APRIL 17 2025

Independent Electricity System Operator Northern Ontario Connection Study

Webinar #1 – Draft Technical and Economic Option Analysis

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Territory Acknowledgement

The IESO acknowledges the land we are conducting today's meeting 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.

Purpose

The purpose of this webinar is to:

1. Provide an update on the technical and economic findings of the draft Northern Ontario Connection Study
2. Gather insights and feedback from your community
3. Share study timelines and next steps

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We work with:

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

<<< **Communities** >>>

Northern Ontario Connection Study

Objectives and Overview

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- The objective of the Northern Ontario Connection Study (NOCS) is to:
  1. Evaluate transmission options to connect off-grid First Nation communities (and improve supply to those already connected)
  2. Enable the development of critical minerals, and facilitate connection of new renewable and hydro resources in the area within Northern Ontario

- Gather insights and feedback on the completed technical and economic evaluation of transmission connection options. Assessments show that the cost of transmission is less than the cost of continuing to serve off-grid communities with diesel. In addition, it will bring other benefits including economic development and facilitating connection of supply resources

Objectives and Overview

- The transmission option that best serves the region, balancing costs, ability to serve load and other benefits is the North-South option, which would bring a connection northward from the existing East-West Tie. Benefits of this option include:
  - When built as a 230 kV line, would meet the needs of the region until 2050 under extreme demand forecasts for community growth and mining development.
  - Improves the reliability of supply in the Greenstone area and aligns with the "Greenstone Region Supply Reinforcement Business Case", a transmission plan that was submitted to the IESO as formal input from Minodahmun Development LP
  - Facilitates connection of new resources including hydro-electric resources (Little Jack Fish and Upper Albany-Attawapiskat river area) through reduced connection costs and providing transfer capability of power to the main transmission network
  - Is compatible with other options, such as development of the Timmins option (running east-west from Hwy 11) should additional reinforcements be required in the future
  - Makes use of transportation corridors

Technical Findings and Transmission Assessment

Draft Technical Findings

1. The demand of the First Nation communities in the area totals 11 MW today. The total demand forecast for the Northern Ontario Connection Study ranges from 50 MW (reference scenario) to 500 MW (extreme scenario) by year 2050. The wide range is driven by the uncertainty of mining development in the North.
2. The study has focused on four primary transmission options. Three of these options have been studied over the years which include transmission lines from Pickle Lake, East-West Tie Corridor, and Attawapiskat. Through engagement with First Nation communities, the IESO studied a fourth option from Timmins which travels along the Highway 11.

Draft Technical Findings

3. Each transmission option explored 115 kV and 230 kV voltages (except the Hwy 11 option from Timmins due to existing infrastructure) and the total distance of circuit required from the point of connection to the existing network in each community.

4. The best performing option is the North-South option with a connection from the East-West Tie. This option balances cost with ability to meet load and facilitate connection of supply resources. When built to 230 kV this option would serve all forecast demand in the region until 2050. The planning cost estimate for this option is ~ $4.5 B.

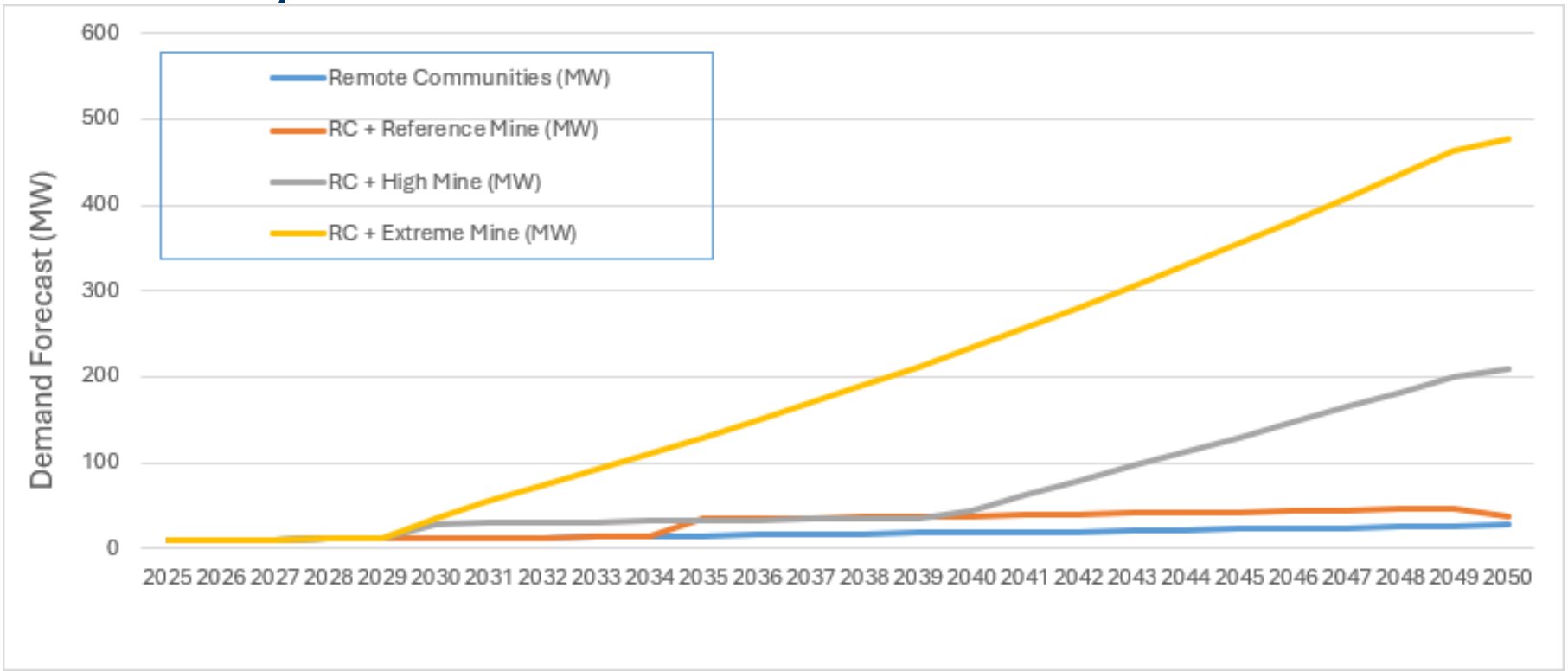
Draft Technical Findings

5. This transmission cost estimate includes the cost of connecting 9 First Nation communities:

- The 5 Matawa nations, Webequie First Nation, Nibinamik First Nation, Neskantaga First Nation, Marten Falls First Nation and Eabametoong First Nation
- The 4 communities of Whitesand First Nation, Kiashke Zaaging Anishinaabek (Gull Bay First Nation), Fort Severn First Nation and Weenusk First Nation, which were deemed uneconomic to connect in 2014

6. While the cost of transmission is high, the avoided cost of continuing to serve the Matawa communities and the other 4 communities of Whitesand First Nation, Kiashke Zaaging Anishinaabek (Gull Bay First Nation), Fort Severn First Nation and Weenusk First Nation with diesel is estimated to be comparably high (~$5 B).

Electricity Demand Forecast

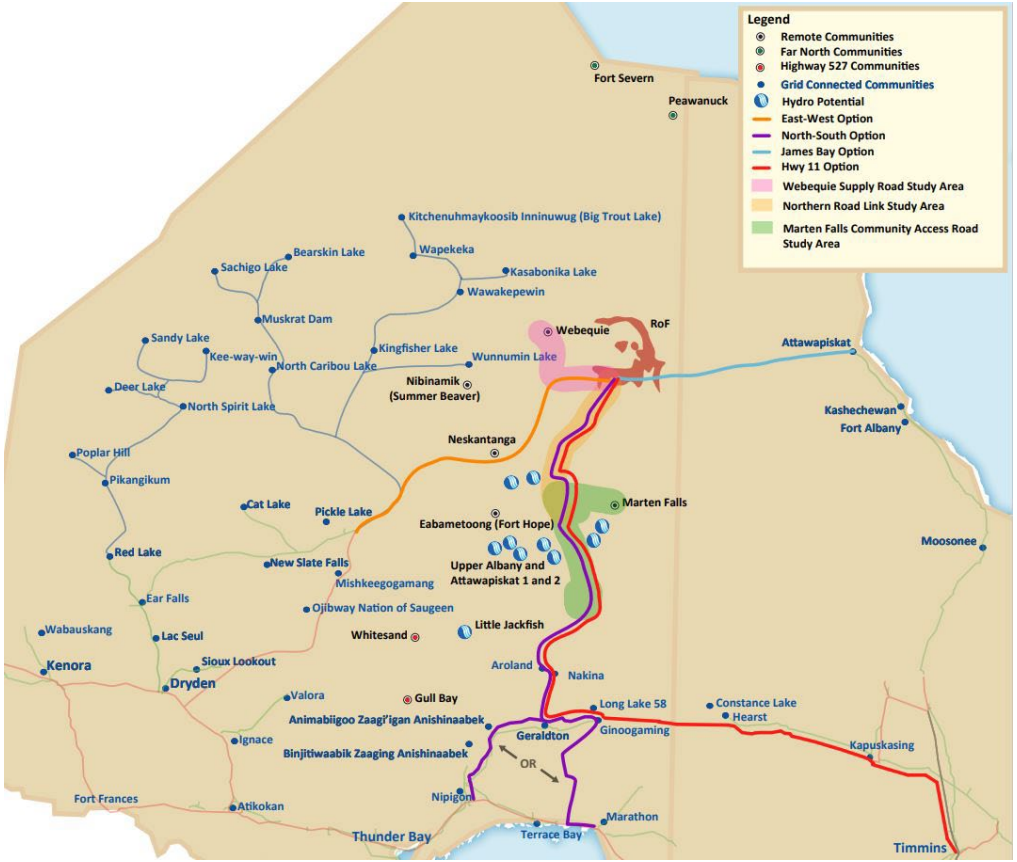


Transmission Assessment

The transmission assessment evaluated four general transmission routes which include:

1. Tx line from Pickle Lake (East-West)
2. Tx line from East-West Tie Corridor (North-South)
3. Tx line from Attawapiskat (James Bay)
4. Tx line from Timmins (Highway 11)

Alternate connection routes within general transmission line options were evaluated to accommodate additional loads and enhance reliability (i.e. Nipigon area vs Marathon area)



Transmission Assessment

The transmission route that best serves the region is the North-South route, built as a double circuit 230 kV transmission line connecting to the existing East-West Tie Line near Nipigon Bay:

- Meets the needs of the region until 2050 under extreme demand forecasts for community growth and mining development
- Improves the reliability and capacity in the Greenstone area
- Enables connection of new hydro-electric resources (Little Jack Fish and Upper Albany-Attawapiskat river area)
- Is compatible with other options, such as development of the Timmins option (running east-west from Hwy 11).
- Makes use of existing right-of-way and transportation corridors

Assessment Summary

The following summary outlines the most feasible transmission options out of all the options that were assessed:

Transmission Option	Load meeting capacity (MW)	Matawa Communities ($CAD in Millions)	Hwy 527 Communities ($CAD in Millions)*	Far North Communities ($CAD in Millions)*	Total Estimated Cost ($CAD in Millions)
North-South double circuit 230kV	550	3,345	421	735	4,501
Hwy11-Timmins double circuit 230kV	550	4,476	463	735	5,674
North-South single circuit 230kV	275	2,623	421	735	3,779
Hwy11-Timmins single circuit 230kV	275	3,320	463	735	4,518
East-West 230kV	150	2,130	350	735	3,215

*These costs are contingent upon the implementation of any of the above transmission options

Economic Assessment

The economic assessment is based on a 70-year planning horizon, starting from the expected transmission line in-service year of 2031, with the following objectives:

- Evaluate the cost of status quo option (continued diesel generation)
- Evaluate the cost of non wires alternative (NWA) for all 9 off grid communities
- Compare the cost of NWA with transmission costs

Findings are summarized below:

- The cost of NWA is greater than any of the transmission supply options and the cost of continuing the supply of diesel generation to the Matawa, Highway 527 and Far North communities.
- The estimated cost of diesel over the study time horizon is ~$5.4B.

Study Timelines

Step #	Topic	Expected Timeline
1	Pre-Engagement & Initial Outreach	Q4 2023 - **Completed**
2	Engagement with Communities (Ongoing)	Q1 2024 to Q2 2025
3	Technical Report back to Ministry of Energy & Electrification	Q4 2024 (December) - **Completed**
4	Final Report Published (with community feedback)	TBD

Your feedback is needed:

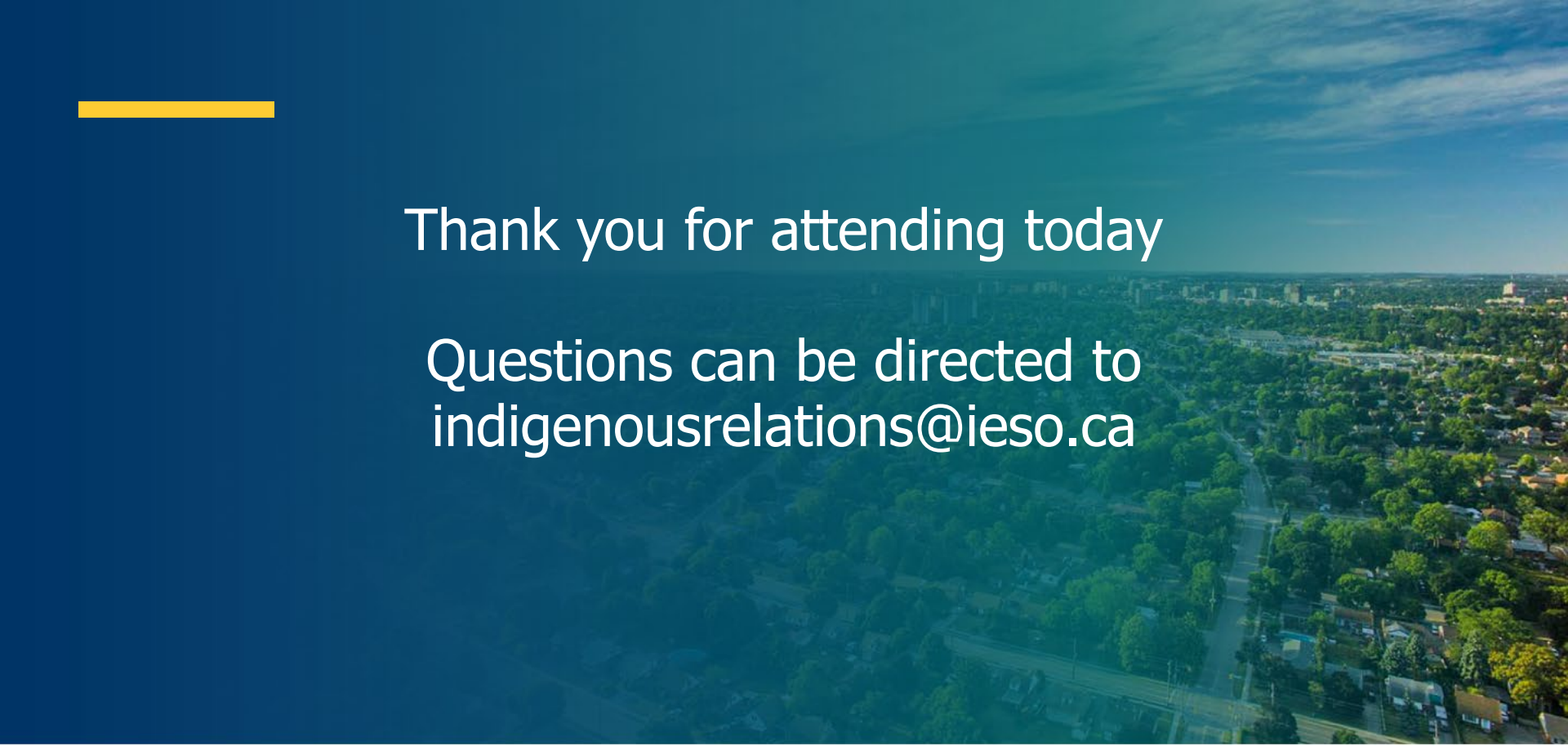
Local considerations and input are a critical component to the development of the Northern Ontario Connection Study.

The IESO wants to hear your perspectives about:

- What other information should be considered in the study scope, examination of the potential options?
- What feedback do you have regarding any of the options proposed?
- What additional information should be provided in future engagements to help understand perspectives and insights?

IESO welcomes written feedback until May 30.

Please submit feedback to indigenousrelations@ieso.ca using feedback form.



Thank you for attending today

Questions can be directed to indigenousrelations@ieso.ca

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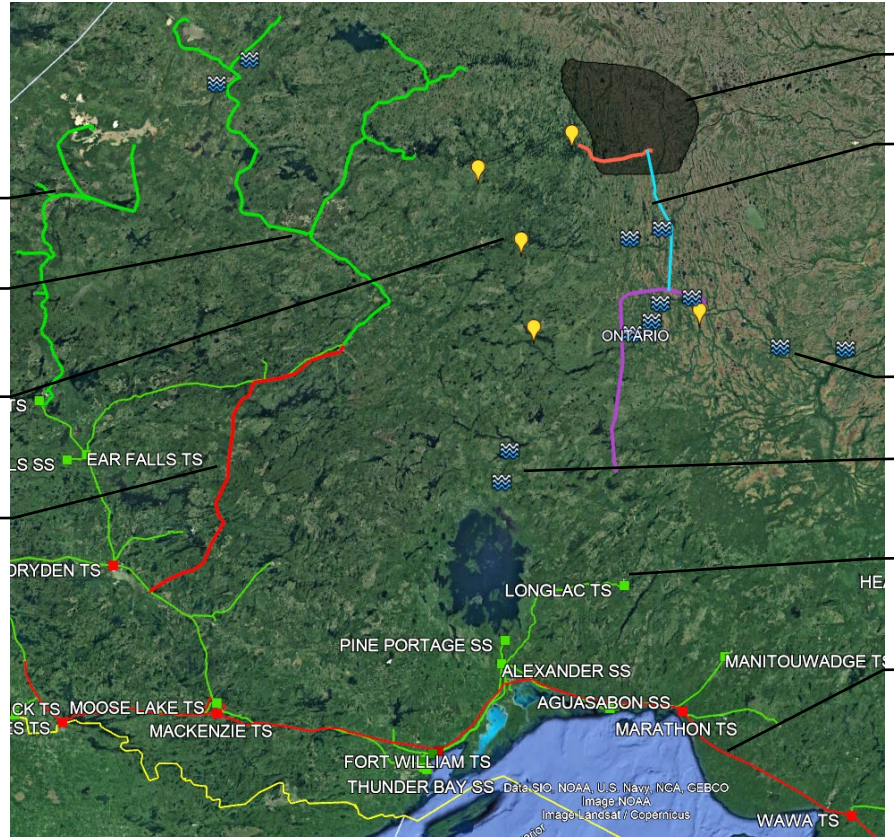
Appendix

Study Scope

- Study covers the time period from 2031-2050
- Builds upon the NW IRRP assessments and co-incident load forecast from the existing NW IRRP forecast and the APO
- The load forecast for Matawa First Nations and industrial loads was incorporated up to year 2050
- Calculates Load Meeting Capability (LMC) and estimated cost for all options being considered

Existing System



115 kV Red Lake Subsystem Remotes

115 kV Pickle Lake Subsystem Remotes

Matawa Remote Communities

230 kV Watay Circuit to Pickle Lake (W54W)

Approximate Ring of Fire Area

Proposed All-season Roads (x3)

Potential Hydro Generation (OPG)

Potential Hydro Generation (OPG)

115 kV Circuit to Longlac TS (A4L)

230 kV East-West Tie Circuits

Legend

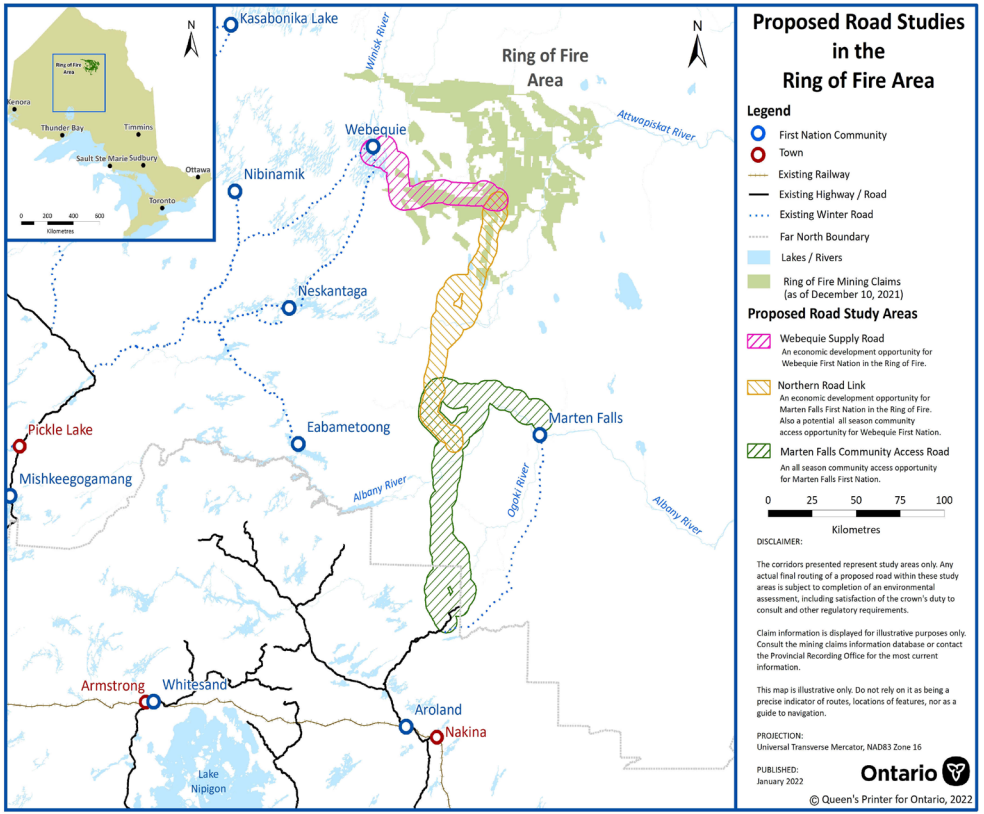
- 230 kV Lines
- 115 kV Lines
- Marten Falls Access Road
- Northern Road Link
- Webequie Supply Road
- Potential Hydro Generation
- Matawa Remote Communities

2014 Remote Connection Plan

- This plan presented options for supplying 21 remote communities in three subsystems, Pickle Lake, Red Lake and Ring of Fire.
- Informed the government's decision to partner with 24 FNs on Wataynikaneyap Power project that supplies communities in Red Lake and Pickle Lake subregions.
- The 2014 plan also presented options for supplying the 5 Matawa communities and industrial load forecasted in the RoF subregion. Forms the foundation for NOCS.
- 4 indigenous communities were deemed uneconomic to connect. Whitesand First Nation, Kiashke Zaaging Anishinaabek (Gull Bay First Nation), Fort Severn First Nation and Weenusk First Nation. Community energy plans were developed for these communities. These communities are being reconsidered in NOCS.

Co-locating with All-Season Roads

- Three proposed roads are being planned, MFCAR, Northern Link Road and Webequie Supply Road
- These roads would provide a continuous all-season access to northern Ontario
- Co-location may help reduce costs and environmental impact



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Remote Off-grid Communities

- Five remote diesel-supplied Matawa First Nations communities could be grid connected from a transmission line to the North:
  - Webequie First Nation, Nibinamik First Nation, Neskantaga First Nation, Marten Falls First Nation, Eabametoong First Nation
- These communities were previously identified as economic to connect in the 2014 Remote Connection Plan
- This study re-evaluated the connection options for the 4 remote communities which were deemed uneconomic to connect in the 2014 Remote Connection Plan. These communities were Whitesand First Nation, Kiashke Zaaging Anishinaabek (Gull Bay First Nation), Fort Severn First Nation and Weenusk First Nation

Break even timeframe

The following table shows the expected timeframe where the cost of transmission breaks even with the cost of supplying via diesel:

Supply Option	Break even year Matawa Communities	Break even year Hwy 527 communities	Break even year Far North Communities
North-South single circuit 230kV	2073	2095	2071
North-South double circuit 230kV	2081	2095	2071
East-West single circuit 230kV	2066	2087	2071
Hwy11-Timmins single circuit 230kV	2081	2100	2071
Hwy11-Timmins double circuit 230kV	2093	2100	2071