MAY 29, 2025

Quarterly Bulk Planning Studies Update: Part 1

Northern Ontario Bulk Plans
Eastern Ontario Bulk Plan

IESO Transmission Planning
Independent Electricity System Operator

ieso
Connecting Today. Powering Tomorrow.

Territory Acknowledgement

The IESO acknowledges the land we are delivering today's webinar from is the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples. We also acknowledge that Toronto is covered by Treaty 13 with the Mississaugas of the Credit First Nation.

As we have attendees from across Ontario, the IESO would also like to acknowledge all of the traditional territories across the province, which includes those of the Algonquin, Anishnawbe, Cree, Oji-Cree, Huron-Wendat, Haudenosaunee and Métis peoples.

Agenda

Approach to Meeting Ontario's Electricity Needs

Bulk Transmission System Planning & Key Updates

Plan Updates

- Northern Ontario System Bulk Plan, North of Sudbury Bulk Plan
- Eastern Ontario Bulk Plan

Next Steps

Discussion

Note: Part 2 webinar will share updates on the South and Central Bulk Study & Q&A.

Shaping Bulk Studies Through Engagement

Input from the many voices and various perspectives across the electricity sector is essential to the IESO's decision-making process. Several tools are available to enable public feedback including:

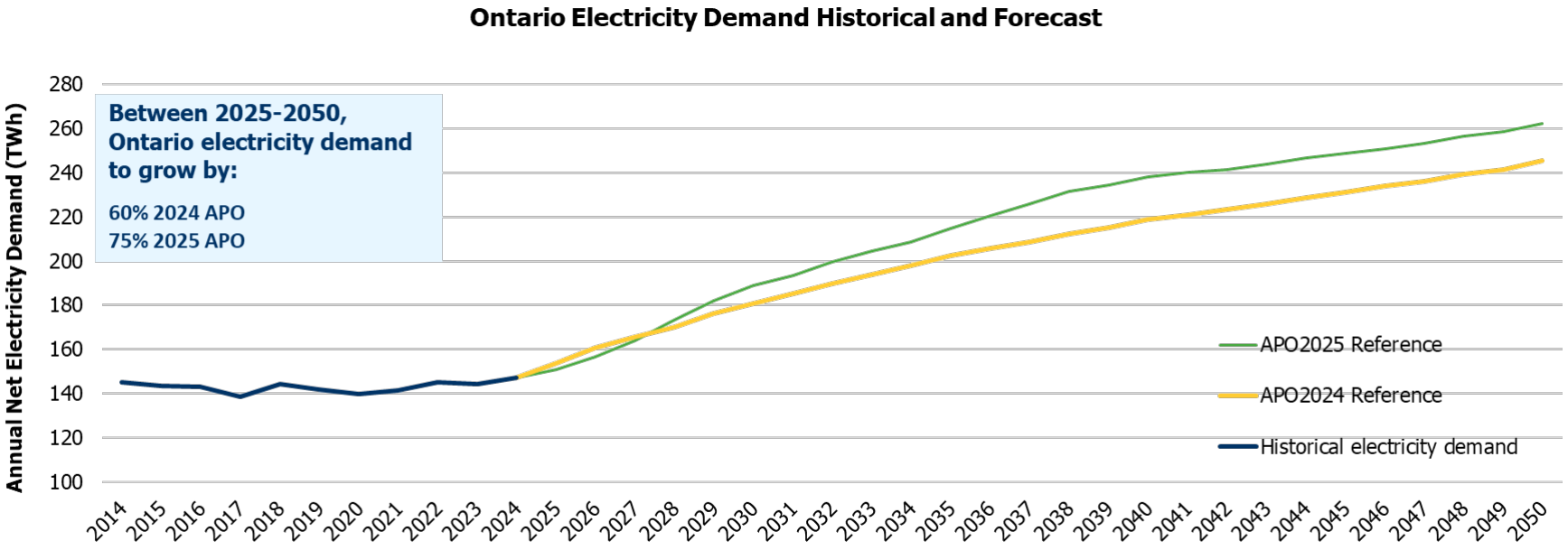
- Announcements on upcoming webinars are shared through the bulletin, subscribe at www.ieso.ca/subscribe. Updates are shared on a quarterly basis.
- Engagement webpages for the South and Central Bulk Plan, Northern Ontario Bulk Plan and Eastern Ontario Bulk Plan include webinar recordings and materials.
- Feedback on the information shared is welcomed. The IESO will consider all feedback received and post a response shortly after.

More information on how the IESO engages can be found on the External Relations Engagement Framework and Indigenous Engagement Framework.

Meeting Ontario's Electricity Needs

ieso
Connecting Today. Powering Tomorrow.

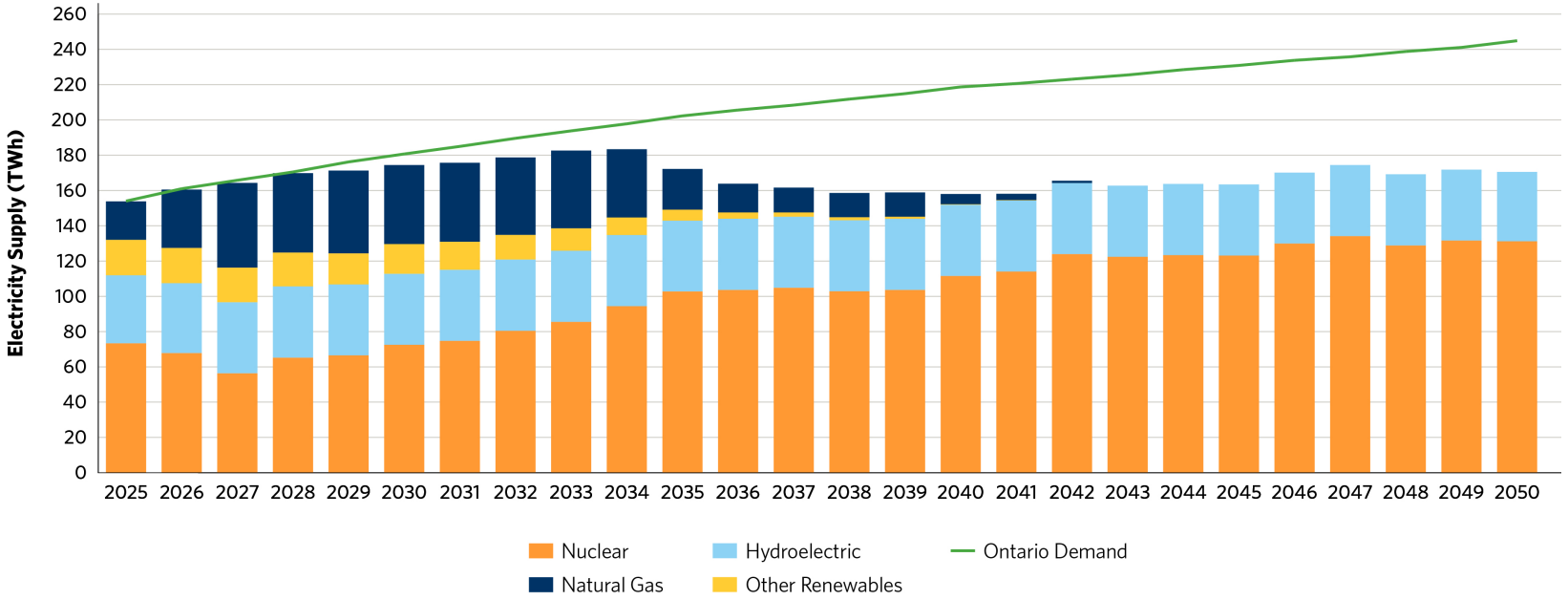
Ontario's Changing Electricity Landscape



ieso
Connecting Today. Powering Tomorrow.

Energy Supply

Energy Adequacy Outlook



ieso
Connecting Today. Powering Tomorrow.

Addressing Electricity Needs

To ensure reliable and affordable electricity is available where and when it is needed, the IESO is moving forward with ambitious plans, key details include:

- **Largest energy storage procurement in Canada:** Ontario's electricity needs for this decade have been successfully met, 3,658 MW of capacity secured through previous procurements.
- **More procurements on the way:** Needs emerging in 2029-2030 will be addressed through the Long-Term 2 Request for Proposals (LT2 RFP).
- **Supporting the expansion of nuclear and transmission:** Five new transmission lines are under development that will allow more power to flow into the region from large generators located elsewhere, and setting up the groundwork for new nuclear development.
- **New electricity trade agreement with Quebec:** A new trade agreement with Hydro-Québec that will optimize the use of existing electricity generation capacity.
- **Several other initiatives are planned or underway**: Northern Hydro Program, Small Hydro Program, medium-term RFPs, procurement for long lead time resources, annual Capacity Auction, and enhanced energy efficiency opportunities.

Bulk Transmission System Planning & Key Updates

ieso
Connecting Today. Powering Tomorrow.

Bulk System Planning Overview

- With capacity and energy needs forecast to increase in the planning horizon, a robust transmission system will play an increasingly critical role in ensuring deliverability of resources to supply forecasted customer demand (including economic development and electrification) provincially and locally.
- The Annual Planning Outlook contains the most up-to-date snapshot of bulk transmission needs.
  - The IESO's Schedule of Planning Activities summarizes the plans that are underway and upcoming.
  - Activities are reviewed and updated with the Annual Planning Outlook every year, considering the most recent demand and supply forecasts, and changes to reliability standards and public policy objectives.
  - Based on these changes, the scope of existing plans may be adjusted, planning work may be re-prioritized, or new planning studies may be initiated.
- For more details and data, download the Annual Planning Outlook from the IESO's website.

Bulk Transmission Schedule of Planning Activities

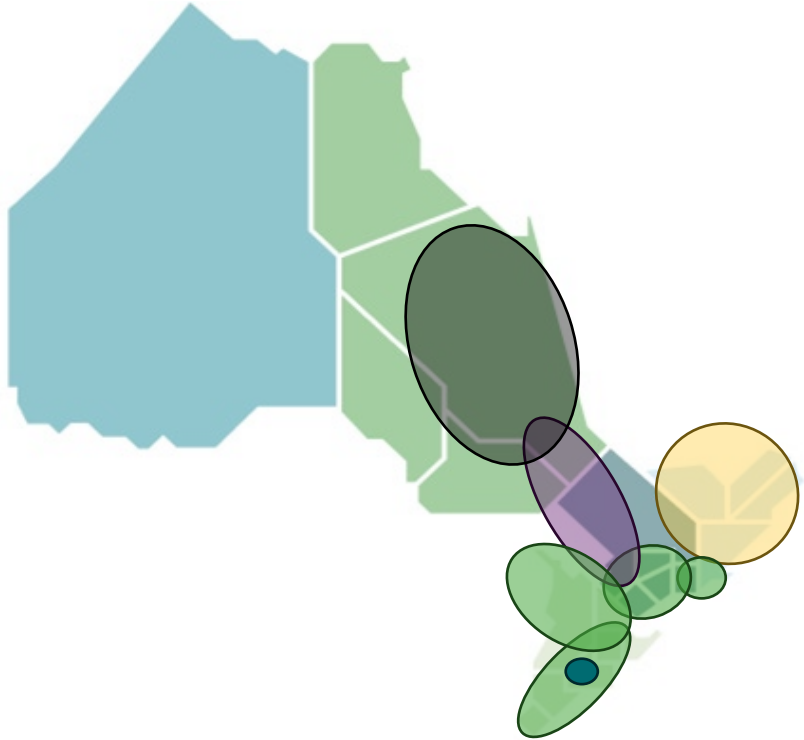
The 2025 APO includes the Schedule of Planning Activities (SOPA):

Study Name	**Start – End (Estimate)**
Central-West Ontario Bulk Plan	2023 – 2024 (complete)
South and Central Ontario Bulk Plan	2024 – Q3 2025 (on-going)
Niagara Bulk Plan	Q3 2025 – 2026 (launch Q3)
Ontario Manitoba Intertie End-of-Life Joint Study	2022 – 2025 (on-going)
Northern Ontario Bulk Plan	2024 – Q3 2025 (on-going)
North of Sudbury Bulk Plan	2025 – 2026 (on-going)
Northern Ontario Connection Study	2024 – 2025 (on-going)
Eastern Ontario Bulk Study	2024 – 2026 (on-going)

For more details and data, download the Annual Planning Outlook from the IESO's website.

Bulk Transmission Planning Activities

- **Northern Ontario Bulk Plan (Active)**
  Transmission expansion options between the Greater Toronto Area and Sudbury to facilitate load growth and enable renewable resources.
- **North of Sudbury (New)**
  Evaluates electricity supply, generation uncertainties, enable new resources, interconnections with Quebec, operational challenges.
- **South and Central Ontario (Active)**
  Accommodating load growth, incorporating new non-emitting resources (small modular reactors, Bruce C), supply to the GTA.
- **Eastern Ontario (Active)**
  Evaluates supply to eastern Ontario (including Ottawa and Belleville areas), and interconnections with Quebec/New York.
- **Central-West (Completed)**
  Ensured reliable electricity supply to support the Volkswagen EV plant plus spin-off and associated growth in the London Electrical Area.

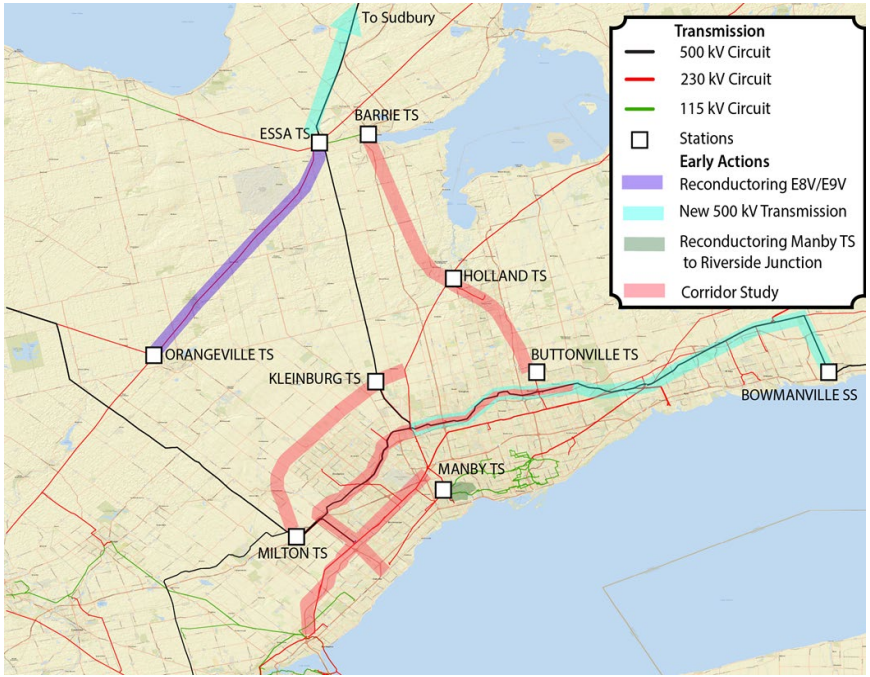


Powering Ontario's Growth (POG) Report Back

Given the urgency of anticipated system needs, the IESO's report back to the Minister in December 2024 identified "Early Actions" to advance transmission projects ahead of the completion of these studies, in cases where the option is sufficiently advanced and there is high confidence in its eventual recommendation, or to preserve options for longer-term solutions.

A summary of recommended Early Actions is included in the appendix. Key details included:

- New 500 kV transmission lines.
- Reconductoring existing 230 kV corridors.
- Corridor studies to preserve land for transmission infrastructure.

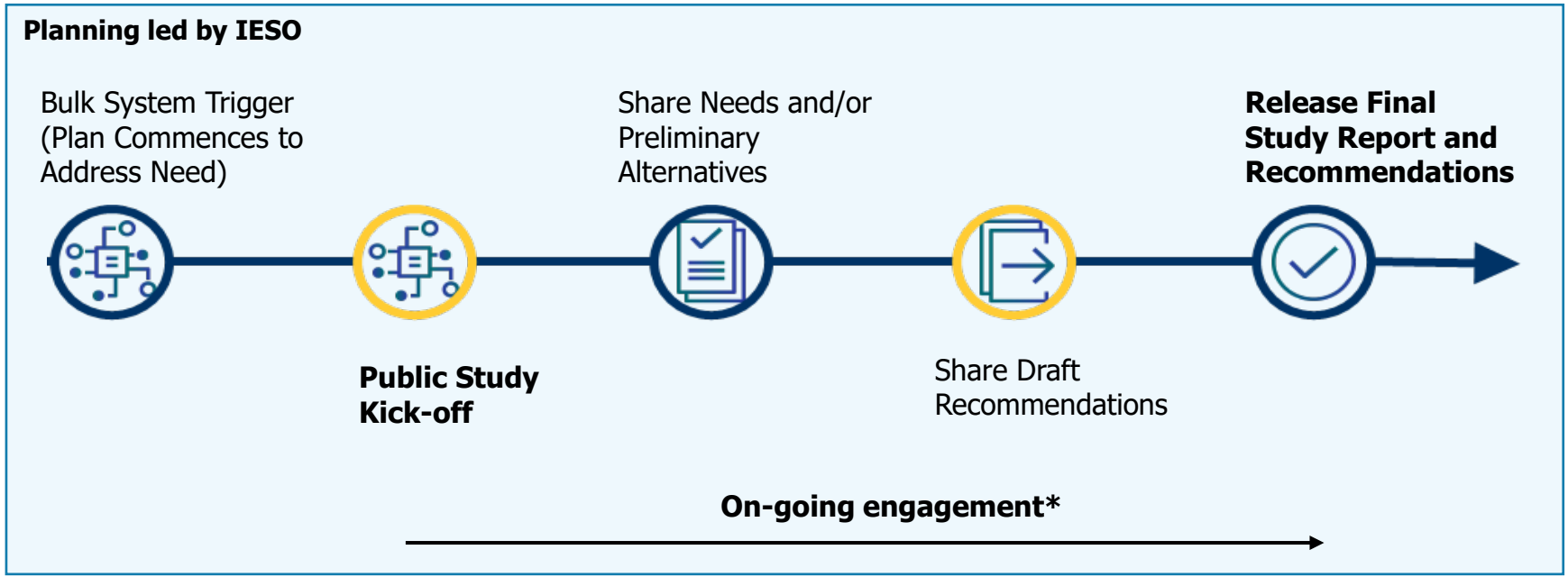


ieso
Connecting Today. Powering Tomorrow.

Components of a Bulk Plan

Demand Forecasts	Needs	Evaluation of Options	Recommendations
How much power is needed over the planning timeframe? Key inputs: -Annual Planning Outlook -Mining load forecast -Regional Planning forecasts -System Impact Assessments	Can the electricity system meet customer demand via a combination of local generation and transmission capacity and maintain reliability planning standards?	What kinds of solutions can meet the future needs for the region? -new transmission -generation -storage -conservation Etc.	Based on an assessment of potential options, what recommended actions will ensure a reliable and adequate electricity supply over the long-term?

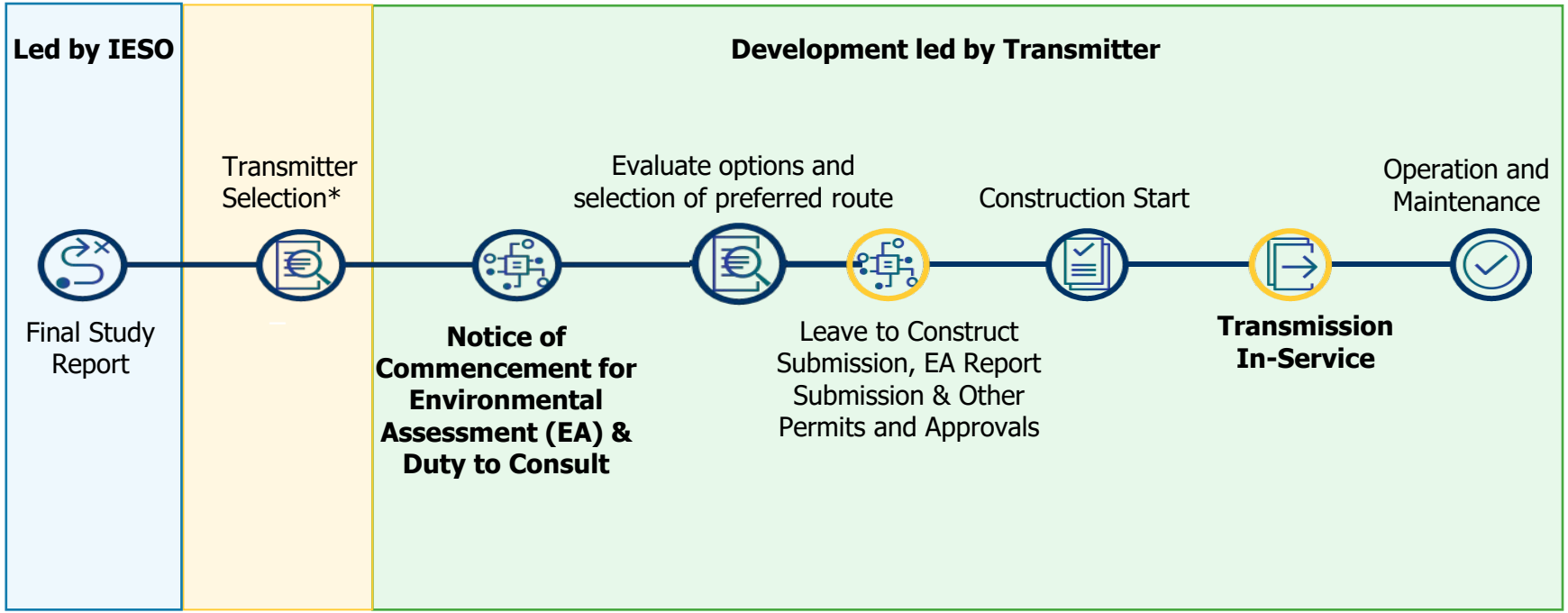
Typical Process for Bulk Planning



*Format of engagements may vary depending on study scope.

ieso
Connecting Today. Powering Tomorrow.

Typical Process for Transmission Development



*Currently, no standardized process exists to select a transmitter

ieso
Connecting Today. Powering Tomorrow.

Plan Updates:

Northern Ontario System Bulk Plan
New North of Sudbury Plan
Eastern Ontario Bulk Plan

ieso
Connecting Today. Powering Tomorrow.

Northern Ontario Bulk Plan & North of Sudbury Bulk Plan

Bulk System Trigger (Plan Commences to Address Need)

Public Study Kick-off

Share Needs and/or Preliminary Alternatives

Share Draft Recommendations

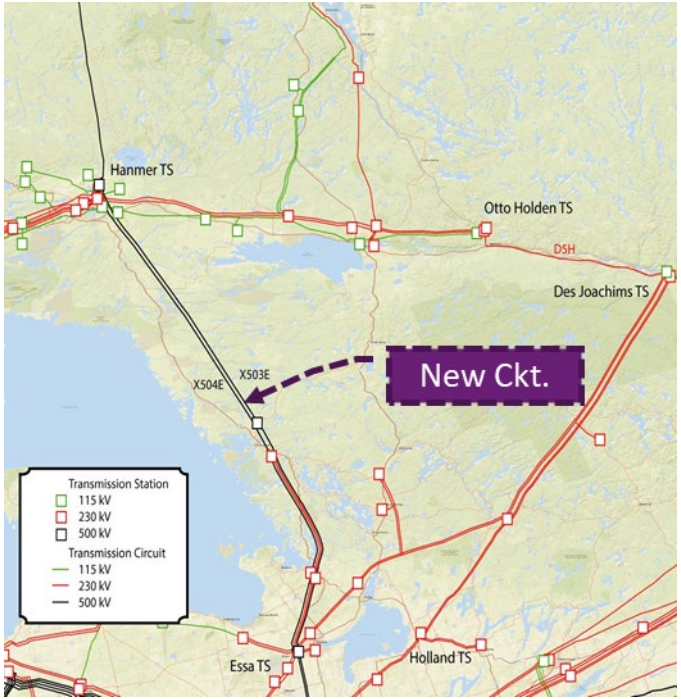
Release Final Study Report and Recommendations

North of Sudbury Bulk Plan We are here

Northern Ontario Bulk Plan We are here

Northern Ontario System Bulk Plan Overview

- Public engagement on the Northern Ontario System Bulk Plan commenced on **June 19, 2024.**
- To meet the growing electricity demand, the plan focuses on supporting economic growth and enabling more generation in Northern Ontario by ensuring the transmission lines running from Barrie to Sudbury have adequate capacity and by addressing existing bottlenecks.
- The draft recommended option would involve building a new 500 kV transmission line from Essa Transmission Station (TS) to Hanmer TS. The option can meet the growing demand and enable more generation, in comparison to the other wire and non-wire options that have been evaluated to date.



ieso
Connecting Today. Powering Tomorrow.

North of Sudbury Bulk Plan Overview

The study will focus on developing a plan to address increasing electricity demand by mining and industrial electrification and bottlenecks in current transmission capacity.

Planning drivers for the North of Sudbury Bulk Plan include:

Adequacy of Electricity Supply Through the Transmission System:

- Assess the adequacy of electricity supply to customers and potential large new load connections in the area north of Sudbury.

Supply Mix Uncertainties:

- Assess the impacts of changing generation resources and potential retirements of gas fired generation facilities and the impact of these retirements in the area North of Sudbury.

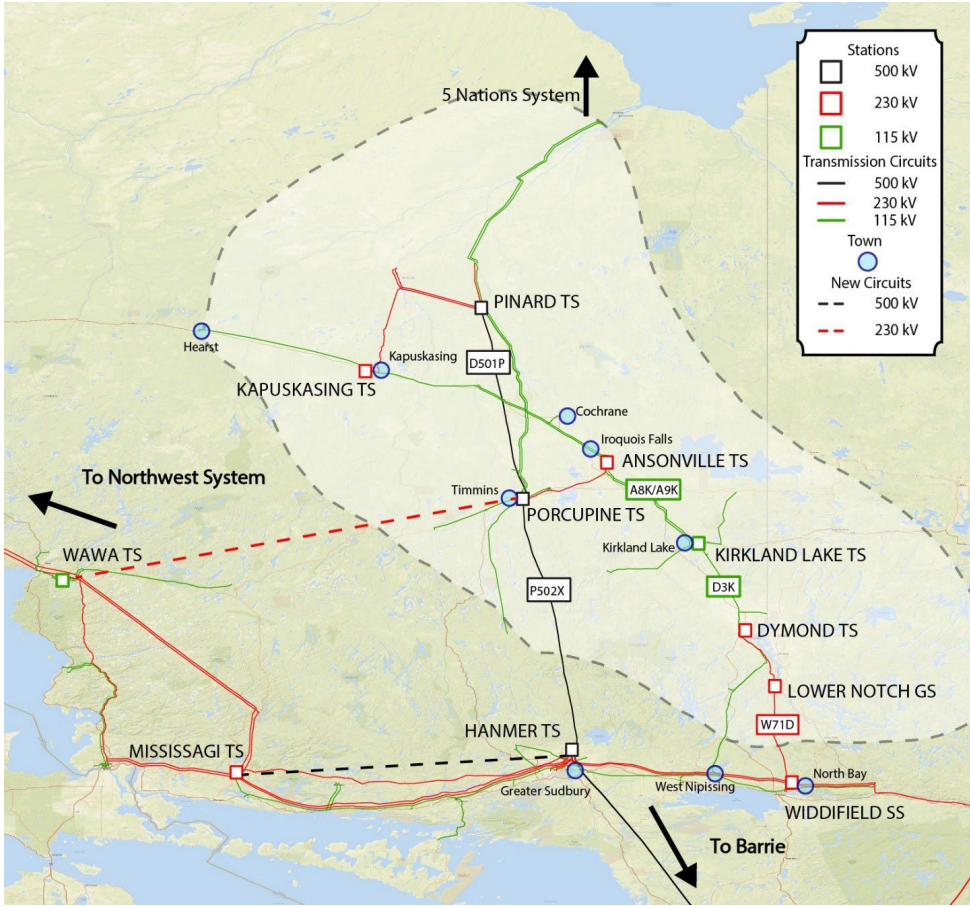
Connection of New Supply Resources:

- Assess the ability to accommodate resource facilities in the area north of Sudbury.

North of Sudbury Bulk System Background

North of Sudbury is supplied by:

- **Three transmission circuits** via a 500 kV circuit (P502X), a 230 kV circuit (W71D) and a 115 kV circuit (D3K). By 2031, a new single circuit 230 kV transmission line between Porcupine TS and Wawa TS will also be in-service, enhancing the region's connectivity.
- **Interconnections** with Quebec via H4Z and D4Z.
- **Local generation** consists of biofuel, gas fired, hydroelectric and solar generation.



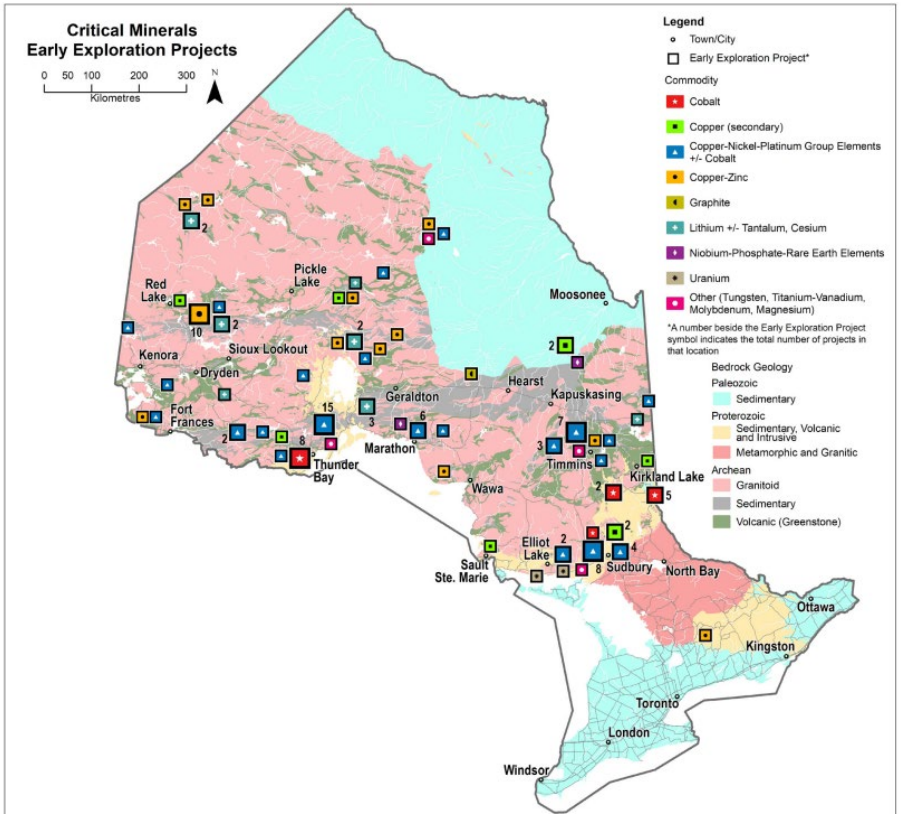
ieso
Connecting Today. Powering Tomorrow.

Drivers for Growth

Forecasts continue to show increasing demand growth in Northern Ontario due to:

- The development of significant potential mineral deposit supplies in northern Ontario to support electrification vehicle manufacturing.
- Electrification of metal production sub-sector and mining.
- Adoption of industrial process electrification in existing mines.

This plan will focus on supporting economic growth, enabling new supply resources in Northern Ontario and exploring opportunities for new or upgraded interconnections with Quebec.



ieso
Connecting Today. Powering Tomorrow.

Considerations

The study will focus on developing a plan to address:

- North of Sudbury adequate need, further broken down into various sub areas.
- Challenges siting new resources in this area.
- 115kV transmission that is end of life.
- Generation mix uncertainties.
- Opportunities for new interconnection with Quebec in the Kirkland Lake area.
- Operability challenges with respect to maintaining voltages.
- Reducing/eliminating the reliance on Remedial Action Schemes ("RAS").
- Any additional needs that emerge in carrying out the Bulk Plan.

Next Steps & Staying Engaged

North of Sudbury Bulk Plan Milestones:

- Feedback due to engagement@ieso.ca by June 19, 2025.
- Quarterly updates in Q3 and Q4 2025 to share demand forecasts, needs, options and recommendations.
- Final report to released and published in Q1 2026.

Northern Ontario Bulk Plan Milestones:

- Final report to released and published in Q3 2025.

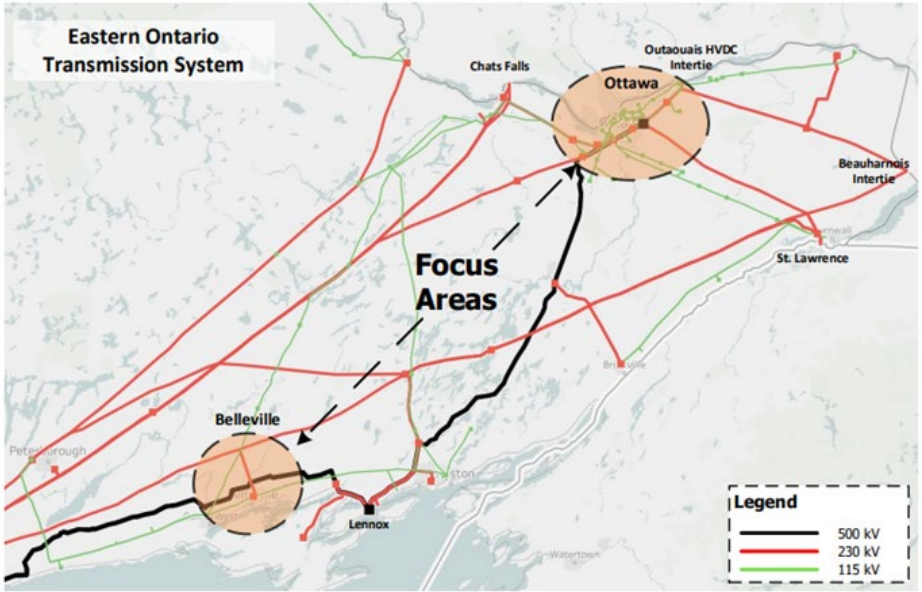
Eastern Ontario Bulk Plan

ieso
Connecting Today. Powering Tomorrow.

Eastern Ontario Bulk Plan Overview

Public engagement on the Eastern Ontario Bulk Plan commenced on September 24, 2024. The study will focus on developing a plan to address forecasted transmission system reliability issues. The study will involve:

- 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.

Feedback Received on Eastern Ontario Bulk Plan

Key Areas of Feedback	IESO Response
Need for Additional Data and Transparency	Key planning data is available through the Annual Planning Outlook, Data Directory, and bulk study webpages. Further detail on the timing and magnitude of needs will be shared at the appropriate stage in the study.
Explore alternative solutions, such a non-wire alternatives	The study is still in the early stages, and the assessment of potential options to enable the above-mentioned study objectives will be completed over the coming months.
Enable projects identified through Long Lead-Time Resource procurement	The Eastern Ontario Bulk Study will review the capability of the bulk system to support enabling projects identified through the Long Lead-Time Resource procurement, with insights from this work helping to identify potential areas where future projects could materialize.

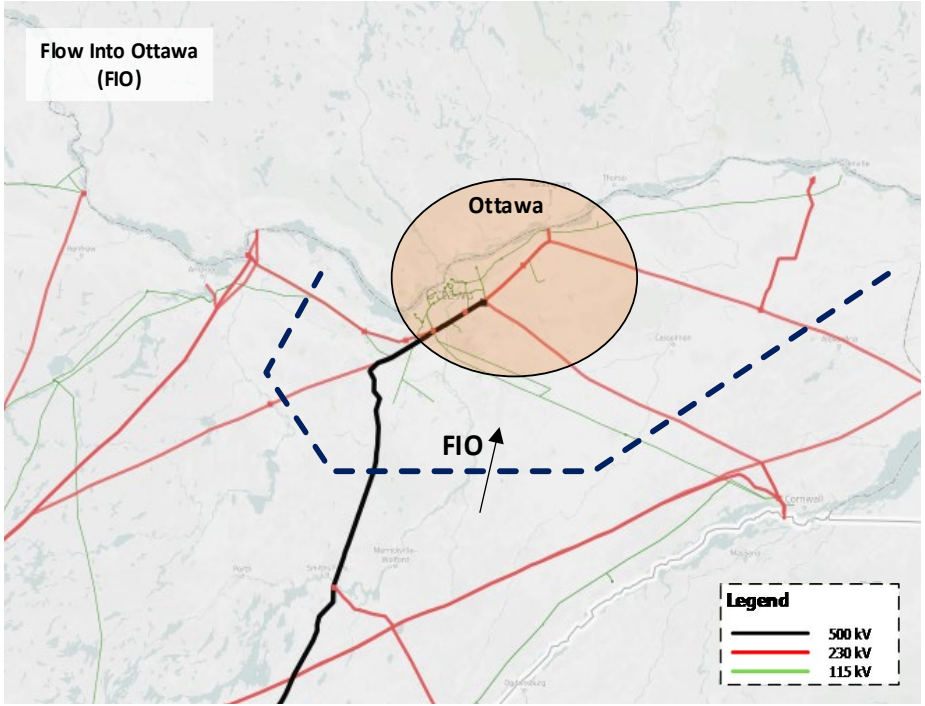
[1] Webpage to view all feedback received and the IESO's responses can be found here.

Developing the Forecast

- This bulk system planning study covers two zones: the East Zone and the Ottawa Zone. An electricity demand forecast was developed to assess the projected growth in demand over the next 20 years and to evaluate whether the existing transmission infrastructure can adequately support this increase.
- Demand forecast and supply outlook are aligned with the IESO 2025 Annual Planning Outlook (APO) and are coordinated the relevant regional plans.
- Additionally, the study will consider a range of scenarios, incorporating factors such as economic development to ensure the plan remains robust for future uncertainties.

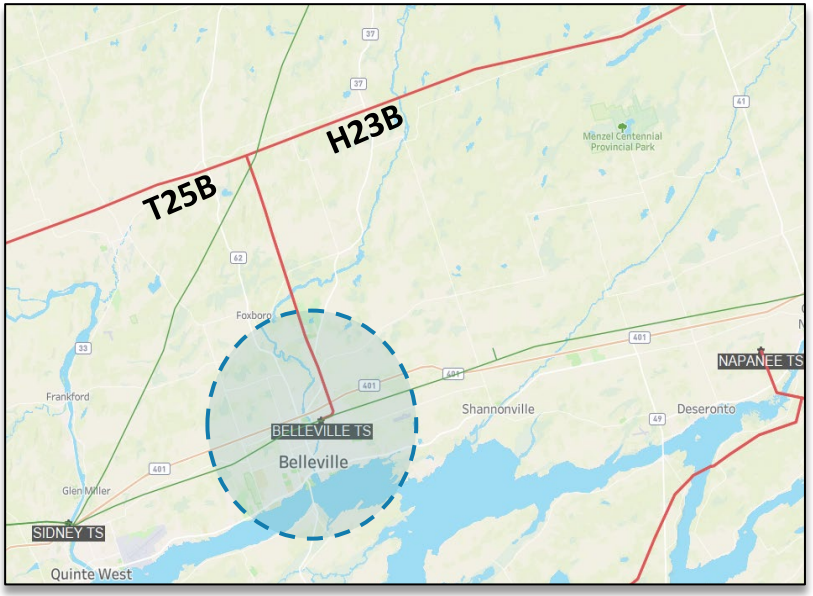
Supply to Ottawa Study

- This study aims to:
  - assess the bulk transmission system capability, focusing on the Flow Into Ottawa (FIO) transmission interface; and
  - identify the required bulk system enhancement to increase the FIO transfer capability to support regional demand growth and facilitate additional power transfer with neighboring jurisdictions.
- Coordinated with the ongoing Ottawa IRRP to ensure alignment and consistency.
- This study is currently at the Needs Identification stage. A detailed needs analysis will be shared during the next Bulk Planning Study update webinar.



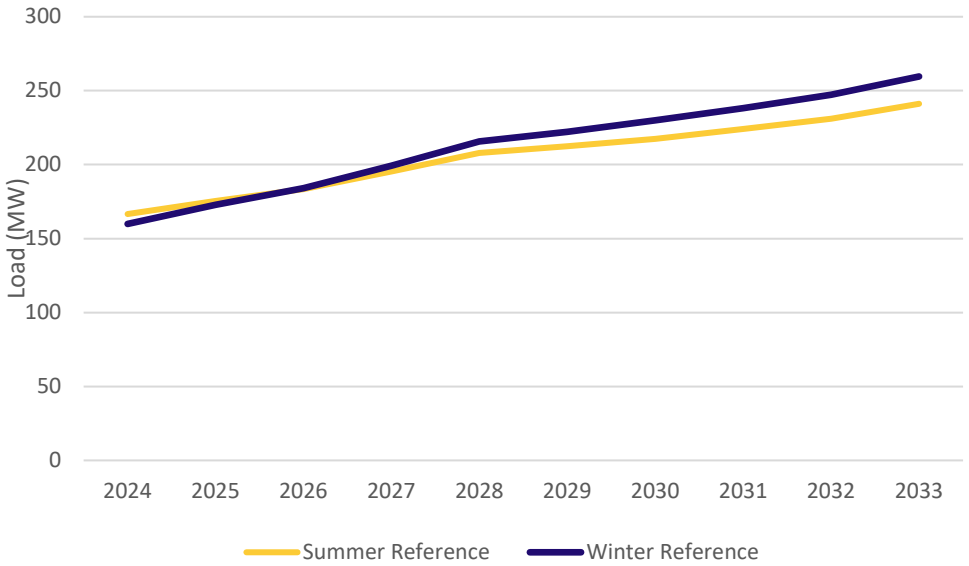
Supply to Belleville Study

- This study aims to assess the bulk transmission system supplying the Belleville area and to identify the required transmission system enhancements to support regional demand growth.
- Coordinated with the ongoing Peterborough to Kingston IRRP to ensure alignment and consistency.
- This study has completed the needs analysis and is currently in the option evaluation stage.



Supply to Belleville Study - Demand Forecast

- Electricity demand in the Belleville area is expected to continue growing, consistent with forecasts in the ongoing Peterborough to Kingston IRRP
- A high industrial growth scenario has been developed to reflect potential future industrial development in the area

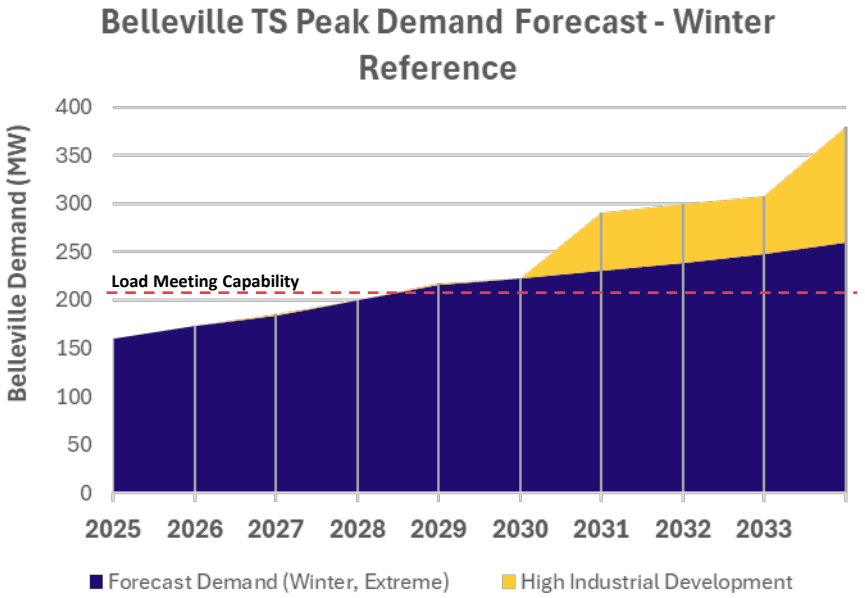


ieso
Connecting Today. Powering Tomorrow.

Supply to Belleville Study – Needs Summary

The existing transmission system has insufficient Load Meeting Capability (LMC) to reliably supply the forecast load growth in the Belleville area:

- The need is expected to begin in the year 2028, and is sustained through the planning horizon
- The high industrial growth scenario is expected to increase the scale of the need



ieso
Connecting Today. Powering Tomorrow.

Supply to Belleville Study – Option Development

- The IESO is currently evaluating both non-wires and wires options to address this capacity need:
    - Non-Wires Options include electricity demand side management (eDSM), incremental energy efficiency, demand response (DR) and energy storage and/or generation facilities.
    - Wires Options include new or upgrading transmission stations or lines, and additional reactive power support facilities.
- Draft findings will be shared during the next Bulk Planning Study update webinar.

Next Steps & Staying Engaged

Upcoming milestones for the Eastern Ontario Bulk Plan:

- Feedback due to engagement@ieso.ca by June 19, 2025.
- Quarterly updates in Q3 2025 and Q1 2026 to share options and draft recommendations.
- Final report to released and published in Q1 2026.

Learn more about this plan by:

Visiting the engagement webpage and subscribing to receive updates.

Next Steps

ieso
Connecting Today. Powering Tomorrow.

Next Steps

- Feedback due to engagement@ieso.ca by June 19, 2025.
- Quarterly updates to share needs, options and recommendations, and introduce new bulk plans until report release.
- Final reports to be released and published:
  - Northern Ontario Bulk Plan – Q3 2025
  - North of Sudbury Module – Q4 2025
  - Eastern Ontario Bulk Plan – Q1 2026

Part 2 of our webinar will focus on South and Central Bulk Planning and will start at 2:30 p.m.

Discussion

Local considerations and feedback are a critical component to the development of bulk plans. The IESO wants to hear your perspectives about:

North of Sudbury Bulk Plan:

- What other information should be considered in the study scope?
- What additional information should be provided in future engagements to help share perspectives and insights?

Eastern Ontario Bulk Plan:

- What information should be considered in the evaluation of wire and non-wire options?
- What additional information should be provided in future engagements to help share perspectives and insights?

The IESO welcomes written feedback until June 19. Please submit feedback to engagement@ieso.ca using feedback form posted on the above linked engagement webpages.

Thank You

ieso.ca

1.888.448.7777

IndigenousRelations@ieso.ca

engagement@ieso.ca

@IESO_Tweets

linkedin.com/company/IESO

ieso
Connecting Today. Powering Tomorrow.

Appendix

ieso
Connecting Today. Powering Tomorrow.

Powering Ontario's Growth Report Back Early Actions

A summary of recommended Early Actions is provided below:

1. Initiate early development work for two new single-circuit 500 kV transmission lines from Sudbury (Hanmer TS) to Barrie (Essa TS) and associated station facilities to enable economic development and renewable generation in Northern Ontario. One single-circuit 500 kV transmission line should proceed to construction in the near-term.

2. Proceed with reconductoring the existing E8V/E9V 230 kV transmission lines, between Barrie (Essa) and Orangeville, using advanced conductors to enable connection of the new Honda facility in Alliston, renewable generation, and economic development in northern Ontario.

3. Support Hydro One in the advanced procurement of up to five 750 MVA 500/230 kV autotransformers to reduce future lead times to meet near-term needs driven by forecast economic development and data centre connections in the southwest, GTA, and northern Ontario.

Powering Ontario's Growth Report Back Early Actions

A summary of recommended Early Actions continued:

4. Communicate the need for a new double-circuit 500 kV transmission line from Bowmanville to Toronto to enable the connection of additional generation in eastern Ontario, including the Darlington Small Modular Reactor (SMR) project.

5. Support Hydro One on the development work to reconductor 115 kV circuits from Manby TS to Riverside Junction to higher-ampacity conductors without replacing the existing towers to enable growth in downtown Toronto.

Powering Ontario's Growth Report Back Early Actions

A summary of recommended Early Actions continued:

6. Work with the Ministry of Energy and Electrification to initiate/continue three studies of land required for future transmission infrastructure to support growth, economic development and data centres in the GTA while lowering long term cost and land use impact:

a) Parkway Belt West

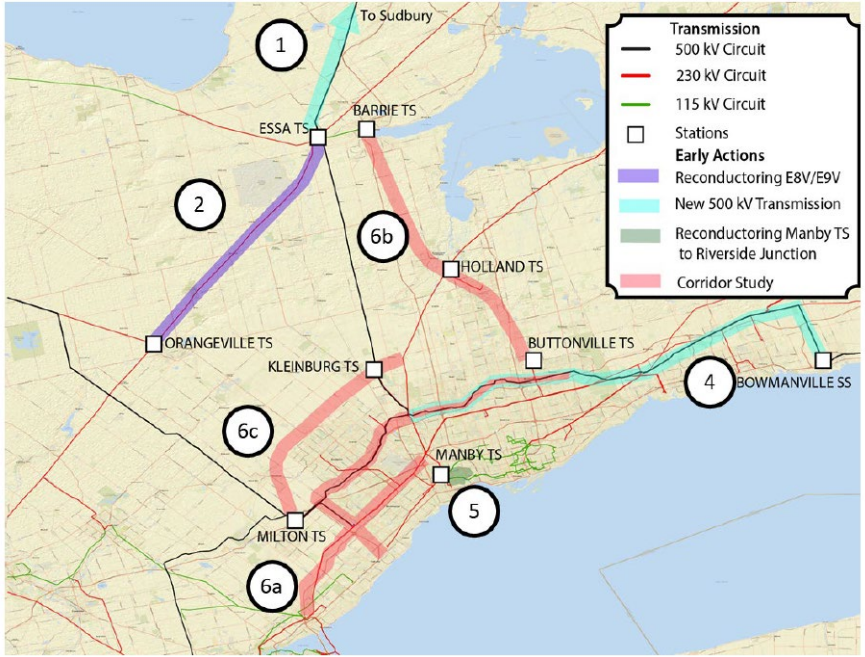
b) Existing (idle sections) 115 kV corridor from Barrie TS to Buttonville TS

c) Northwest GTA Transmission Corridor Study

7. Work with Hydro One to understand current and potential space provisions for expansion at existing strategic station sites to inform and preserve options for ongoing and future planning activities.

Powering Ontario's Growth Report Back Early Actions Map

Figure 1 | Early Actions with Known Sites



ieso
Connecting Today. Powering Tomorrow.