MAY 7, 2025

North of Dryden Addendum Study

Webinar #1: Demand Forecasts, Electricity Needs, and Non-Wires and Wires Options Screening

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Land Acknowledgement

The IESO acknowledges that North of Dryden is the traditional territory of many nations including the Anishinaabe Nation and Métis people, encompassing areas covered by Treaty 3, Treaty 5, and Treaty 9.

The IESO would also like to acknowledge all First Nations, Inuit and Métis peoples and their valuable past and present contributions to this land.

Agenda

- The Role of the IESO and Ontario's Electricity Sector
- Overview of the Regional Electricity Planning Process
- Overview of the Electricity Demand Forecasts
- Overview of Electricity Needs
- Overview of the Non-Wires and Wires Options Screening
- Next Steps
- Discussion: Considerations for the Development of the Addendum

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We work with:

Generators >>> **Transmitters** >>> **Local Distribution Companies** >>> **Energy Consumers**

<<< **Communities** >>>

Seeking Input

Please keep the following points in mind to help shape your feedback during the discussion and written feedback:

- Perspectives on the electricity demand forecast and needs in the North of Dryden sub-region.
- Perspectives on the non-wires and wires options to meet electricity needs.
- Additional information you need to participate in the planning process.
- Who else we should engage for the Addendum study.

IESO welcomes written feedback until May 21, 2025. Please submit feedback to: engagement@ieso.ca.

Overview of the Regional Electricity Planning Process

Electricity Planning in Ontario

Provincial/ Bulk System Planning

Addresses provincial electricity system needs and policy directions.

Completed: Northwest Ontario Bulk Planning

Regional Planning

Addresses local electricity system needs at the transmission system level.

Underway: North of Dryden Addendum Study

Completed: 2023 Northwest IRRP

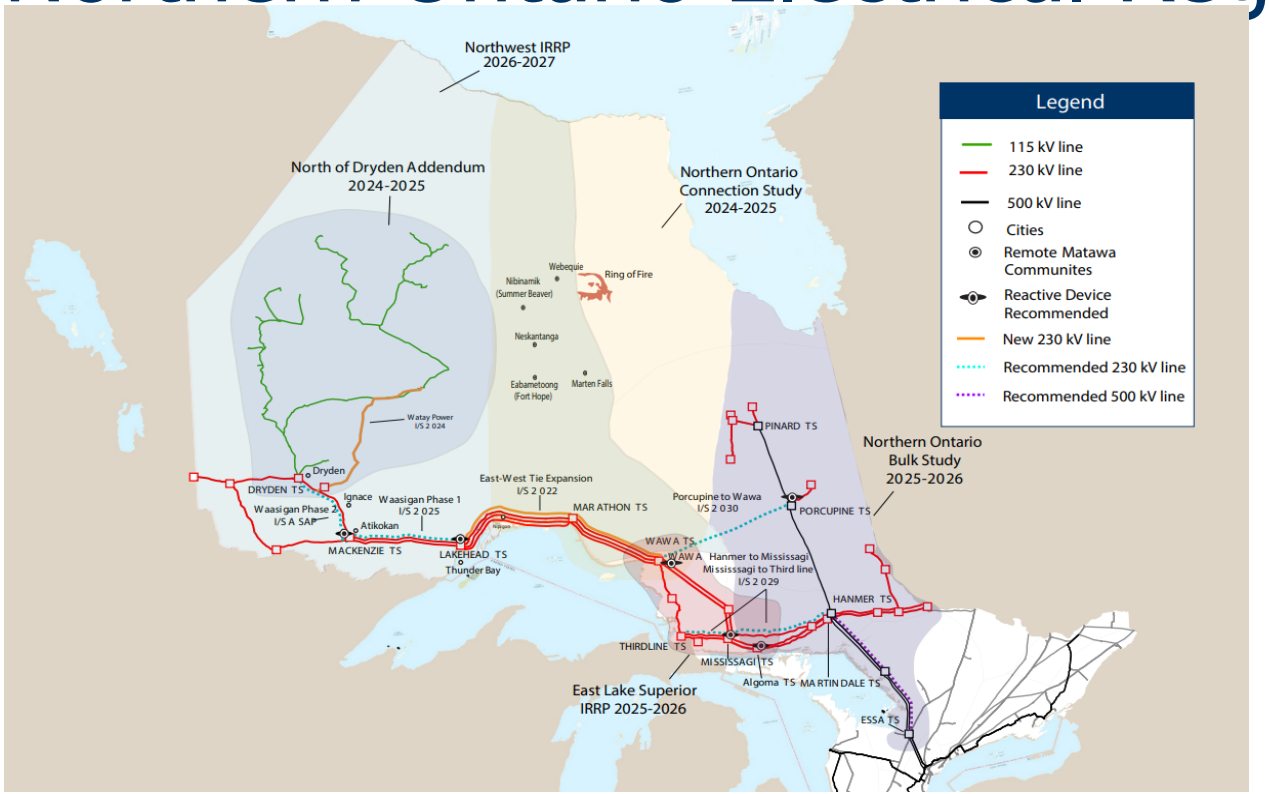
Upcoming:
Northwest Regional Planning (mid-2025)

Distribution Planning

Addresses local electricity system needs and priorities at the distribution system level.

Led by local distribution companies.

Northern Ontario Electrical Region



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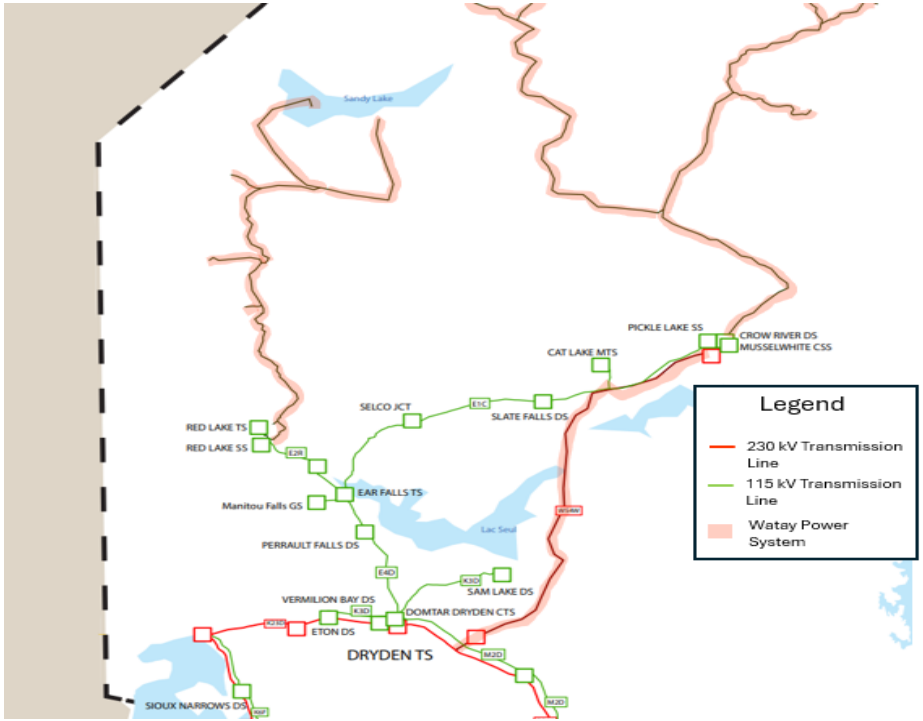
Regional Electricity Planning: North of Dryden Addendum

- In 2023, the IESO published the Northwest Integrated Regional Resource Plan ("NW IRRP"). While the supply capacity was adequate at the time the NW IRRP was published, emerging growth in the North of Dryden sub-region has necessitated re-studying the supply capacity needs. This study will be an Addendum to the NW IRRP 2023.
- The objective of the North of Dryden Addendum is to study the specific electricity needs in the reference forecast scenario, which include mining and industrial growth, in the North of Dryden sub-region (generally the area extending northward from Dryden to the towns of Ear Falls, Red Lake, Pickle Lake and surrounding areas).
- Following the regional system planning process, the North of Dryden Addendum will ensure a reliable supply of electricity by understanding the unique needs of the sub-region and consider a range of options and resources to address the identified needs.
- The IESO will continue to monitor the forecast for the forthcoming Northwest Regional Plan, commencing mid-2025.

North of Dryden Electrical Region

Area is serviced by 230 kilovolt (kV) and 115 kV lines and transformer stations (TS).

The electrical region encompasses a number of municipalities, Indigenous communities and Métis councils extending northward from Dryden to the towns of Ear Falls, Red Lake, Pickle Lake and surrounding areas.



Map is for illustrative purposes.

IRRP Study Team ("Technical Working Group")

The plan will be developed by a Technical Working Group, led by the IESO, and consisting of the local distribution companies and transmitters.

Team Lead, System Operator	• Independent Electricity System Operator
Lead Transmitters	• Hydro One Networks Inc. (Transmission) • Wataynikaneyap Power
Local Distribution Companies (LDC)	• Hydro One Networks Inc. (Distribution) • Hydro One Remotes • Fort Frances Power Corporation • Sioux Lookout Hydro Inc.

Regional Planning Milestones for North of Dryden Addendum

We are here

Q4 2024
Develop Updated Forecasts

Q2 2025
Identify Needs and Potential Options

Q3 2025
Complete Options Analysis and Draft Recommendations

Q3 2025
Release Final Plan

On-going engagement – Led by the IESO

Components of an Electricity Plan

Demand Forecast	Needs	Potential Solutions	Recommendations
How much power is needed over the planning timeframe?	What needs are emerging in the region that need to be addressed? Electrical needs fall in the following categories: equipment and system capacity, end-of-life replacement, system security and power restoration.	What kinds of solutions can meet the future needs for the region?	Based on an assessment of potential options, what recommended actions will ensure a reliable and adequate electricity supply for the region over the long-term?

Overview of the Electricity Demand Forecasts

Forecast Development Overview

The IESO developed the 20-year forecast by:

- The Addendum reference forecast was built upon the 2023 Northwest IRRP reference demand forecast.
- Further information was collected from the local distribution companies (LDC), transmission connected customers, future mining projects, and municipalities.
  - By engaging with municipalities, customers, and other interested parties the IESO was better able to understand the unique needs of the sub-region and incorporate potential growth and decarbonization plans.
- The demand forecasts account for the impacts of demand-side management, distributed energy resources, and extreme weather conditions.

Forecast Scenarios

Three scenarios were developed for the North of Dryden Addendum:

- **Reference Scenario:** firm loads (current and planned), projects with highest likelihood to proceed, etc.
- **High Scenario:** incorporate potential demand growth that is less certain or likely to proceed, in terms of timelines, magnitude and location
- **Extreme Growth Scenario**: incorporate potential demand growth with much less certainty and likelihood to materialize

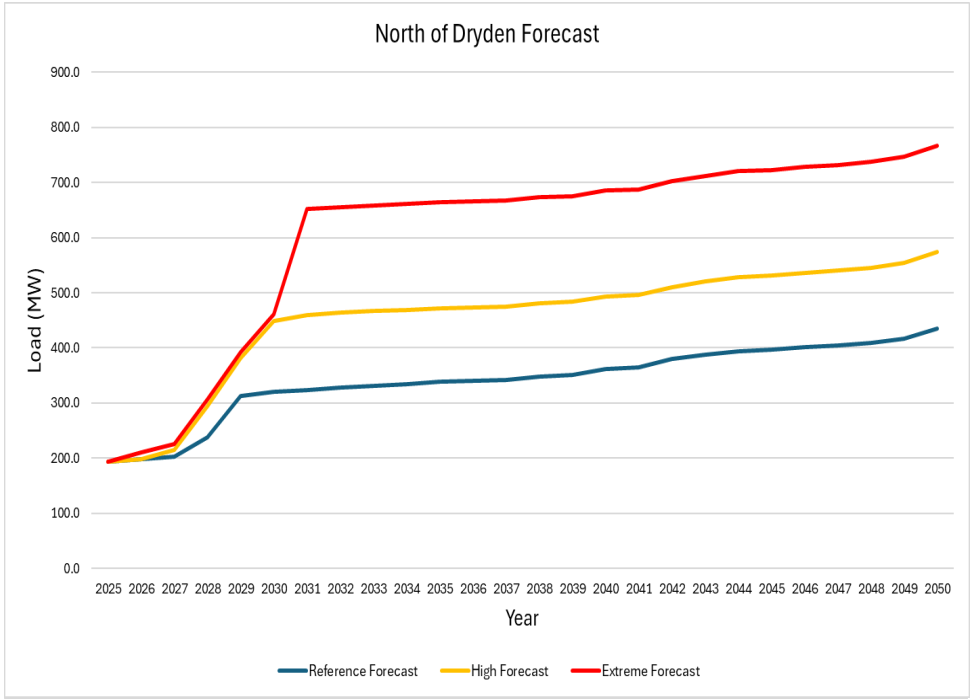
The planning approach considers a wide range of forecast scenarios to develop recommendations that are resilient across different potential futures. Insights from the Reference, High, and Extreme scenarios are integrated to ensure recommendations are robust, to identify key signposts for tracking future demand shifts, and to define potential actions should demand grow faster than expected. This scenario-based methodology enables proactive, flexible planning that can adapt as conditions evolve.

North of Dryden Scenarios

Three scenarios were developed for the North of Dryden Addendum:

1. Reference Scenario: 435 MW
2. High Scenario: 574 MW
3. Extreme Growth Scenario: 766 MW

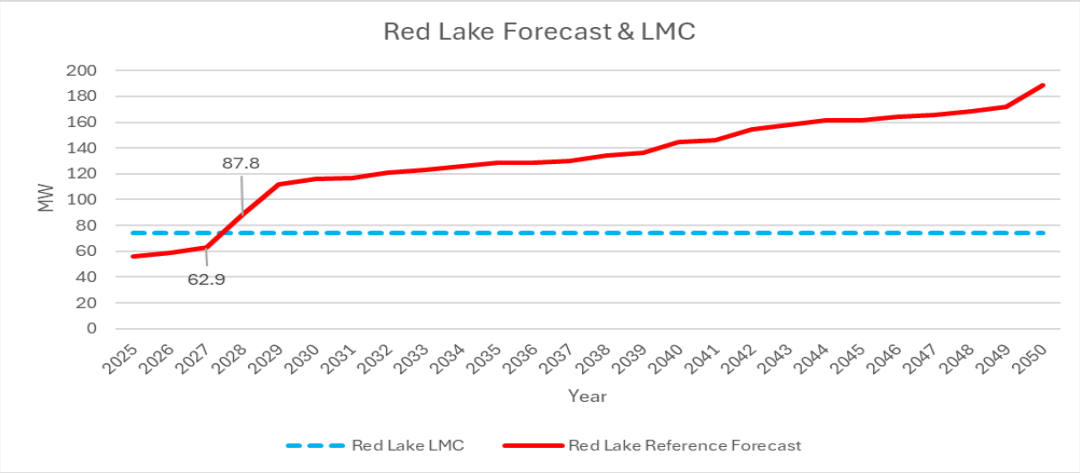
The **main driver** of load growth in the sub-region is **new forecasted mining load**. Existing mining load remains relatively flat over the study and the residential load growth is estimated to be 1.6% per year.

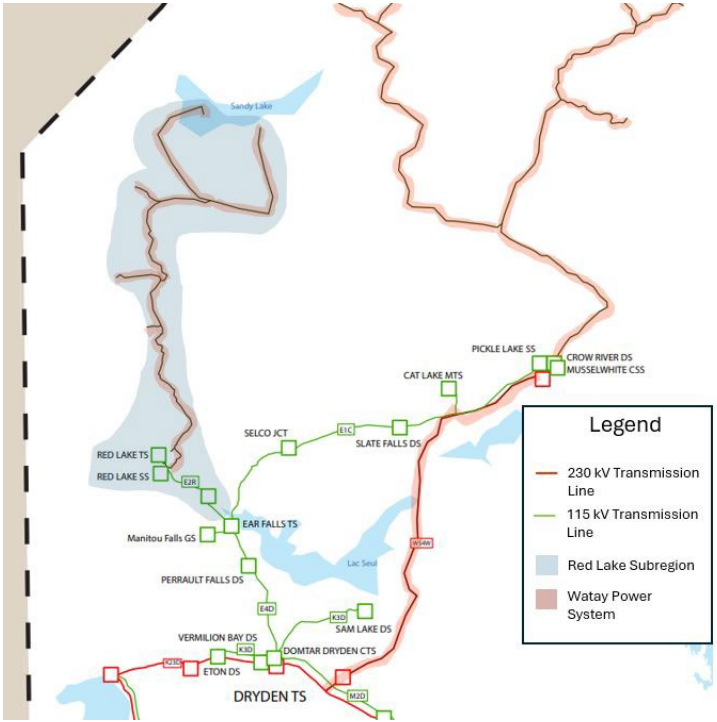


Overview of Electricity Needs

Reference Needs – North of Dryden Sub-Region

Need Type	Impacted Equipment	Need Timing
Supply Capacity Ability of the system to supply power through the transmission lines to a local area, as the Load Meeting Capability (LMC) in Red Lake is surpassed.	E4D and transmission network supplying the Red Lake sub region (highlighted in blue on map)	2028





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Summary of Approach to Meet Needs

Considering the forecasted and potential growth, the IESO plans reinforcement to set up the system to be able to quickly respond when higher growth materializes, specifically:

- Reference forecast will drive firm near- and mid-term recommendations.
- High forecast will be used to establish a plan based on load thresholds rather than need years, direct early development work, and identify sign-posts to trigger further investments.
- The IESO will continue to study the forecast for the forthcoming Northwest Regional Plan, commencing in mid-2025.

Overview of the Non-Wires and Wires Options Screening

Determining Options

A combination of wires and non-wires options may be needed to address the needs, and over the course of the planning process, the IESO will:

Screen various options to address the region's near, medium and long-term electricity needs for the reference forecast, including:

Traditional wires option to supply local area

Non-wires alternatives (NWAs), such as transmission-connected generation or energy storage, demand side management, distributed generation or demand response

Complete a detailed analysis of screened-in options to recommend solutions to meet needs.

Seek community feedback at key milestones to enhance development and evaluation of options before making a final recommendation.

Recommend options that address firm growth and consider potential growth to meet needs and ensure we can act quickly in the future when higher growth materializes.

Screening of Options

1. Type of Need	2. Need Traits	3. Additional Considerations
Evaluate the compatibility of the need with the various option types, based on technical requirements and permissibility under planning standards and criteria.	Further filter compatible options with high-level need traits (such as timing, size, and coincidence with system needs).	Take into account local factors that may require further analysis of non-wire alternatives, even if earlier steps haven't identified non-wires alternatives as suitable.

Non-Wires Alternatives (NWA) - Options Screening

Following the IESO's Guide to Assessing Non-Wires Alternatives, the following NWAs were screened-in:

- Battery Energy Storage Systems (BESS) (in combination with solar and on-shore wind)
- Biomass Generation

As a next step, the IESO will **evaluate the screened-in NWAs** listed above for economic feasibility to meet the reference demand forecast with supply.

Transmission Wires - Options Screening

Transmission wires options were screened-in as a potential option to meet the needs. To accommodate the forecasted needs in the North of Dryden sub-region, **three main transmission options** are being considered based on past study experience, Hydro One's analysis and feedback from communities (see Appendix for more details):

Option 1:

- 230 kV transmission line from Dryden to Ear Falls
- 115 kV transmission line from Ear Falls to Red Lake
- 230 kV transmission line from Ear Falls to Pickle Lake
- 230 kV transmission line from Dinorwic Junction to Pickle Lake (parallel to W54W)

Option 2:

- 230 kV transmission line from Dryden to Ear Falls
- 115 kV transmission line from Ear Falls to Red Lake
- 230 kV transmission line from Ear Falls to Pickle Lake

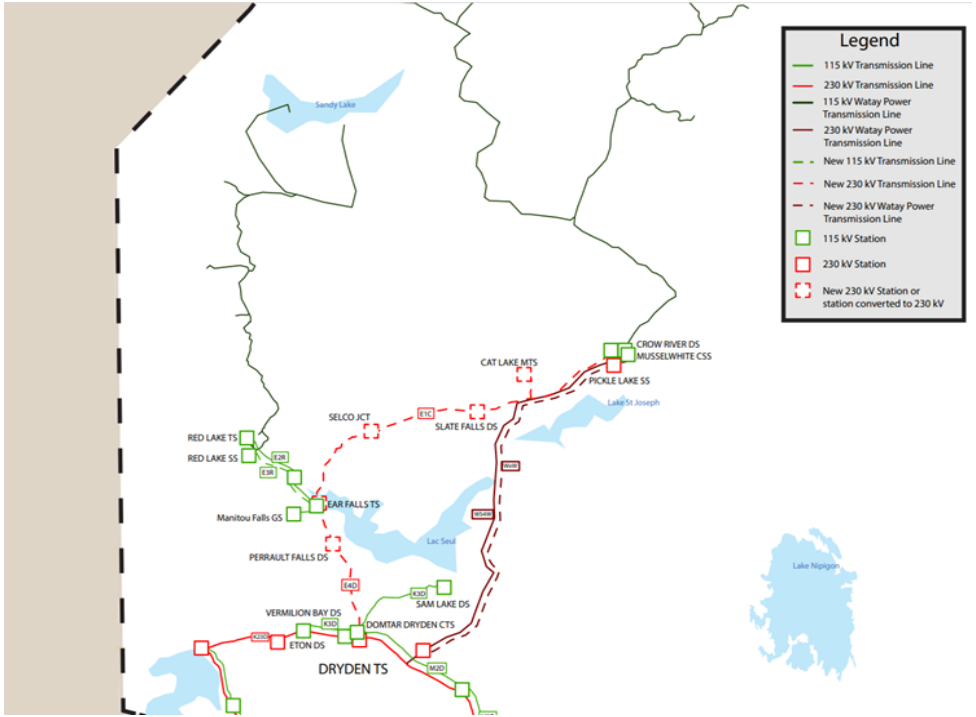
Option 3:

- 230 kV transmission line from Dryden to Ear Falls
- 230 kV transmission line from Ear Falls to Red Lake

Transmission Wires - Options Screening (Cont'd)

Option 1:

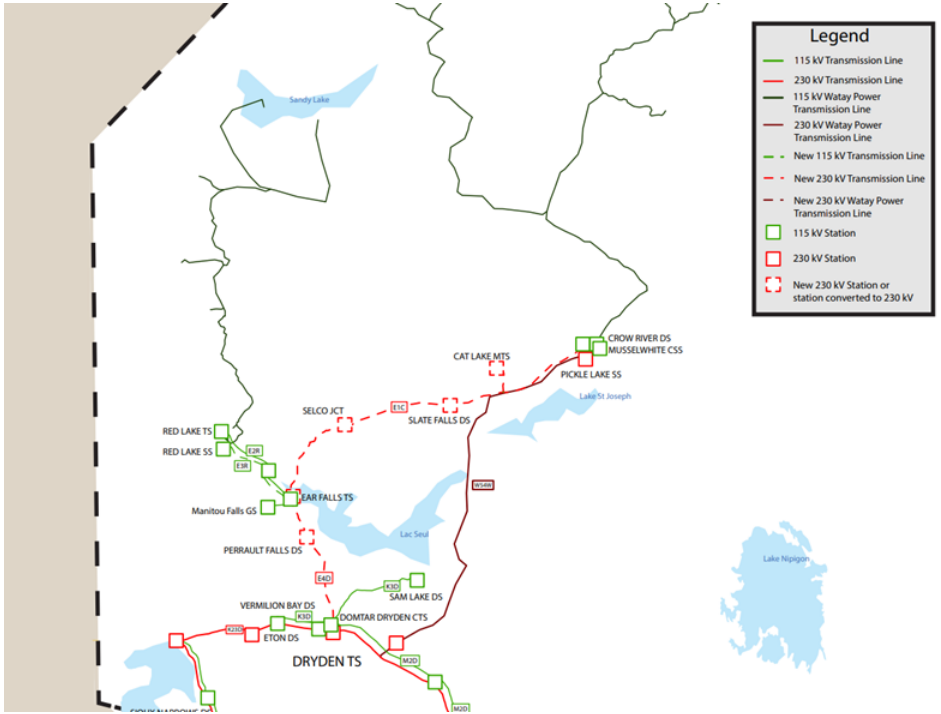
- 230 kV transmission line from Dryden to Ear Falls
- 115 kV transmission line from Ear Falls to Red Lake
- 230 kV transmission line from Ear Falls to Pickle Lake
- 230 kV transmission line from Dinorwic Junction to Pickle Lake (parallel to W54W)



Transmission Wires - Options Screening (Cont'd)

Option 2:

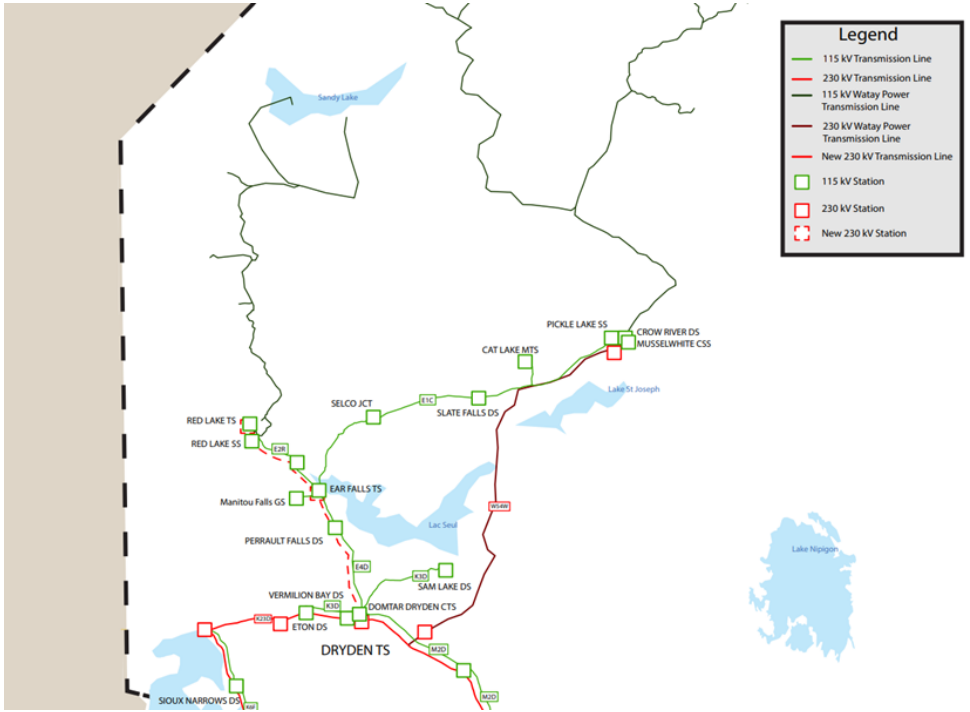
- 230 kV transmission line from Dryden to Ear Falls
- 115 kV transmission line from Ear Falls to Red Lake
- 230 kV transmission line from Ear Falls to Pickle Lake



Transmission Wires - Options Screening (Cont'd)

Option 3:

- 230 kV transmission line from Dryden to Ear Falls
- 230 kV transmission line from Ear Falls to Red Lake



Next Steps

Ongoing Engagement

Your input plays an important role in developing the electricity plan.

Participate in upcoming public webinars

Subscribe to receive updates on the IESO website by selecting the Northwest Region

Follow the Northwest regional planning activities online and the North of Dryden Engagement online

Next Steps

The IESO will continue to engage and inform throughout the Addendum's development. Communities and stakeholders can expect to hear from the IESO at these milestones:

May 7, 2025: Demand forecasts, needs and potential options presented in a public engagement webinar with an opportunity to provide feedback.

May 21, 2025: Deadline for feedback to the IESO on forecasts, needs and potential options.

Q3 2025: Options analysis and draft recommendations will be presented in a public engagement webinar with an opportunity to provide feedback.

August 2025: Addendum Study will be completed and published on the North of Dryden Engagement webpage. Next steps for wires solutions, the transmitter will lead the development of a Regional Infrastructure Plan, which assesses and develops a detailed plan on how wires options can be implemented. For any non-wire solutions, implementation mechanisms for new resources and eDSM programs will be determined following plan publication.

IESO welcomes written feedback until May 21, 2025. Please submit feedback to: engagement@ieso.ca.

Key Takeaways

- The purpose of the North of Dryden Addendum is to study the electricity needs in the North of Dryden sub-region, largely comprised of mining and industrial projects between Red Lake, Pickle Lake, and Ear Falls.
- Projects with the highest degree of certainty or likelihood are included in the reference forecast, and projects with less certainty or likelihood of proceeding are categorized in the high and extreme growth forecasts.
- The IESO has screened-in potential non-wires options and wires options that will be evaluated for economic feasibility and further study. Draft recommendations will be shared in Q3 2025.
- Final recommendations will address the needs of the reference forecast but will also allow the IESO to act to address load growth from the high and extreme growth forecast if it materializes.
- The forecast will be further studied in the upcoming Northwest Regional Plan, commencing in mid-2025.

Key Discussion Questions

The following is a list of questions to facilitate the discussion, but is not intended to limit the discussion:

- Perspectives on the electricity demand forecast and needs in the North of Dryden sub-region.
- Perspectives on the non-wires and wires options to meet electricity needs.
- Additional information you need to participate in the planning process.
- Who else we should engage for the Addendum study.

IESO welcomes written feedback until May 21, 2025. Please submit feedback to: engagement@ieso.ca.

Thank You

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Appendix

Electricity Planning in Northwest Ontario

- Since 2015, the IESO has undertaken significant planning work to address capacity needs to the electrical areas in Northwest Ontario.
    - The Northwest Ontario Bulk Planning included two bulk transmission projects: East-West Tie Expansion (came into service in 2022) and the Northwest Bulk Transmission Line (Phase 1 line from Thunder Bay to Atikokan in-service end of 2025 and Phase 2 Atikokan to Dryden in service as soon as possible).
    - The IESO published the Integrated Regional Resource Plan (IRRP) for the Northwest region in 2023 which identified future electricity needs and options to ensure an adequate and reliable supply continues to be provided for customers in Northwest Ontario.
- The Northern Ontario Connection Study was launched in 2024 to evaluate transmission options for enabling connection of remote First Nation Communities and prospective mining developments in remote northwestern Ontario. The final report will be published in 2025.
- Due to emerging growth in the North of Dryden electrical sub-region, the IESO initiated a local electricity study to address emerging supply capacity needs. This study will be published as an Addendum to the Northwest IRRP from 2023 and will further support mining developments, First Nation communities and municipalities in the North of Dryden sub-region, including wires and non-wires options needed to accommodate forecasted and potential growth.

Meeting Electricity Needs

To meet the growing demand in the North, the IESO has been developing electricity plans and evaluating solutions.

Recommended Solutions

- **Four transmission lines in Northwest:** East-West Tie in service 2023, and Waasigan Transmission Line in-service 2025 and 2027
- **Three transmission lines in the Northeast:** Lines in-service dates starting in 2029
- **New equipment to manage voltage across the North:**Equipment in-service between 2025 and 2029
- **New energy-saving retrofit incentives**

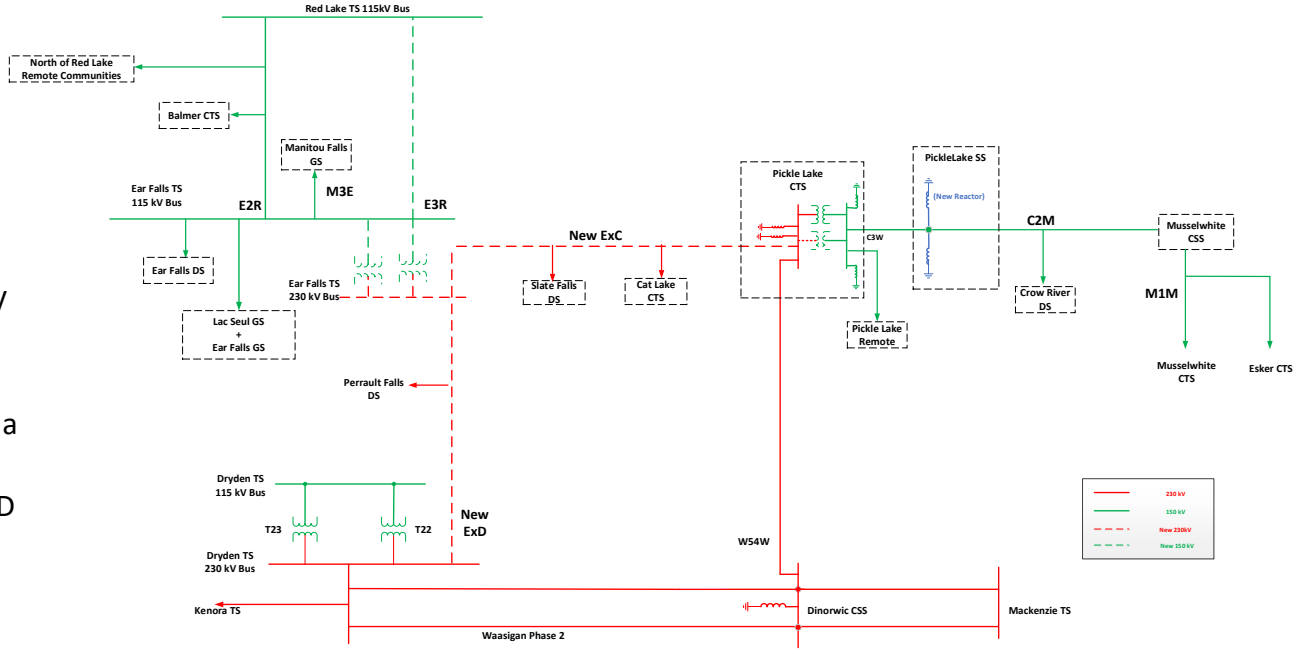
Solution Benefits

- **Accommodating increased electricity demand** and connecting new customers
- **Increasing power transfer capability** between Northeast and Northwest
- **Improving the resilience** of the Northern transmission network
- **Providing the ability for future expansion**

Transmission Option #1

Option 1

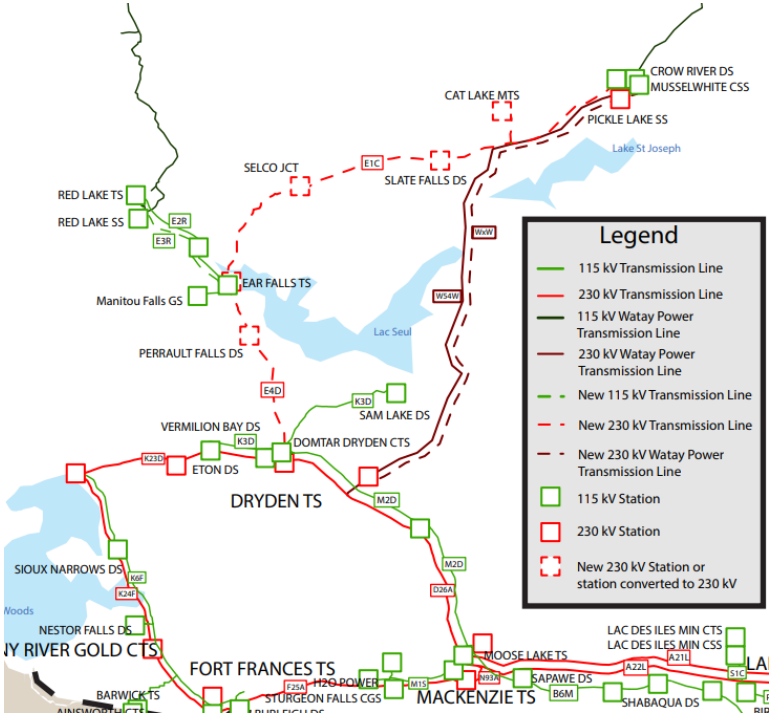
- Build one new 230kV E4D (100km) + one new 230kV E1C (260km) with terminals
- Build one parallel 115kV E2R (66.5km) with terminals
- Install two 230/115kV auto at Ear Falls TS and one 230/115kV auto at Pickle Lake CTS
- Replace Perrault Falls, Cat Lake and Slate Falls step-down with a 230/12.5 or 25kV transformer
- Remove old 115kV E1C and E4D infrastructure.



Transmission Option #1

Option 1

- Build one new WxW 302km 230kV line with 230kV terminations
- Build one new 230kV E4D (100km) with 230kV terminations
- Build one new 230kV E1C (260km) with 230kV terminations
- Build one parallel 115kV E2R (66.5km) with 115kV terminations
- Install two 230/115kV auto at Ear Falls TS and one 230/115kV auto at Pickle Lake CTS
- Replace Perrault Falls, Slate Falls and Cat Lake MTS step-down with a 230/12.5 or 25kV
- Build new Switching station with ring bus at Dinorwic
- Remove old 115kV E4D and E1C infrastructure



Transmission Option #2

Option 2

- Build one new WxW 302km 230kV line with 230kV terminations
- Build one new 230kV E4D (100km) with 230kV terminations
- Build one new 230kV E1C (260km) with 230kV terminations
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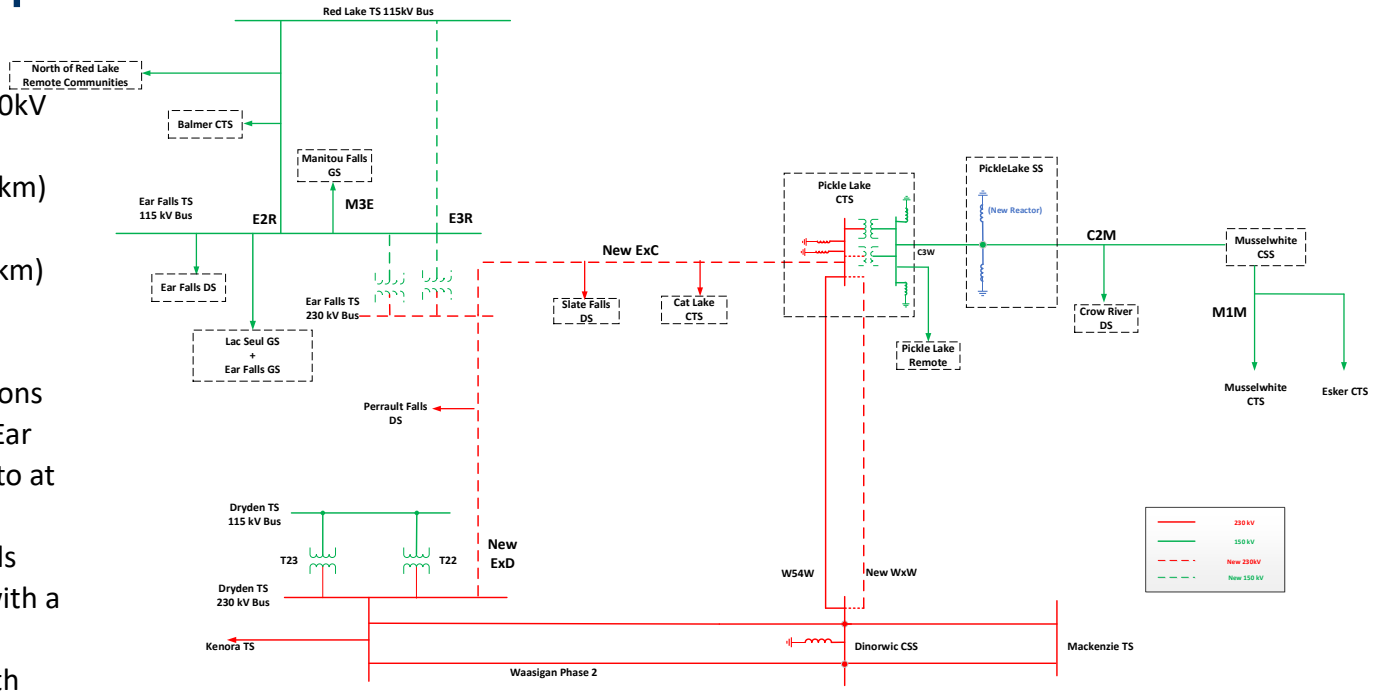
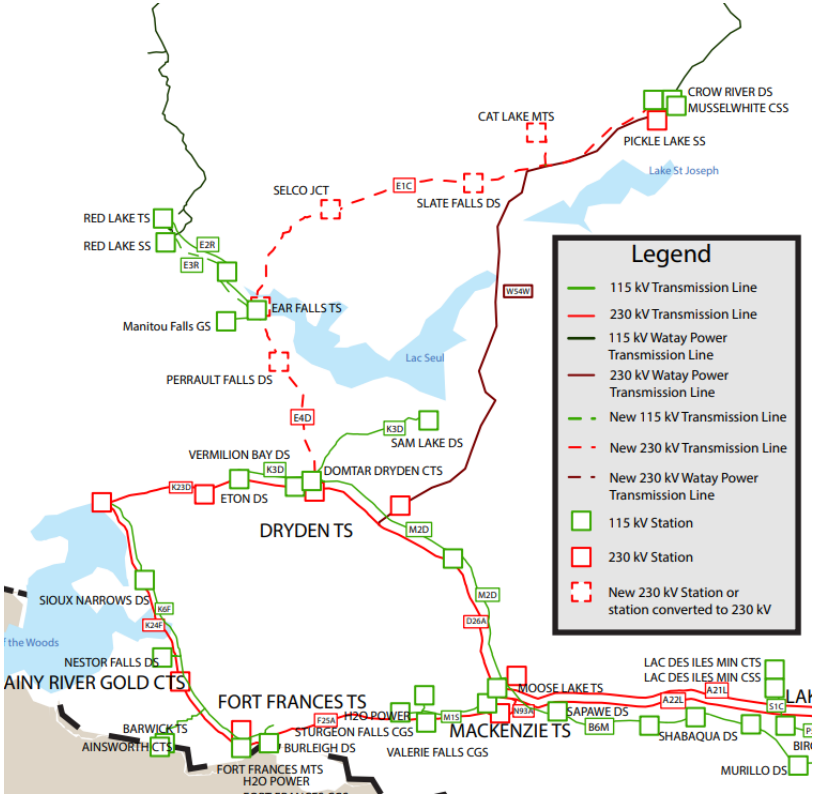


Transmission Option #2

Option 2

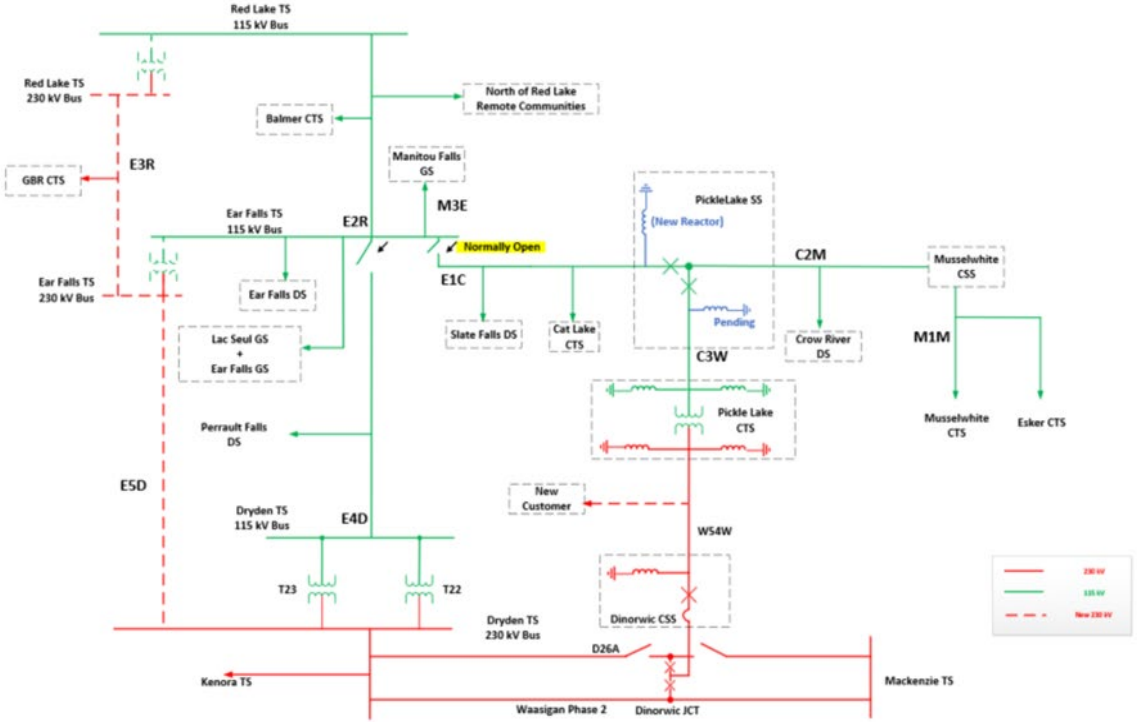
- Build one new 230kV E4D (100km) + one new 230kV E1C (260km) with terminals
- Build one parallel 115kV E2R (66.5km) with terminals
- Install two 230/115kV auto at Ear Falls TS and one 230/115kV auto at Pickle Lake CTS
- Replace Perrault Falls, Cat Lake and Slate Falls step-down with a 230/12.5 or 25kV transformer
- Remove old 115kV E1C and E4D infrastructure.



Transmission Option #3

Option 3

- Build one new 230kV line from Ear Falls TS to Dryden TS (100km)
- Build one new single 230kV line from Ear Falls TS to Red Lake TS (66.5km)
- Install 230/115kV autotransformers at Red Lake TS and Ear Falls TS
- Normally Open 115kV E4D at Ear Falls TS – This configuration is to be utilized as back-up
- After the I/S of Waasigan 230kV D32A (Phase 2 – Anticipated by end of 2027), W54W @ Dinorwic Jct to tap onto the D32A circuit



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