essa zones.
4. **Higher Flow South conditions.** Increase new generation in the North, decrease in the East, Essa, and Southwest zones (linkage with North Bulk Study).

Four Modules for Study

Bruce: Transmission expansion to enable Bruce C NGS, considering potential Meaford PS



East GTA: Expansion of the 500 kV transmission system between Cherrywood TS and Bowmanville to enable expansion of generation, including SMRs and potential Marmora PS, in eastern Ontario

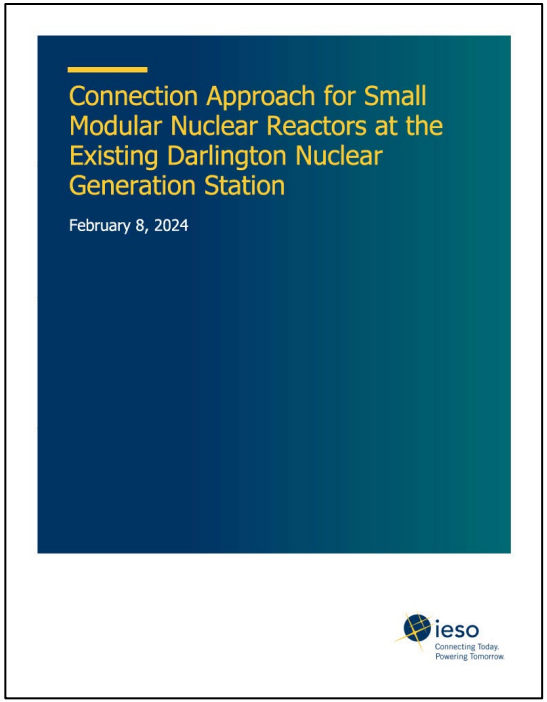
Windsor to Hamilton: Sufficiency of the bulk transmission system between the Windsor and Hamilton areas given future economic development

GTA: Sufficiency of the bulk transmission system to the GTA given future growth in electrical demand, and decrease in reliance on local natural gas-fired generation

Module review: East GTA

- In February 2024 the IESO released a report, recommending a connection approach for the small modular reactor (SMR) project at Darlington Nuclear Generation Station. Among the recommendations were:
  - "The initiation of an IESO led bulk system study to determine the scope of network expansion required on the 500 kV system between Bowmanville to Cherrywood."
- Given that the first of four planned SMRs is planning to connect in 2027,* and reinforcement will be needed to support the second SMR connecting, this need will be prioritized. Recommendations may be released ahead of the final report.

*commercial operation is planned for 2029



Module review: East GTA

- The February report outlined a number of expected system changes that would impact supply to the GTA and the need to reinforce the Bowmanville to Cherrywood 500 kV corridor.
- The system continues to evolve in-line with the assumptions set out in the report, expediting the need to initiate work to reinforce the corridor, most critically:
  - The results of the LT1 RFP were announced in June. With these expected additions, there is limited room for further resource development in the east due to the Bowmanville to Cherrywood corridor.
- Hydro One is continuing the work required to expand Bowmanville Switching Station ahead of the connection of the second SMR. They require input on the scope of the needed 500 kV reinforcement as early as it can be made available throughout the course of the study.

Module review: East GTA (cont'd)

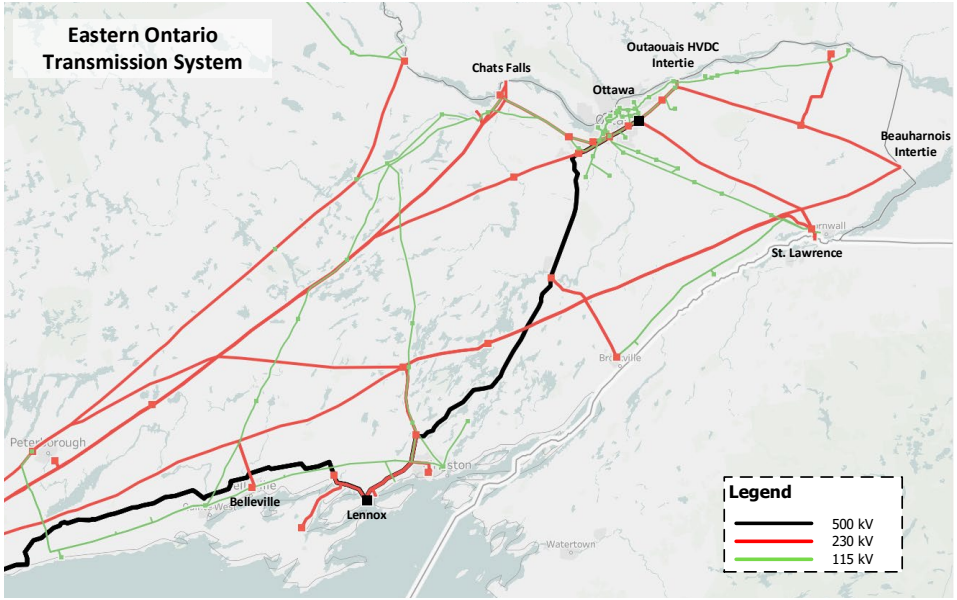
- Snapshot of 2035 APO case to focus on needs associated with SMR integration and feasibility/requirements of connecting Marmora PS (areas highlighted below)
- Snapshot of 2050 P2D case to focus on transmission needs to support higher demand growth throughout the province, and potential integration of other major generation facilities

Upcoming Bulk Plans

Eastern Ontario Bulk Study Preview to Niagara Area

Eastern Ontario Bulk Study - System Overview

- The Eastern Ontario bulk transmission system is composed of 500kV and 230kV circuits which help facilitate power flows from several large generation facilities to main load centers in Ottawa, Kingston, Belleville, Peterborough, and back to Toronto
- Additionally, there are several interties Ontario shares with neighboring Quebec and New York

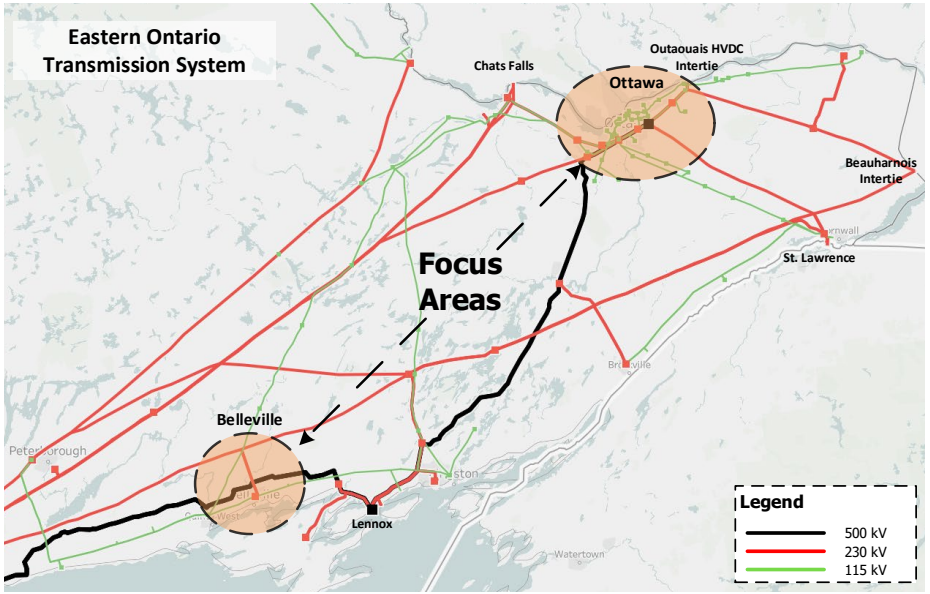


ieso
Connecting Today. Powering Tomorrow.

Eastern Ontario Bulk Study - Scope of Study

The study will focus on developing a plan to address forecasted transmission system reliability issues. This involves:

- Evaluating the adequacy of electricity supply to key focus areas (including Ottawa, Belleville) over the next 20 years
- Assessing opportunities for expanding interties with neighboring Quebec and New York
- Exploring opportunities to improve transmission capability to deliver new resources located in Eastern Ontario



ieso
Connecting Today. Powering Tomorrow.

Eastern Ontario Bulk Study - Timelines

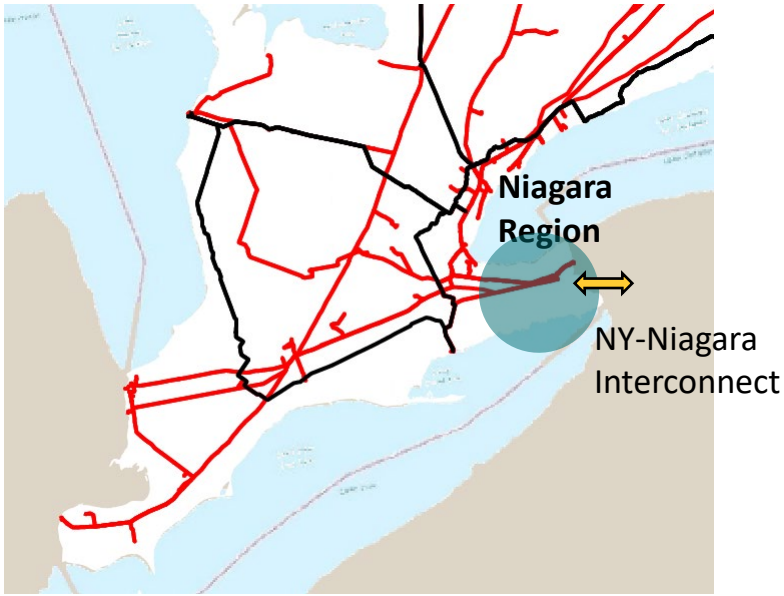
Activity	Timeline
Scoping	Q3 - Q4 2024
Transmission System Needs	Q1 - Q2 2025
Options Analysis and Evaluation	Q2 - Q4 2025
Reporting	Q1 2026

Preview: Niagara Area

Electricity demand is expected to continue to increase across the Niagara region, primarily driven by economic development

The IESO recognizes that this is an emerging area of interest, and that it is important to ensure the bulk transmission system can continue to supply potential growth

The IESO will consider this area as we develop the Schedule of Planning Activities (SOPA) for the 2025 APO and subsequent quarterly engagement sessions, as necessary



Next Steps

Next Steps

- Feedback due to engagement@ieso.ca by **October 15, 2024**

Questions to help inform participant feedback on the active Bulk Studies:

- What feedback do you have regarding the content delivered today?
- Are there specific areas of urgency that should drive the studies to prioritize one need or area above others?

Potential topics for upcoming Bulk Studies quarterly updates:

- Discussing Needs, Options and Recommendations
- More detailed, targeted engagement sessions for each individual study

Questions?

Questions of clarification on the material presented today?

Submit additional questions to engagement@ieso.ca

Thank You

ieso.ca

1.888.448.7777

customer.relations@ieso.ca

engagement@ieso.ca

@IESO_Tweets

facebook.com/OntarioIESO

linkedin.com/company/IESO

ieso
Connecting Today. Powering Tomorrow.