



APR 2022

Northwest 2021 Integrated Regional Resource Plan (IRRP)

Engagement Webinar #3

Objectives of Today's Webinar

- To provide an update and seek feedback on:
 - Targeted discussions in Nov 2021 and outcomes
 - Regional electricity system needs based on low, reference, and high demand scenarios and possible options
 - Additional growth sensitivities
- To provide an update on bulk planning activities
- To outline next steps

Seeking Input

As you listen today, please consider the following items to help guide your feedback after today's webinar:

- What other local reliability concerns or growth scenarios in addition to those presented today should be further investigated?
- What are some options or local opportunities that should be considered as we begin options analysis?
- Is the data provided sufficient to enable your participation? What other data or information would you like to see further discussed or shared publically?

**Please submit your written comments by May 16th
using the feedback form by email to engagement@ieso.ca**

IRRP Status & Extension

- The IRRP started in Jan 2021 and is normally an 18 month study scheduled for completion in July 2022
- Activities completed thus far include:
 - Demand forecasting
 - Needs identification studies for low, reference, and high scenarios
 - Two webinars and three focused discussions meetings on customer reliability, local initiatives, and the North of Dryden area
- The IRRP will be extended by 6 months in order to:
 - Allow the recommendations to be aligned with bulk planning activities
 - Allow more time to study additional sensitivities including the Nipigon and Ring of Fire areas given recent connection interest
 - Allow for comprehensive engagement activities as required during upcoming options analysis

Data Sharing

- In order to improve transparency and enable greater stakeholder and community engagement as we begin options analysis, a demand forecast and profiling spreadsheet was posted alongside this presentation
- The data includes 20-year demand forecasts broken down by subsystem and load type as well as hourly load profiles for Kenora MTS where non-wires alternatives are being considered
- Note that the data is provided for informational purposes only based on information currently available to the IESO and subject to change



Summary of Targeted Stakeholder and Community Discussions

Focused Discussions

- Three focused discussions in Nov 2021:
 - Discussion #1: Customer Reliability
 - Discussion #2: Emerging Local Initiatives
 - Discussion #3: North of Dryden Area
- Purpose was to discuss specific topics of interest with stakeholders and communities in more detail than what the general IRRP webinars allow
- The meetings were informative and helped refine the IRRP scope
- The following slides outline some high-level takeaways and actions for the IRRP
- Presentation materials can be found on the IESO [engagement website](#)

Customer Reliability

- Discussions covered a broad range of topics some of which are outside of the typical scope of regional planning and transmission planning standards
- Stakeholders and communities felt that their reliability and power quality is worse than other areas of the province and expressed a desire for comparable performance metrics and standards
- Power quality concerns were expressed – specifically, voltage issues during faults on nearby elements
- Concerns that planned transmission outages are not reflected in performance metrics but nevertheless has a significant impact on customer interruptions
- Frustration due to the limitations of load security/restoration criteria to address concerns about the frequency/duration of their outages
- Stakeholders expressed interest in local generation but cautioned against over dependency on a single resource type

Customer Reliability – Action #1

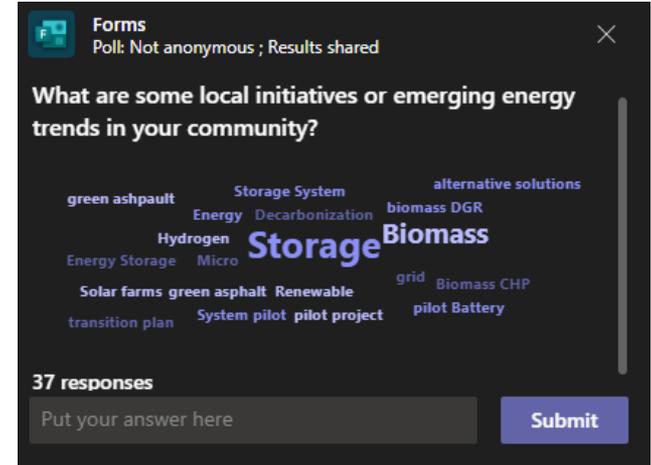
- Regional planning needs are typically based on transmission planning criteria (primarily ORTAC, TPL-001-4, and Directory 1) but they do not cover many issues that were raised by stakeholders and communities
- The Reliability and Power Quality Review (RPQR) is an active OEB policy consultation that seeks to address many of the concerns raised thus far including utility accountability, monitoring performance, customer specific reliability, and utility planning practices
- Feedback received as part of this IRRP was relayed to OEB staff
- Please register on the [OEB's website](#) to be notified of further engagement and next steps

Customer Reliability – Action #2

- Stakeholders and communities asked for historical outage/reliability data on existing transmission facilities
- Hydro One is currently compiling data and evaluating outage statistics against other regions in order to show relative performance trends taking into account different infrastructure builds
- Data and findings will be posted in the coming months

Emerging Local Initiatives

- Although many stakeholders and communities expressed desire for new infrastructure to keep pace with/enable growth, there was also strong interest for local energy solutions; biomass and storage were of particular interest.
- Mining electrification is an emerging trend and is starting to be implemented already. The impact to a mine's overall peak electricity demand is mixed – for example, use of electric trucks in underground mines may decrease peak demand due to reduced ventilation requirements
- **Actions for IRRP:** Monitor mining electrification and update mining forecast in the future. Continue to explore non-wires options where appropriate.



North of Dryden

- Key messages from stakeholders and communities regarding growth were consistent with input received during demand forecasting
- Stakeholders and communities expressed interest in better understanding what system limitations exist today; some also expressed a preference to overbuild/oversize infrastructure to prepare for growth
- **Actions for IRRP:** Study and communicate where supply/capacity limitations might arise (even in the absence of a firm “need” according to our current forecast scenarios); subsystem load meeting capabilities are discussed in today’s webinar

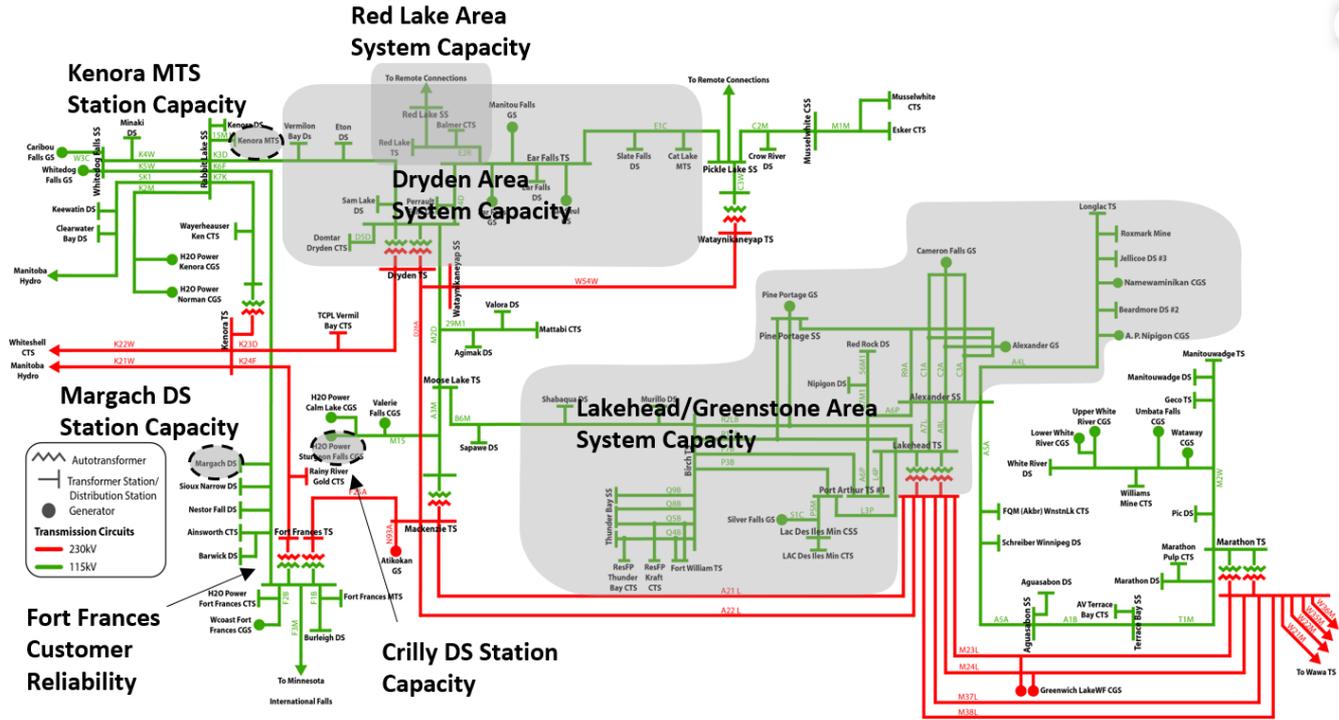


Regional Needs Identification Study Results

Results Summary (1/2)

- The Northwest transmission system is being significantly reinforced with the East-West Tie expansion, Wataynikaneyap Transmission Project, and Waasigan Transmission Project
- The regional Northwest transmission system is generally adequate to support forecast growth
- There are three subsystems that are approaching **system capacity** which will be monitored but no specific actions are required in this IRRP
- There are three **station capacity** needs emerging over the near- to medium-term at Kenora MTS, Margach DS, and Crilly DS that the IRRP will further investigate in options analysis
- The Working Group is also investigating options to incrementally improve **customer reliability** at Fort Frances TS

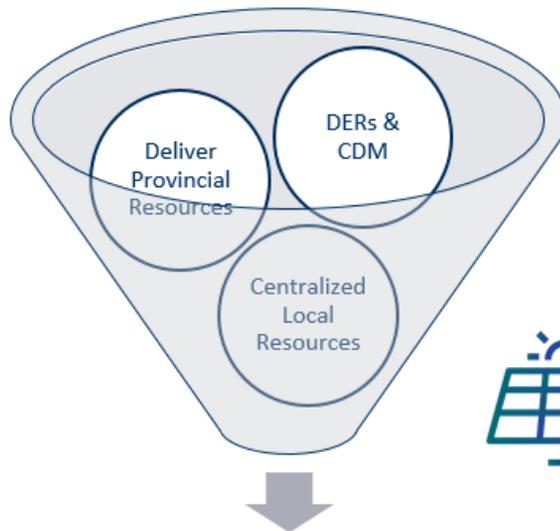
Results Summary (2/2)



Possible Options



Traditional “wires” option to supply the local area with system resources



Recommendations

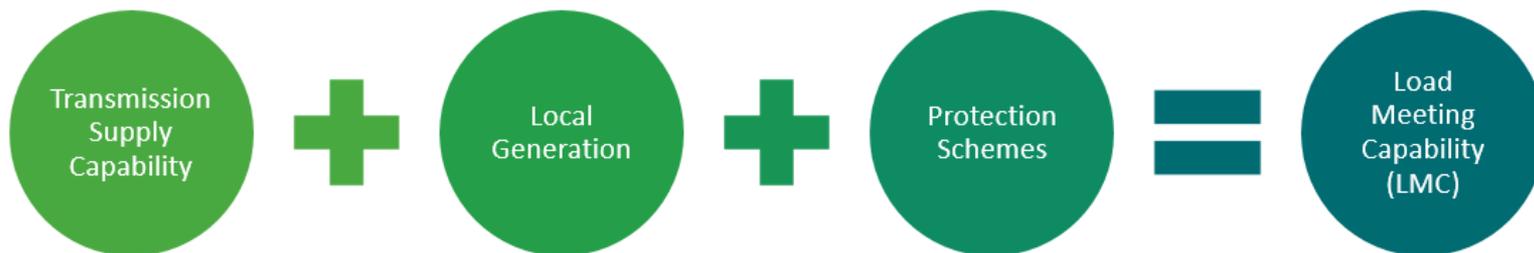


Non-wires alternatives like distributed energy resources (DERs) or conservation & demand management (CDM)



Strategically sited local generation to address transmission infrastructure limitations

How are system capacity needs identified? (1/2)



Power that the transmission system can supply into the subsystem

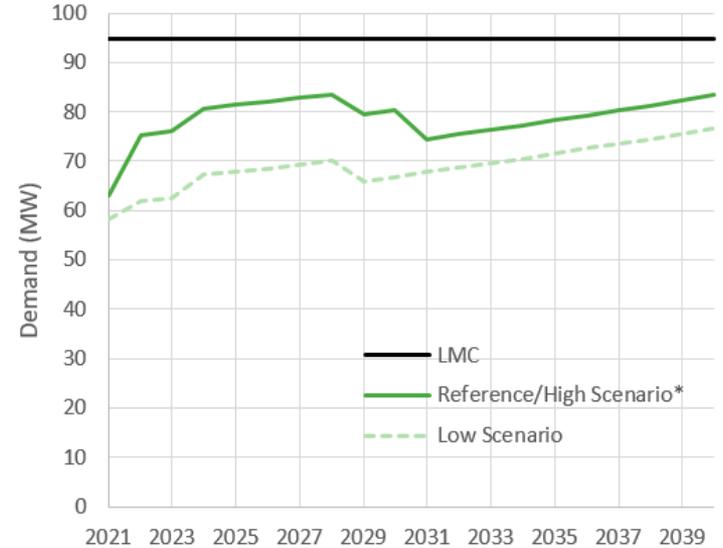
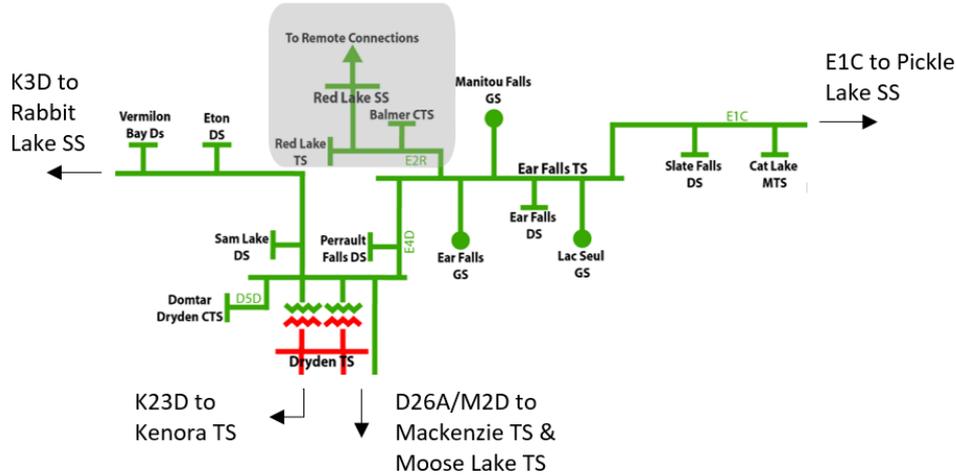
Generation within the subsystem accounting for dependable hydro output and generation outages

If applicable, the impact of existing protection schemes

How are system capacity needs identified?(2/2)

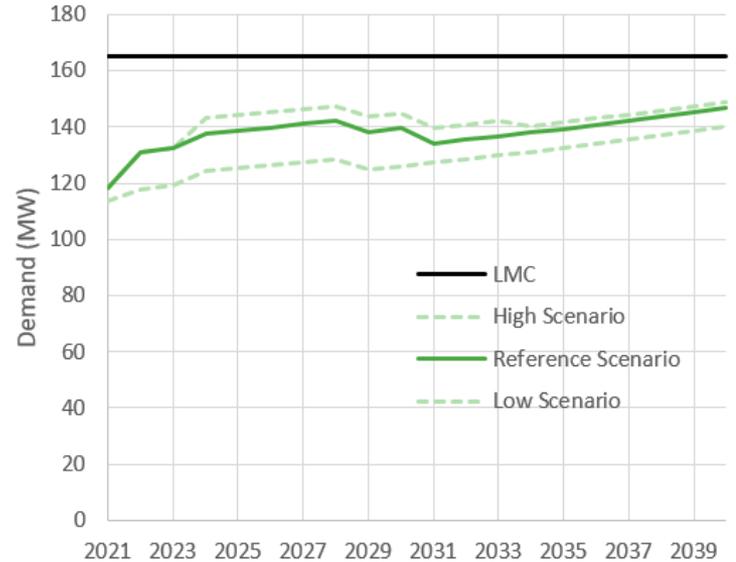
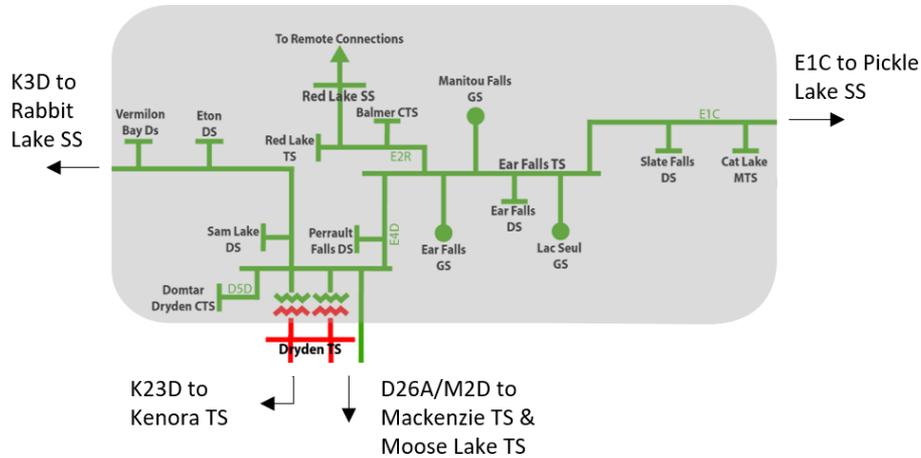
- The load meeting capability (LMC) is compared to the subsystem coincident low, reference, and high forecast scenarios to determine when needs will materialize
- The following slides show the low, reference, and high forecast scenarios graphed against the LMC
- For each of the needs listed, technical details can be found in the Appendix including the:
 - Relevant subsystem/stations
 - Limiting phenomenon
 - Transmission supply capability
 - Local generation capacity
 - Existing and/or permissible protection schemes

System Capacity - Red Lake Area

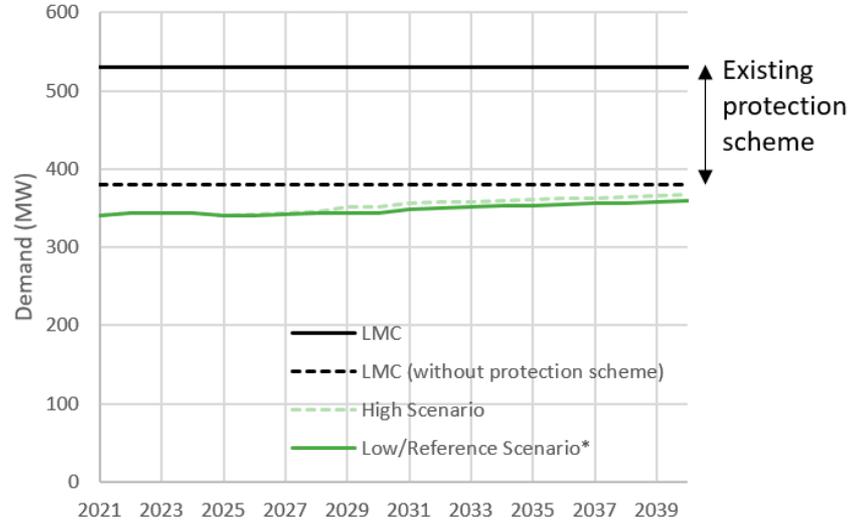
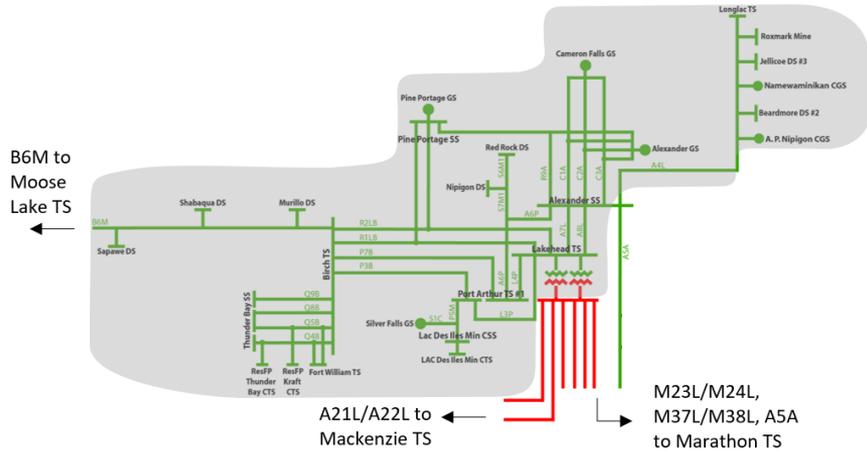


*Ref/high scenario are the same for this subsystem

System Capacity - Dryden Area



System Capacity - Thunder Bay + Greenstone Area



*Ref/low scenario are the same for this subsystem

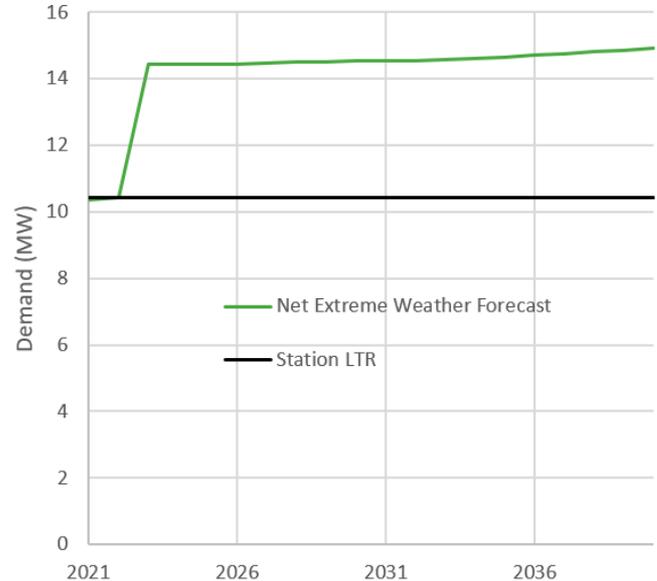
Station Capacity Needs

- There are several stations reaching their step-down capacity within the forecast horizon:

Station	Need Date	Notes
Sapawe DS and Sam Lake DS	Today	Needs Assessment recommended local planning between the transmitter and distributor, no further actions required for this IRRP
White Dog DS Marathon DS	2032 2038	Long-term need date, no further actions required for this IRRP but growth will be monitored
Margach DS	2023	For discussion today
Crilly DS	2027	For discussion today
Kenora MTS	2029	For discussion today

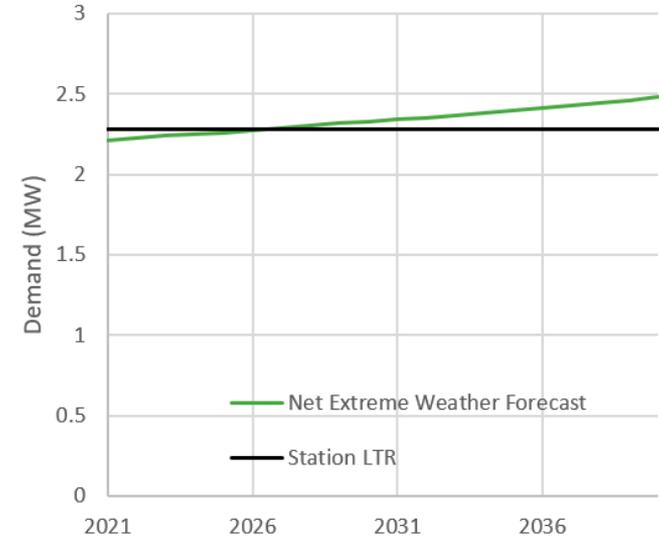
Station Capacity: Margach DS

- 10.4 MW station nearing capacity today
- Capacity need is driven by an industrial customer seeking to be resupplied at this station around 2023 – there is a high degree of uncertainty on when this will occur
- Due to the relative magnitude of the demand increase, non-wires alternatives are unlikely to be feasible and Hydro One Distribution will investigate wires option to increase station capacity if demand materializes



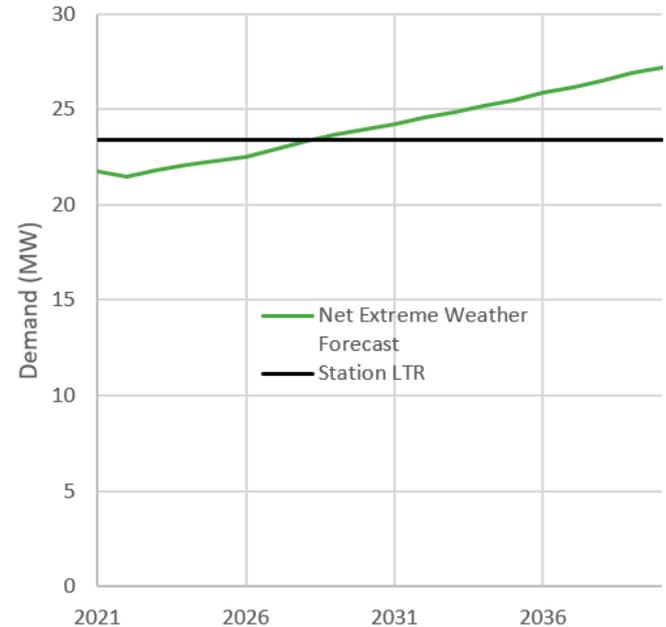
Station Capacity: Crilly DS

- 2.2 MW station; no specific growth drivers but is projected to reach capacity in 2027
- Station is currently served from Sturgeon Falls CGS bus which results in annual outages when the generator is undergoing maintenance
- Station equipment is nearing end-of-life and space constraints prevent additional supply points
- Non-wires options may be limited due to the small pool of customers (~500), the remote nature of the load, and limited data connectivity
- IESO and Hydro One Distribution will investigate options for increasing station capacity



Station Capacity: Kenora MTS

- Kenora MTS is expected to reach capacity around 2029 and may be a good candidate for non-wires options
- The IESO and Synergy North will collaborate to explore non-wires options that may include elements like conservation and demand management, demand response, and other distributed energy resources
- Synergy North will also be evaluating the 'wires' option including expanding the existing station or constructing a new station on the opposite side of the city

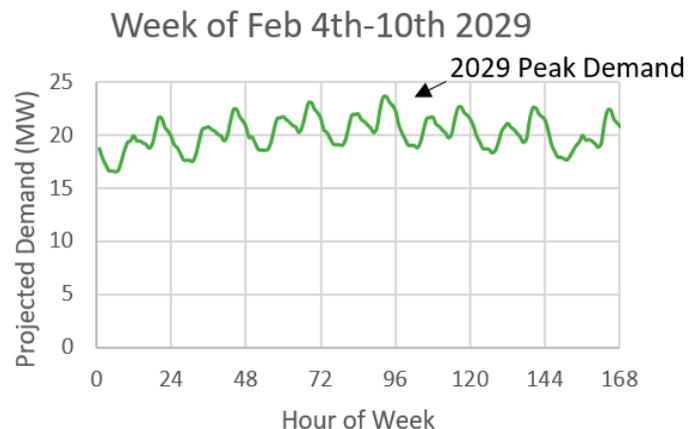
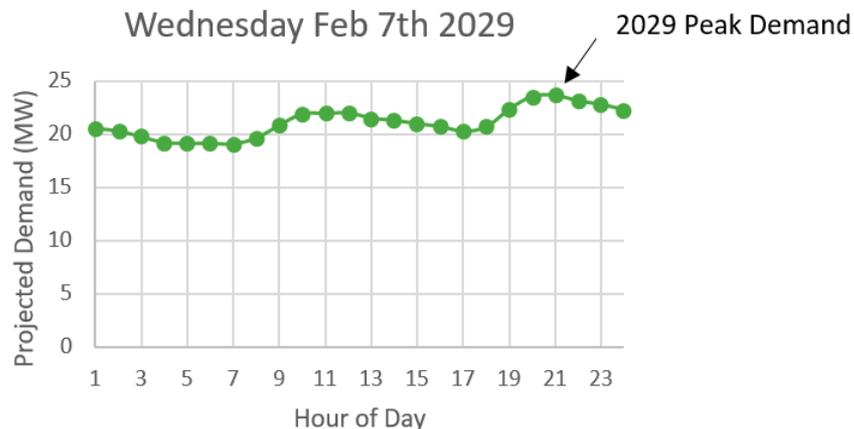


Kenora MTS Load Profiling

- Evaluating non-wires options requires more detail than an annual peak forecast
- 20-year hourly load profiles are used to determine the frequency, duration, and magnitude of the need in each year
- The energy-not-served profile – i.e. the amount of forecast demand in each hour above station capacity – determines the technology types and sizing of non-wires options
- A large number (~460) of hourly demand profiles are created to capture a range of possible demand profile shapes by varying explanatory factors like weather and calendar variables
- From this range of profiles, three are selected for further analysis corresponding to the 3rd, 50th, and 97th percentile annual energy

Kenora MTS Load Profiling Sample Plots

- Sample plots from 2029:



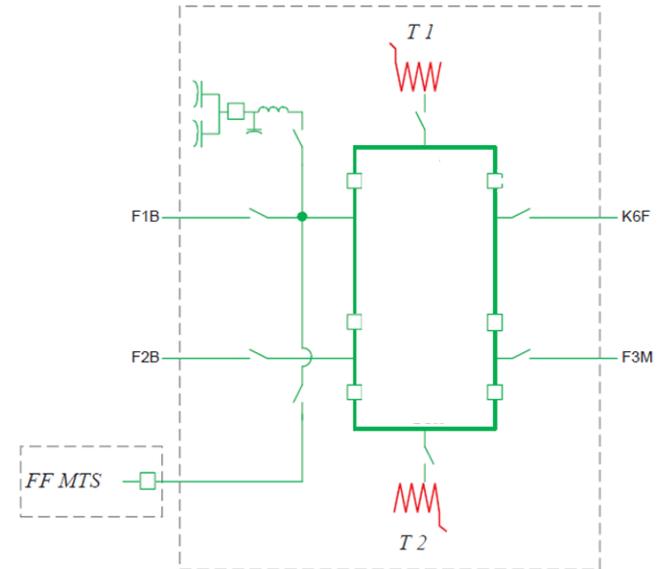
The 3rd, 50th, and 97th percentile annual energy profiles have been posted alongside this presentation.

Station Capacity Needs: Feedback & Next Steps

- Please comment or submit written feedback regarding:
 - Input on the demand forecast and/or load profiles
 - Local initiatives, trends, or opportunities
 - Specific options that should be considered

Customer Reliability: Fort Frances TS Configuration

- Fort Frances TS is configured in a manner that would result in Fort Frances MTS supply interruptions during select transmission outages
- The working group determined that the outages can be best mitigated by configuration changes at Fort Frances TS while also maintain future supply options given the recent connection interest at Fort Frances MTS
- Hydro One Transmission has proposed several configuration options and Fort Frances Power will evaluate and report back





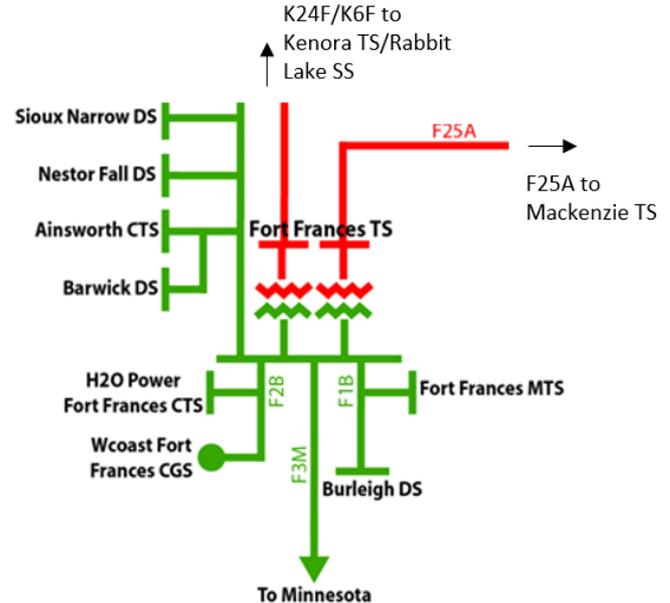
Additional Sensitivities

High Growth Sensitivities

- The IRRP evaluated two high growth sensitivities (on top of high forecast scenario):
 1. Thunder Bay area high electric vehicle adoption sensitivity
 - Preliminary analysis by Synergy North showed that EV adoption in line with the 2020 IESO Annual Planning Outlook would not result in a significant change to their forecast
 2. Fort Frances area high industrial growth sensitivity
 - IESO has received a 100 MW connection application in the area and Fort Frances Power has receive inquires totalling another ~110 MW
 - This totals 210 MW above the IRRP forecast but the likelihood of all or some of this load materializing is unknown

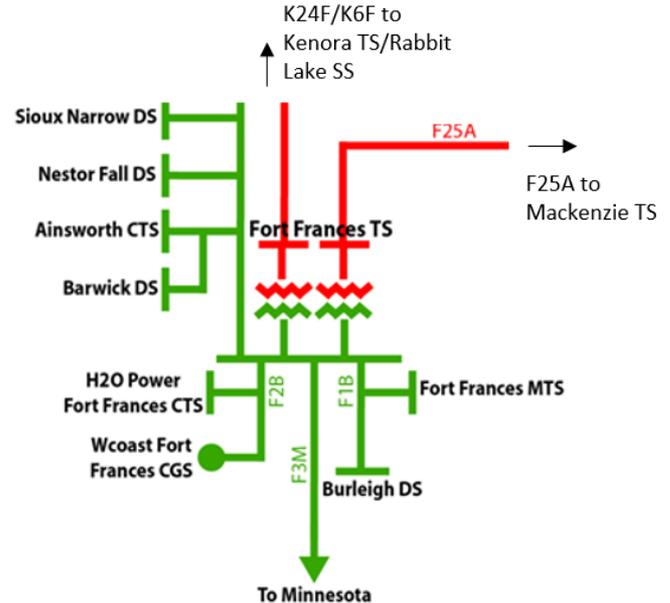
Fort Frances High Sensitivity – Results

- Starting from the IRRP high demand scenario case, a large new load directly on the Fort Frances 115 kV bus was simulated to quantify how much growth can be accommodated on the 115 kV subsystem
- The Fort Frances 115kV bus can accommodate approximately 55 MW of additional load due to bulk system limitations (voltage decline at Dinorwic Junction on D26A) and 60 MW due to local limitations (voltage change violations at Fort Frances 115kV bus)



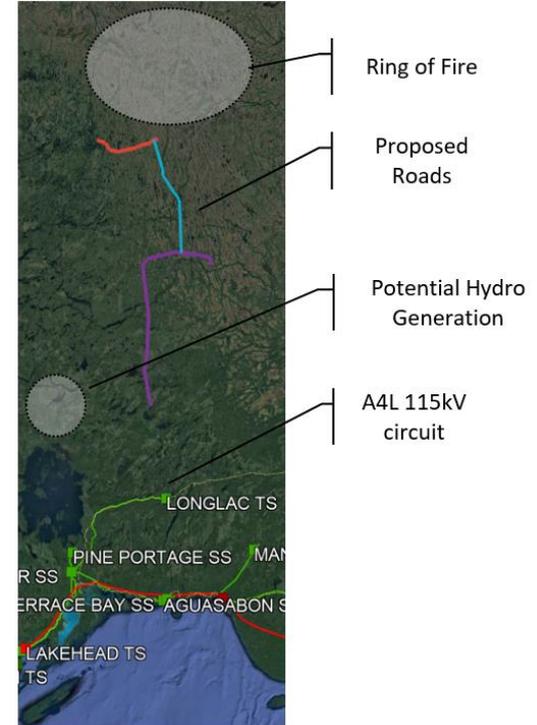
Fort Frances High Sensitivity – Limitations

- This is a rough estimate and many factors can change the result once details about the load and connection arrangement are known
- The IRRP will not perform options analysis nor make firm recommendations at this time



Nipigon Area & Ring of Fire

- The Nipigon and Ring of Fire areas are very active:
 - Proposed mining development in the Ring of Fire
 - Renewed connection interest on A4L totaling ~20MW
 - Three proposed roads (Marten Falls Community Access Road, Northern Road Link, and Webequie Supply Road)
 - Potential new hydro generation north of Lake Nipigon
 - Five remote communities previously identified in the 2014 Remote Community Connection Plan as economic to connect
 - A4L refurbishment is underway and distance-to-fault relays have been installed to improve restoration times



Nipigon Area & Ring of Fire Sensitivity

- The 2015 North of Dryden IRRP and Greenstone-Marathon IRRP both studied connection options for the Ring of Fire
- While there are new developments above since 2015, there are no firm forecast demand commitments
- This IRRP will refresh the analysis for the Ring of Fire connection and highlight opportunities for alignment and integration with the potential activities in the area
- This analysis can help inform government policy and potential customers seeking connection in the area



Bulk Planning Update

Northeast Bulk Plan

- Electricity demand from the mining and mineral processing sectors in the northeast is forecasted to increase, driven by decarbonization policies
- The Northeast Bulk Plan explores options to ensure a reliable electricity supply to meet forecast growth and improve deliverability of existing generation resources in the north



Northeast Bulk Plan – Upcoming Webinar

- Northeast Bulk Plan is expected to be complete by Q3 2022
- Engagement activities are ongoing; the next public webinar is tomorrow **April 26th at 1 PM**
- For more information and to register for the webinar, please visit the [Northeast bulk planning engagement website](#)

Waasigan Transmission Project: Background

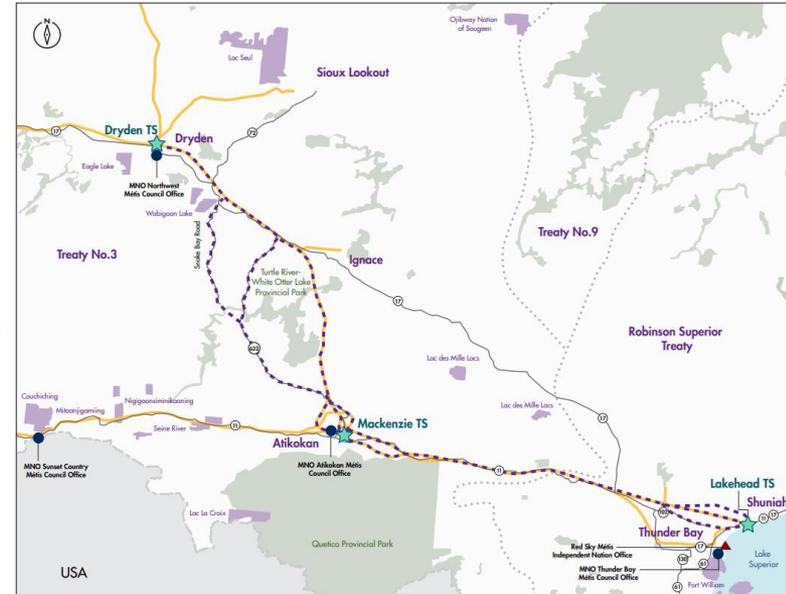
- The Waasigan Transmission Line was identified in the 2013 Long Term Energy Plan as a priority project in order to:
 - Increase electricity supply to the region west of Thunder Bay;
 - Provide a means for new customers and growing loads to be served with clean and renewable sources that comprise Ontario's supply mix; and,
 - Enhance the potential for development and connection of renewable energy facilities.



WAASIGAN TRANSMISSION LINE

Map Legend

- ★ Existing Transformer Station (TS)
- - - Alternative Routes
- Existing Transmission Line
- Highway
- - - International Border
- ▲ Red Sky Métis Independent Nation Office
- Métis Nation of Ontario (MNO) Council Office
- ⋯ Treaty Boundary
- First Nation Reserve
- Provincial Park



Waasigan Transmission Project: Development Work

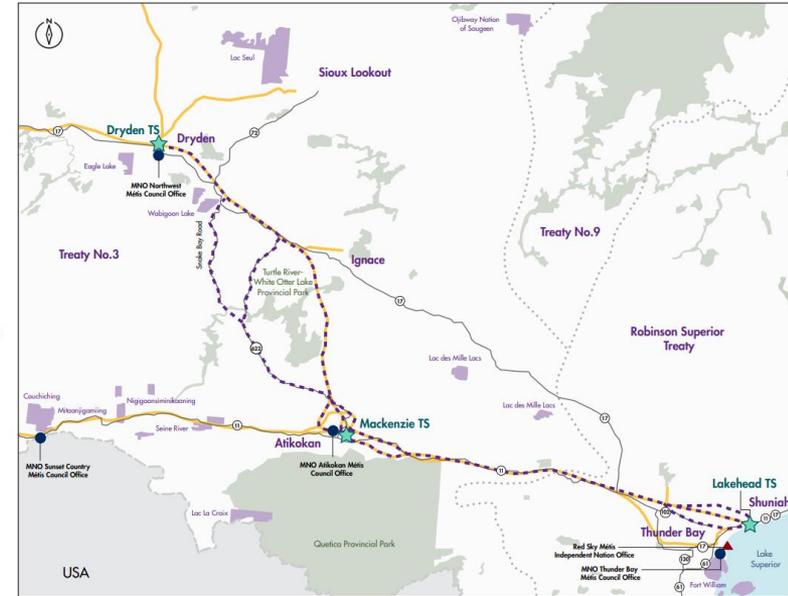
- In accordance with the Long Term Energy Plan and subsequent Order in Council, the IESO recommended that Hydro One commence development work on Phase 1 (Thunder Bay to Atikokan) and Phase 2 (Atikokan to Dryden) in 2018
- The staging of the Project and trigger for construction are based on the timing of the system capacity need
- The IESO regularly refreshes the demand forecast including consideration of stakeholder feedback from the Northwest IRRP



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Waasigan Transmission Project: Staging & Construction

- Given the timing of the needs, the range of possible growth scenarios, and the lead time for implementing solutions, the IESO recommends a staged approach for construction
- Hydro One should construct the Project to meet near-term system capacity needs with Phase 1 being placed in-service as close to the end of 2025 as possible
 - The IESO will continue to monitor developments in the Region and provide the targeted in-service date for Phase 2



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Waasigan Transmission Line – Community Open Houses

Hydro One is hosting in-person and virtual community open houses

In Person:

- May 3, 2022 – Dryden 5:30 p.m. – 7:30 p.m. (CDT)
- May 4, 2022 – Atikokan 5:30 p.m. – 7:30 p.m. (CDT)
- May 5, 2022 – Thunder Bay 5:30 p.m. – 7:30 p.m. (EDT)

Virtual session:

- May 18, 2022 7:00 p.m. – 8:00 p.m. (EDT)

Visit **[HydroOne.com/Waasigan](https://hydroone.com/Waasigan)** for more details



Next Steps

Upcoming IRRP Study Work

- The working group will conduct options analysis and study additional sensitivities over the next few months:

Item	Lead
Options for Margach DS and Crilly DS station capacity needs	Hydro One Dx
Fort Frances TS arrangement and future supply options for Fort Frances MTS	Fort Frances Power, Hydro One Tx
Non-wires alternatives for Kenora TS supply capacity need	IESO, Synergy North
Greenstone/Ring of Fire Supply Sensitivity	IESO, Hydro One Tx

Feedback on...

- What other local reliability concerns or growth scenarios in addition to those presented today should be further investigated?
- What are some options or local opportunities that should be considered as we begin options analysis?
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Keeping in Touch

- **Subscribe** to receive updates for Northwest regional planning on the IESO website – www.ieso.ca/subscribe; select 'Northwest'
- **Follow** the Northwest regional planning activities on the dedicated [engagement webpage](#)
- **Join** the Northwest Regional Electricity Network - [Community Engagement \(ieso.ca\)](#)

Thank You

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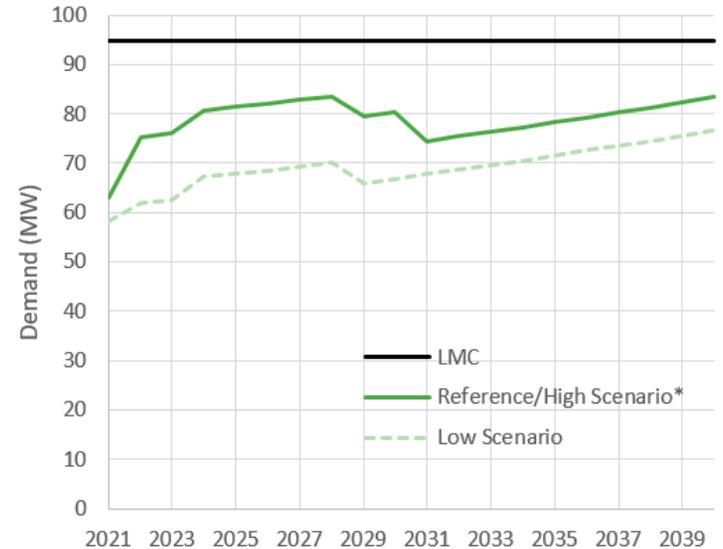
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Appendix: Red Lake Area Need

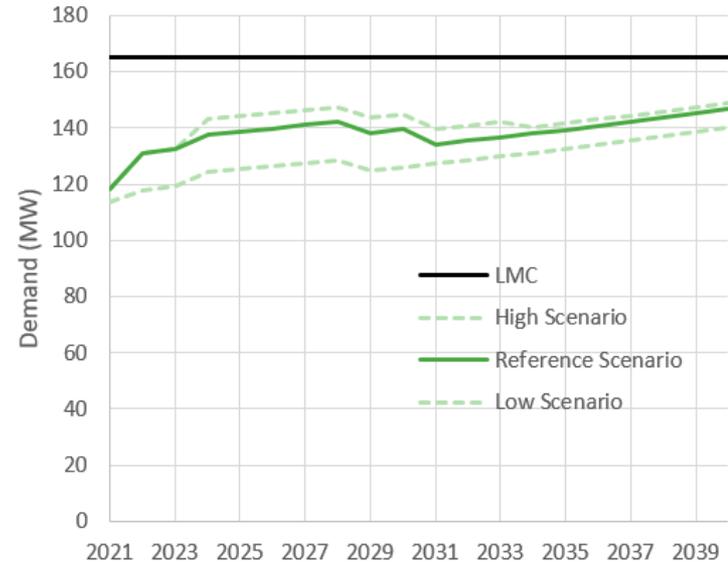
- **Subsystem:** Stations supplied on E2R (including remote connections)
- **Limiting Phenomenon:** Pre-contingency low-voltage at Red Lake TS, Balmer CTS, and Ear Falls TS. E4D thermal limitation is also not fall behind (~95% LTE).
- **LMC:** Tx supply capability of 95MW. No local generation. No L/R permitted (all elements in service).



*Ref/high scenario are the same for this subsystem

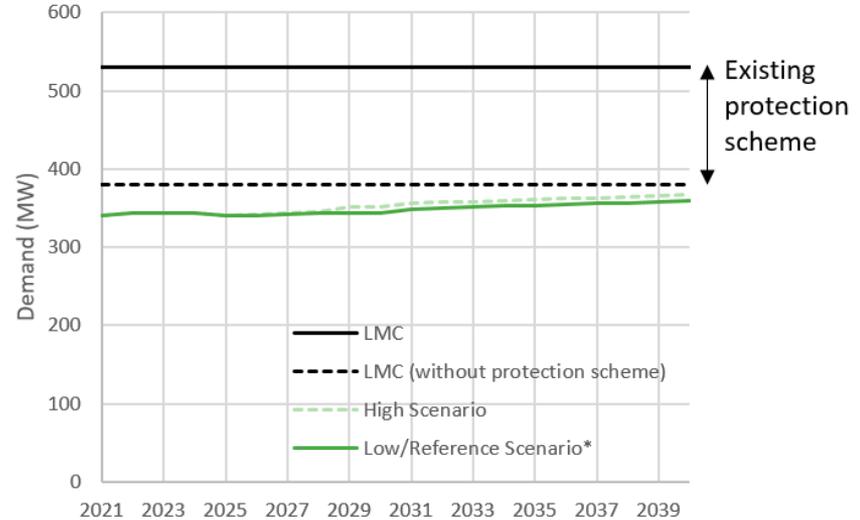
Appendix: Dryden Area Need

- **Subsystem:** Stations bounded by K3D at Rabbit Lake SS, M2D at Dryden TS, and Dryden TS autos. E1C assumed open at Pickle Lake SS.
- **Limiting Phenomenon:** K23D + D26A N-1-1 voltage decline at Dryden 115kV bus followed by voltage collapse
- **LMC:** Tx supply capability of 97MW. 85th percentile coincident hydro output of 68MW. No existing SPS but L/R is permitted for outage conditions.



Appendix: Thunder Bay + Greenstone Area Need

- **Subsystem:** Stations bounded by B6M at Moose Lake TS, A5A at Alexander SS, and Lakehead TS autos
- **Limiting Phenomenon:** Lakehead autos T7/T8 N-1-1 A5A/T1M thermal overload
- **Existing Capability:** Tx supply capability of 124MW. 85th percentile coincident hydro output of 240MW. 16MW of other local generation. 150MW of L/R currently available as part of the NW SPS #2.



*Ref/low scenario are the same for this subsystem