Renfrew Region
2021-2022 Integrated Regional Resource Plan (IRRP)

Engagement Webinar #2

July 26, 2022

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Objective of Today’s Webinar

- To provide an update on the electricity planning underway in the Renfrew Region
- To seek feedback on the potential options and recommendations to address forecast transmission issues identified for the Renfrew Integrated Regional Resource Plan (IRRP)
- To outline next steps

Agenda

1. Renfrew Region Electricity Planning Status Update and Recap
2. Summary of Options to Address Identified Transmission Issues
3. Community Engagement and Next Steps

Seeking Input

- What other information should be taken into account that would influence the electricity demand forecast?
- What feedback do you have on the screening of high-level potential options?
- What additional information should be considered as we screen high-level potential options?
- What information should be provided in future engagements?

Please submit your written comments by email to engagement@ieso.ca by August 16.

IRRP Status Update

IRRP Status Update - Timeline

- IRRP began in Q3 2021, and is on track for completion by Q4 2022
  - Electricity demand forecast, and issues have been determined and feasible options have been identified
  - The next steps are to complete options evaluation and subsequently draft the final recommendations and report

Regional Planning Activities to Date

- Engagement launched on Renfrew Scoping Assessment (SA) – June 30, 2021
- Public webinar on Renfrew regional planning and draft SA – July 19, 2021
- Final Scoping Assessment posted – Aug 13, 2021
- Initiated IRRP Process – Sept 8, 2021
- Public Webinar #1 on this region's forecast, issues, and engagement – February 9, 2022
- Engagement Process with local communities and stakeholders – Q1-Q2 2022
- Technical Working Group Meetings to develop demand forecast, assess issues, and determine options – Q3 2021 to Q3 2022

Engagements

Engagement Overview

- The Working Group developed and executed an engagement plan, available on the IESO's dedicated engagement webpage
- As part of the first webinar, we invited input on identifying key interested parties to meet with as part of the planning process
- One-on-one outreach activities centered around reviewing and seeking input on the electricity planning demand forecast
- The following slides will detail the findings of the outreach activities

Engagement in Renfrew

Finalize Forecast

- Verify reference forecast
- Seek input relating to energy programs, projects, etc.

Share Knowledge

- Better understand the Renfrew Region
- Provide resources to the region's stakeholders

Understand Trends

- What is the nature of the existing and future load?
- What are the greatest challenges on the horizon?

- Town of Petawawa – February 22 2022
- City of Pembroke – March 16 2022
- Town of Laurentian Valley – March 17 2022
- Town of Deep River – March 18 2022
- CFB Petawawa – March 25 2022, April 5 2022
- Roseburg Forest Product – April 27 2022

Engagement Insights

Finalize Forecast

- Majority of feedback received confirms proposed demand forecast
- Two cases where small incremental load increase to forecast was necessary to more accurately reflect growth

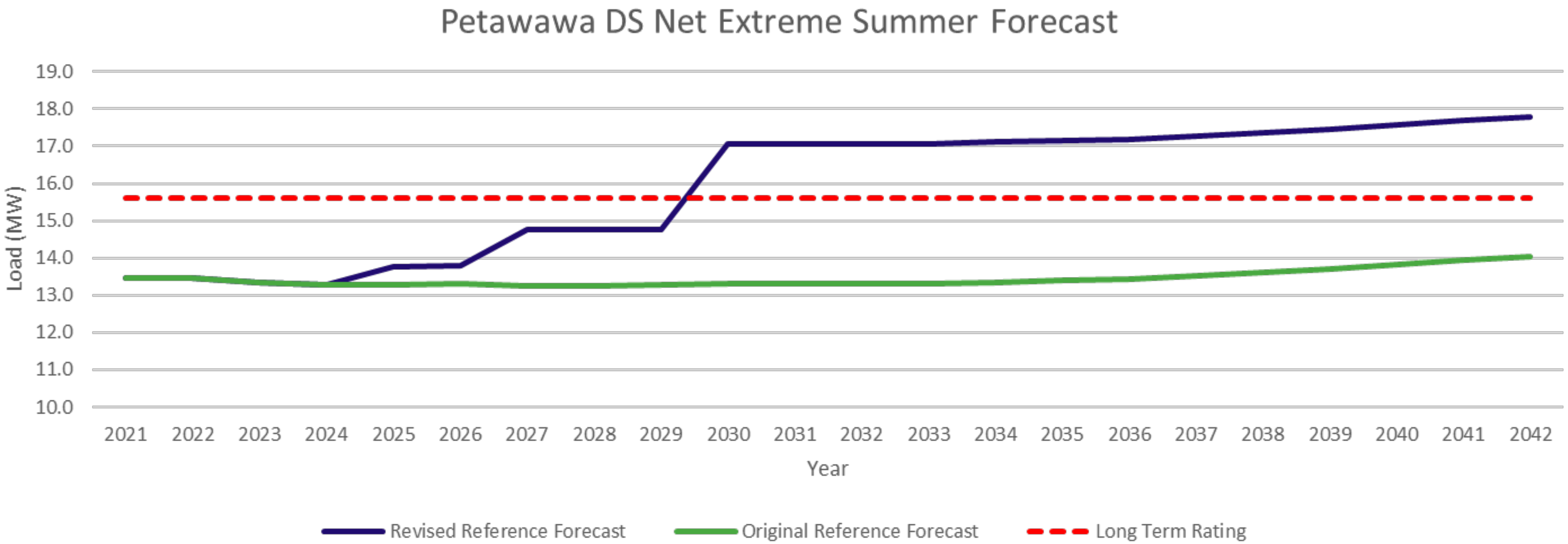
Understand Trends

- Rural and exurban communities across the region are experiencing unprecedented growth caused by people moving away from cities
- Many communities experiencing accelerated demand for housing, many communities have ample land to meet demand
- Identified two areas with potential large scale increases in electricity demand that required the development of new growth scenarios

Share knowledge

- Provided service area maps to help communities better understand their energy supply
- Gained insight into the Renfrew region while putting communities in contact with their LDCs

Revisions to Forecasts – Petawawa DS



During engagement with CFB Petawawa the base informed the working group of additional forecasted growth which was considered by Hydro One Distribution and incorporated in the revised forecast

Transmission System Issues

Categories of Regional Planning Issues

Capacity Needs

- Station capacity needs - refers to the ability to convert power from the transmission system down to distribution system voltages
- Local system supply capacity (or "load meeting capability") - refers to the ability of the electricity system to supply power to customers in the area, either by generating the power locally, or bringing it in through the transmission system

Load Restoration and Supply Security Needs

- Load restoration describes the electricity system's ability to restore power to those affected by a major transmission outage within reasonable timeframes
- Supply security describes the total amount of load interrupted following major transmission outages

End-of-Life Asset Replacement Needs

- Based on the best available asset condition information at the time
- Evaluated to decide if the facility should be replaced "like-for-like", "right-sized", or retired

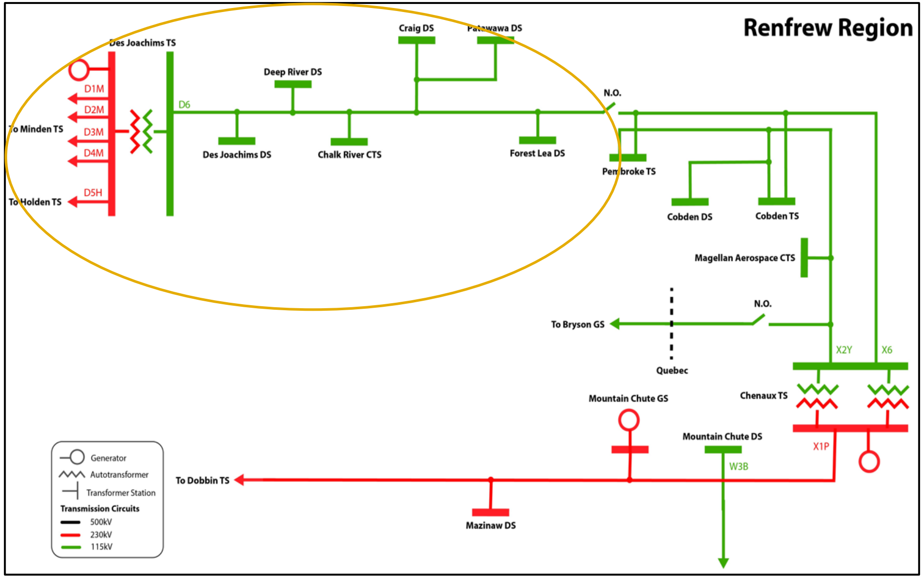
Transmission System Issues - Summary

- Three station capacity issues and one upstream transmission system issue have been identified for the region
- Upstream transmission system supply issues only appear in the growth scenarios for the Des Joachims Sub-system

	Issues	Location	Timeframe
1	Station Capacity	Pembroke TS	Today
2	Station Capacity	Forest Lea DS	Today
3	Station Capacity	Petawawa DS	Mid term
4	Local Area Transmission	115 kV Des Joachims side	Long term

Transmission System Recap

The Renfrew Region has two supply points, separated by a normally open point, creating two Sub-systems, which support one another but have different capabilities: the Des Joachims Sub-system (West) and Chenaux Sub-System (East)



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Growth Scenarios

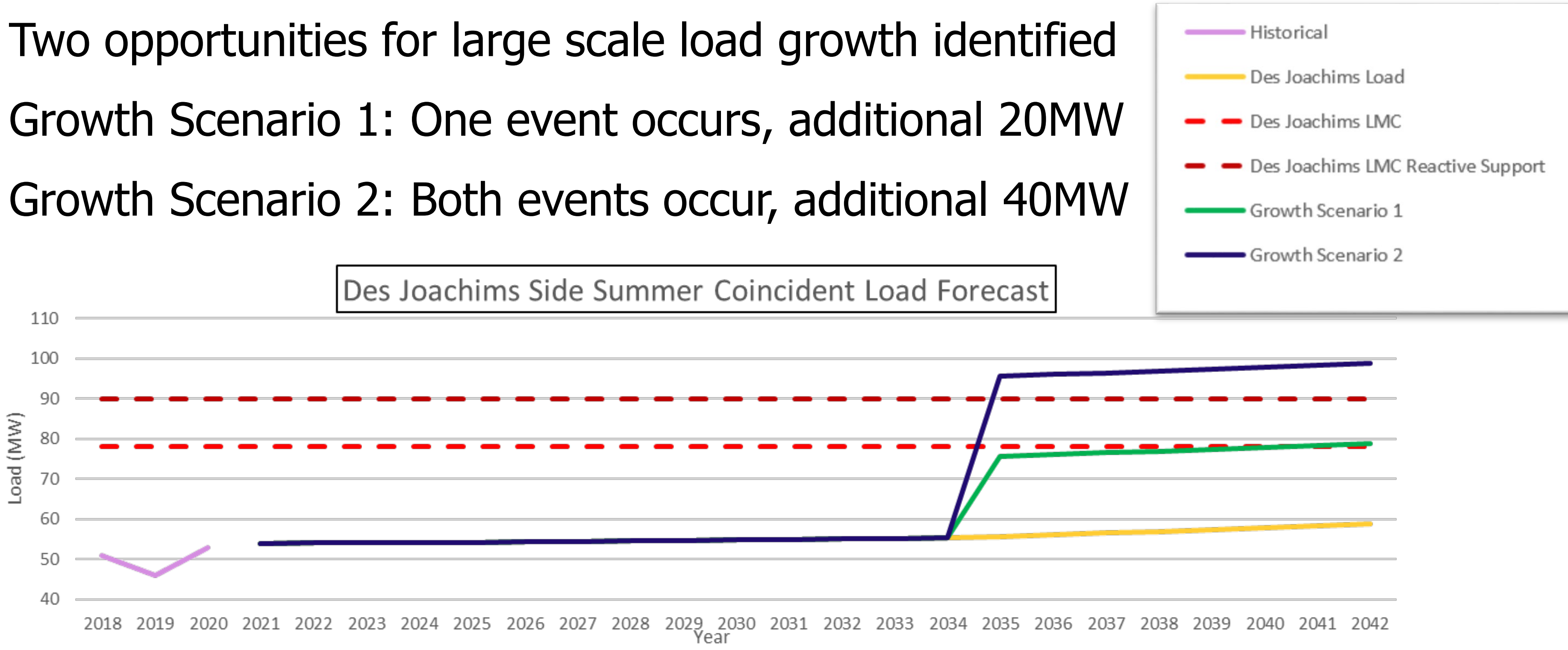
- Reference forecast that was developed considers medium growth and high confidence load connections
- Certain conditions (electrification, uncertain large scale load connections) require the development of alternative forecast growth scenarios
- Discussion with stakeholders in the Des Joachims Sub-system revealed the potential for larger scale electricity demand in the next 10-20 years
- Two growth scenarios were developed in order to examine and test the Des Joachims side transmission system

Des Joachims Side Impact of Growth Scenarios

Two opportunities for large scale load growth identified

Growth Scenario 1: One event occurs, additional 20MW

Growth Scenario 2: Both events occur, additional 40MW



Options Considered

Potential Options

- Regional planning seeks to recommend the most cost-effective, technically feasible, and integrated solution
- Potential options being typically examined include:
  - Non-wires alternatives (e.g. distributed energy resources, energy efficiency measures etc.)
  - Wires (e.g. step-down station, transmission line, etc.)
  - Centralized local generation (e.g. utility-scale storage, gas-fired peaking plant, etc.)

Evaluating Options

In addition to input from community engagement, potential solutions are evaluated based on the following key considerations:

Technical Feasibility	• Can the option actually be executed? i.e., proximity to customers, routing and spacing considerations, operations
Ability to Address Needs	• Are the number, magnitude, and diversity of needs adequately addressed?
Integration & Cost-Effectiveness	• What is the lowest cost solution considering the possibility that one option may be able to address multiple needs simultaneously? • Would a combination of option types be most effective?
Lead Time	• New transmission infrastructure or resource procurement/development could take 4-10 years – how does this compare to the timing of needs?

Types of Wires Options

- The wires options considered for addressing the identified needs include combinations of the following elements:
  - Additional, refurbished and/or uprated load supply stations
  - New connection lines, as required, for any new or modified stations
  - Distribution load transfers between load supply stations

Types of Non-Wires Options

- An initial screening exercise, examining the duration, frequency, and magnitude of the need, need timing, and cost has been undertaken to determine if detailed evaluation of non-wires alternatives is warranted for each identified need
- Various technology types could contribute to meeting some of the identified needs as part of an integrated solution, and will form a part of the integrated options analysis for the capacity needs in Renfrew

Evaluating Non-Wires Options

- In addition to the typical considerations taken into account before selecting a preferred option, development of non-wires options requires more information and analyses
- What information might stakeholders and solution providers require from the study team?
- Conversely, what information do stakeholders and solution providers believe the study team should incorporate?

Example of More Analysis Needed

Need Characterization

- Hourly and seasonal details on the load forecast to provide more granularity on estimated frequency, duration, and size of need events
- To help size and characterize the option

Economic Assumptions & Financial Models

- Planning-level estimates of cost factors (i.e., capital, O&M, operating life expectations) to compare against the preferred wires option
- Expected funding streams if the option provides multiple services/benefits

Options - Pembroke TS

Wires Options – Pembroke TS

Option	Capacity Increase	Cost	Implementation
Distribution Load Transfers	1.5-7MW	$50k-$8M	1-2 years
Upgrade existing TS (transformer upgrade)	50MW[1]	$30M	4-6 years
New Supply - TS (new)	50MW[2]	$25M	4-6 years
Upgrade existing HVDS (convert existing DS)	5-8MW	$6M	3-5 years
New Supply - HVDS (new)	18MW	$10M	4-6 years

2042

Summer Capacity Issue:	**16MW**
Winter Capacity Issue:	**12MW**

[1]upgrading TX from 42MVA to 83MVA
[2]installing 42MVA TX

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Non-Wires Options – Pembroke TS

- Non-wires options have specific capabilities and characteristics which need to match the need requirement

Non-Wire Options Considered	Comments
Generation - SCGT	• Low capacity factor need dictates a SCGT generation facility located in the Eastern Zone to address the 16 MW need with the average capacity factor of 1% • Cost assumptions will be based on internal engineering reports • Consideration will be given to system capacity contribution
Storage	• Need profile allows sufficient time for charging and discharging function • Cost based on National Renewable Energy Laboratory (NREL) publically available data, which is also being used for Pathways to De-carbonization (P2D) study • Consideration will also be given to system capacity contribution from the storage facility

Options – Forest Lea DS

Wires Options – Forest Lea DS

Option	Capacity Increase	Cost	Implementation
Distribution Load Transfer	1-2MW	$50k	3-5 years
Upgrade existing DS (install transformer cooling & monitoring)	4MW	$0.6M	4-6 years
Upgrade existing DS (transformer upgrade)	10MW	$4.5M	1-2 years
New Supply - HVDS (new)	18MW	$10M	3-5 years

2042

Summer Capacity Need: **1MW**
Winter Capacity Need: **0.1MW**

Non-Wires Options – Forest Lea DS

- Non-wires options have specific capabilities and characteristics which need to match the need requirement

Non-Wire Options Considered	Comments
Demand Response	• Need requirement is 1 MW by 2042, with energy requirement predominately in the summer • Assume Demand Response for 1 MW in east zone with capacity cost based on average auction cost of 2018 to 2021
Storage	• Need profile will be reviewed to ensure sufficient time for charging and discharging function as associated with a storage option • Cost based on NREL, which is also being used for P2D study • Consideration will also be given to system capacity contribution of storage

Options – Petawawa DS

Wires Options – Petawawa DS

Option	Capacity Increase	Cost	Implementation
Distribution Load Transfer (none viable)	-	-	-
Upgrade existing DS (transformer upgrade)	3MW	$4.5M	3-5 years
New Supply - HVDS (new)	18MW	$10M	4-6 years

2042

Summer Capacity Need:	**2.2MW**
Winter Capacity Need:	**0MW**

Note: Non-wires alternatives still under development

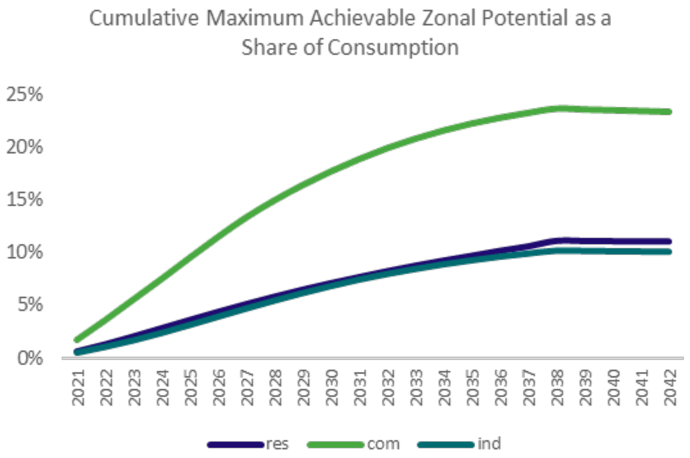
Non-Wires Options Development: Energy Efficiency Potential Analysis

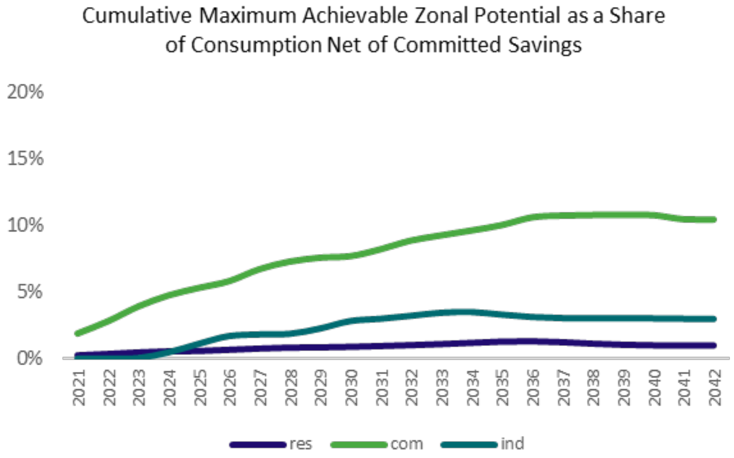
Energy Efficiency Potential Analysis

- In 2019, the IESO and the Ontario Energy Board completed the first integrated electricity and natural gas achievable potential study in Ontario (2019 APS)
- The main objective of the APS was to identify and quantify energy savings (electricity and natural gas), GHG emission reductions and associated costs from demand side resources for the period from 2019-2038.
- The study shows a significant and sustained potential for energy efficiency across all sectors and is used to inform:
  - future energy efficiency policy and/or frameworks
  - program design and implementation
  - long-term resource planning

Energy Efficiency Potential Analysis cont’d

- Based on APS results, energy efficiency is expected to be able to reduce demand by ~1% per year on average in the Niagara zone, with near-term opportunities reduced by CDM commitments and new opportunities increasing in the medium term following conclusion of the 2021-2024 CDM framework





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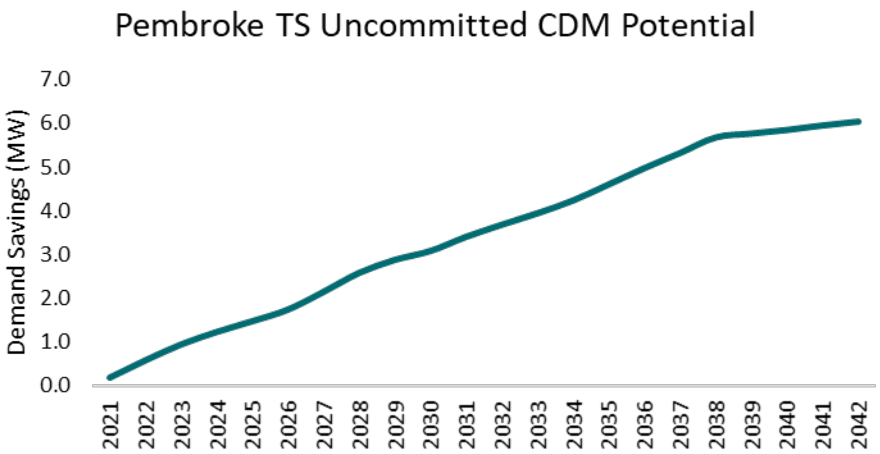
Energy Efficiency Potential Analysis – Pembroke TS

- Uncommitted cumulative CDM potential that is cost effective based on avoided system energy and capacity costs for Pembroke TS is presented on the right
- The estimated cost to deliver these savings is $23 million dollars over the forecast period



Pembroke TS	2027	2042
Net Forecast Demand (MW)	51	63
Max Achievable CDM Potential (MW)	3.1	8.0
Committed CDM Potential (MW)	1.0	2.0
Uncommitted CDM Potential (MW)	2.2	6.0

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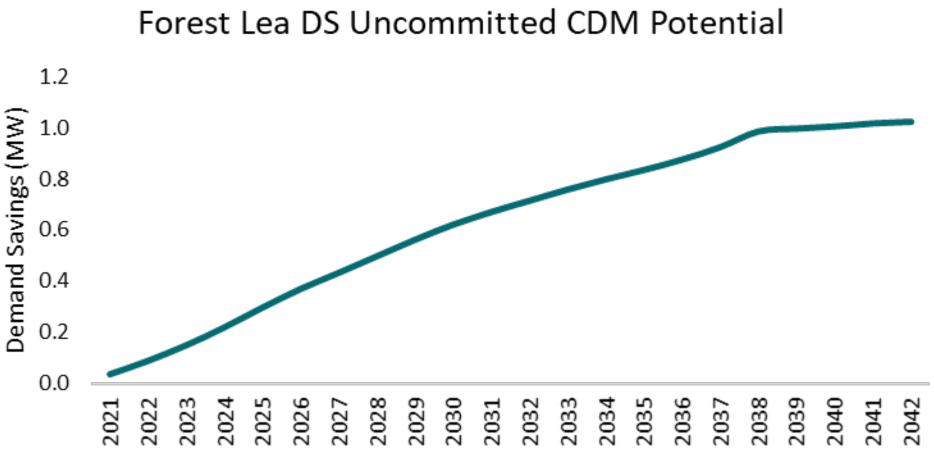
Energy Efficiency Potential Analysis – Forest Lea TS

- Uncommitted cumulative CDM potential that is cost effective based on avoided system energy and capacity costs for Forest Lea TS is presented on the right
- The estimated cost to deliver these savings is $4.4 million dollars over the forecast period



Forest Lea DS	2027	2041
Net Forecast Demand (MW)	9	9
Max Achievable CDM Potential (MW)	0.6	1.2
Committed CDM Potential (MW)	0.1	0.2
Uncommitted CDM Potential (MW)	0.4	1.0

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Energy Efficiency Opportunities

- The IESO can continue to refine these assumptions and explore options to target system cost effective EE in the region in collaboration with the Working Group
- The Local Initiative Program, under the 2021-2024 CDM Framework, is one tool available to target delivery of additional CDM savings to specific areas of the province with identified system needs
- A review of the opportunity for targeted CDM to address regional or local needs and available tools to do so under the current framework is underway as part of the 2021-2024 CDM Framework Mid-Term Review

Engagement & Next Steps

Seeking Feedback

- What other information should be taken into account that would influence the electricity demand forecast?
- What feedback do you have on the screening of high-level potential options?
- What additional information should be considered as we screen high-level potential options?
- What information should be provided in future engagements?

Please submit your written comments by email to engagement@ieso.ca by August 16.

Next Steps

- August 16– Deadline for written feedback on screening of high-level options.
- September 2022- Responses to written feedback and additional data posted
- Q3 2022 – Final public webinar to seek input on options analysis and draft recommendations
- Q4 2022 – Final IRRP published
- Q3/Q4 2022 – East Regional Electricity Network Forum

Keeping in Touch

- **Subscribe** to receive updates on the Renfrew regional electricity planning initiatives on the IESO website
- **Follow** the Renfrew regional planning activities on the dedicated engagement web page
- **Join** the East Regional Electricity Network

Questions?

Do you have any questions for clarification on the material presented today?

Submit questions via the web portal on the webinar window, or by email to engagement@ieso.ca

Seeking Input on the Webinar

- Tell us about today
- Was the material clear? Did it cover what you expected?
- Was there enough opportunity to ask questions?
- Is there any way to improve these gatherings, e.g., speakers, presentations or technology?

Chat section is open for comments

Thank You

ieso.ca

1.888.448.7777

customer.relations@ieso.ca

engagement@ieso.ca

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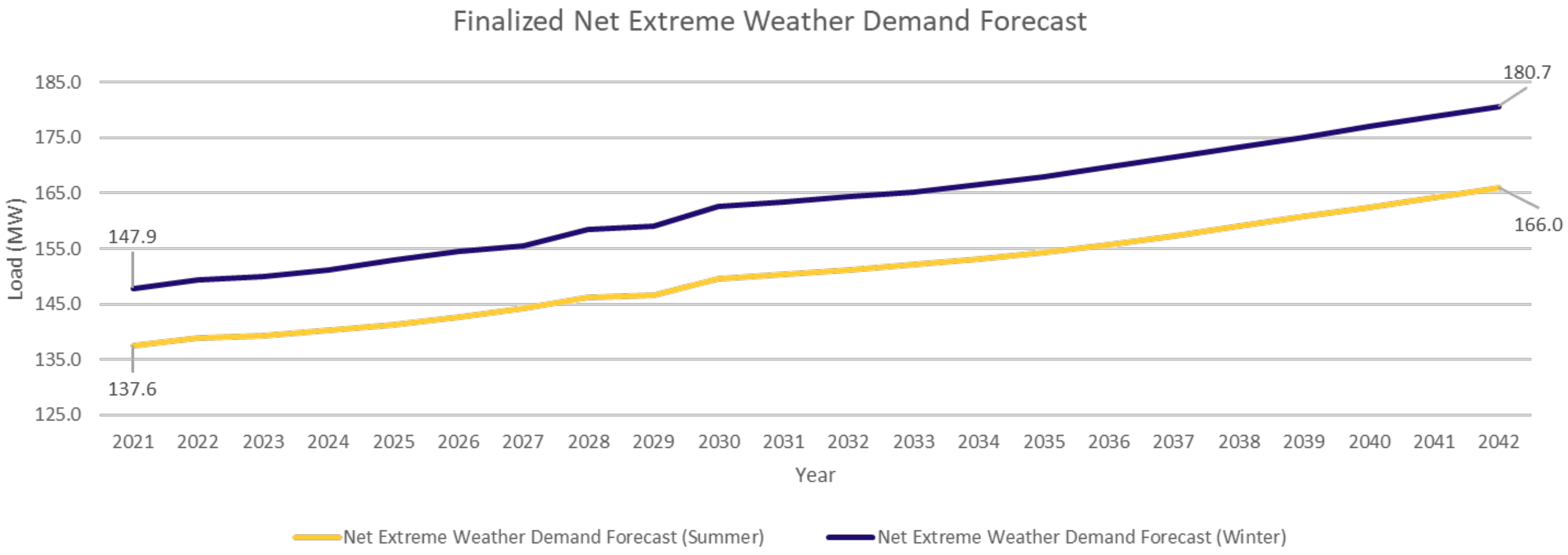
Appendix

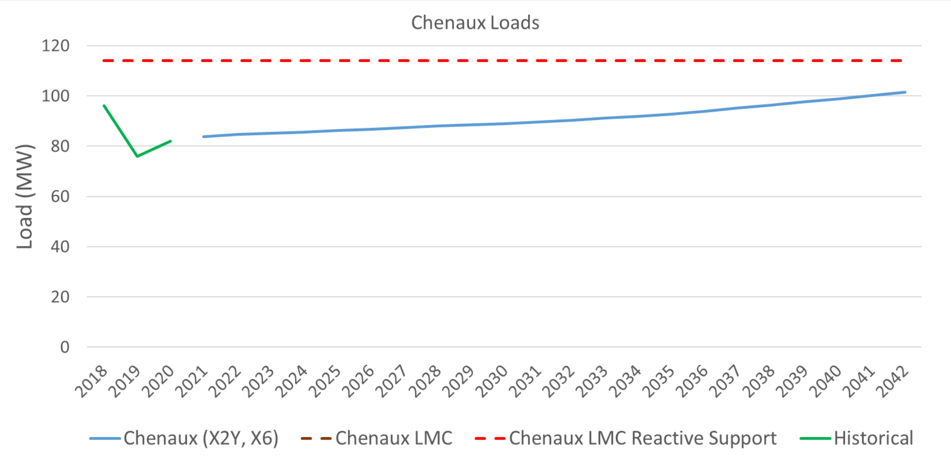
Final Demand Forecast Overview



Forecast average growth rate of ~1.1% Summer, 1.3% Winter

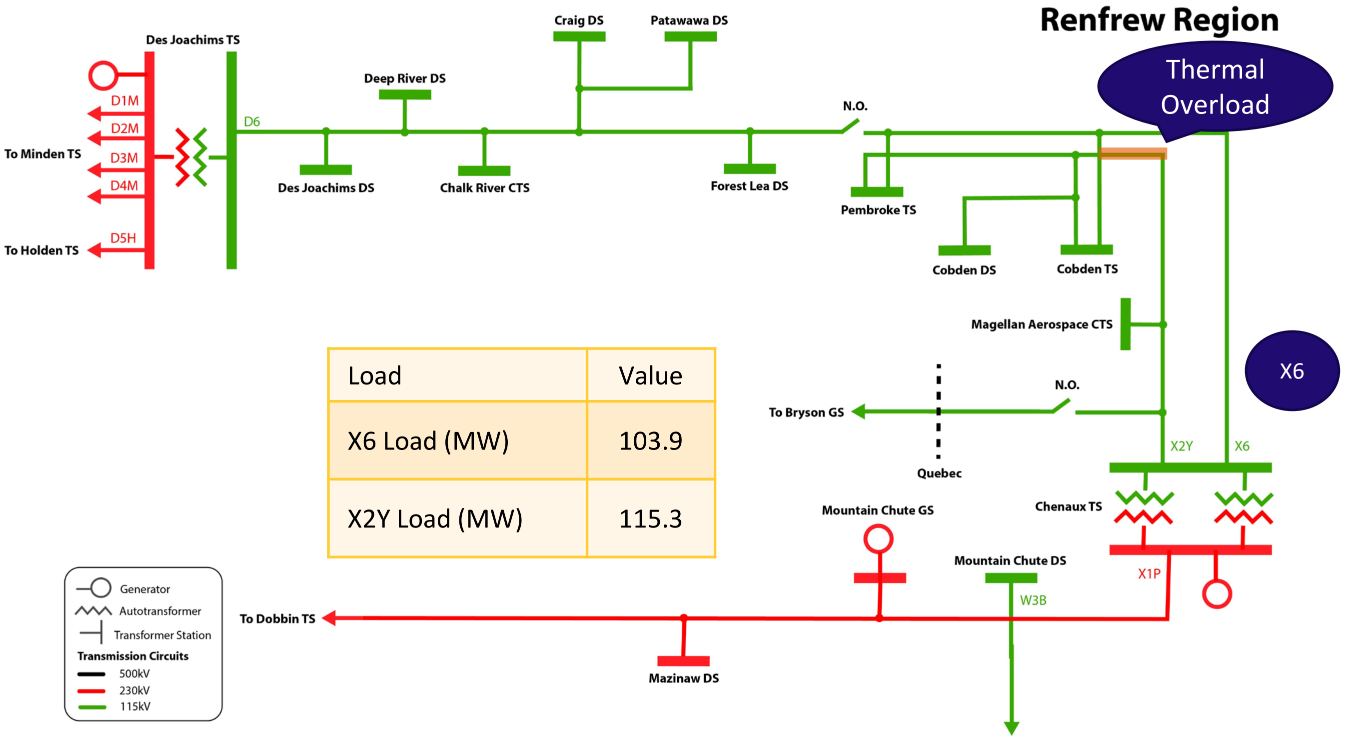
System Today – LMC Chenaux

Item	Chenaux Area Supply
Definition	X2Y, X6 loads
Limiting Phenomena	Thermal
System Topology	Loss of X6 (N-1)
System Today	LMC for Chenaux side is approximately 115MW[1]



[1] *Ongoing system studies are finalizing*

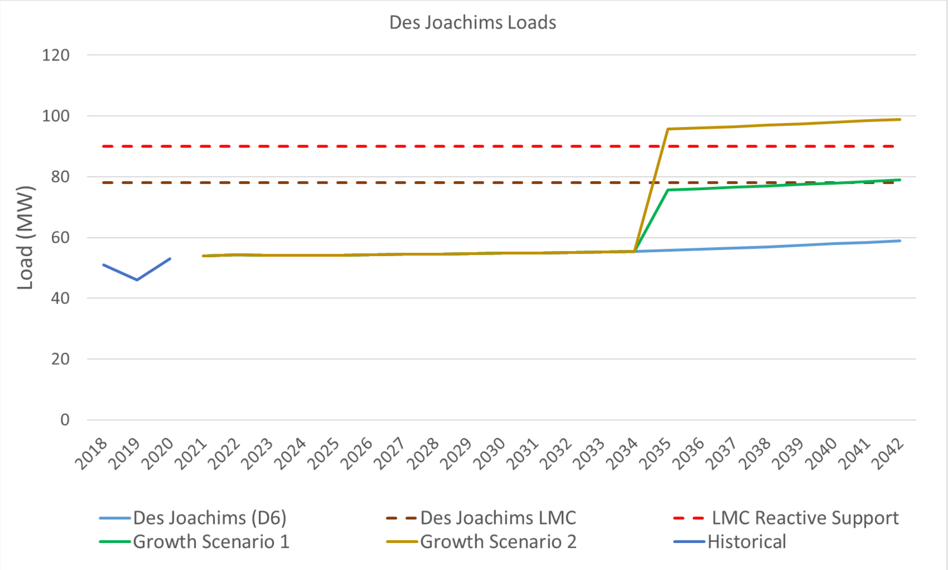
Chenaux 115kV LMC - Thermal



Load	Value
X6 Load (MW)	103.9
X2Y Load (MW)	115.3

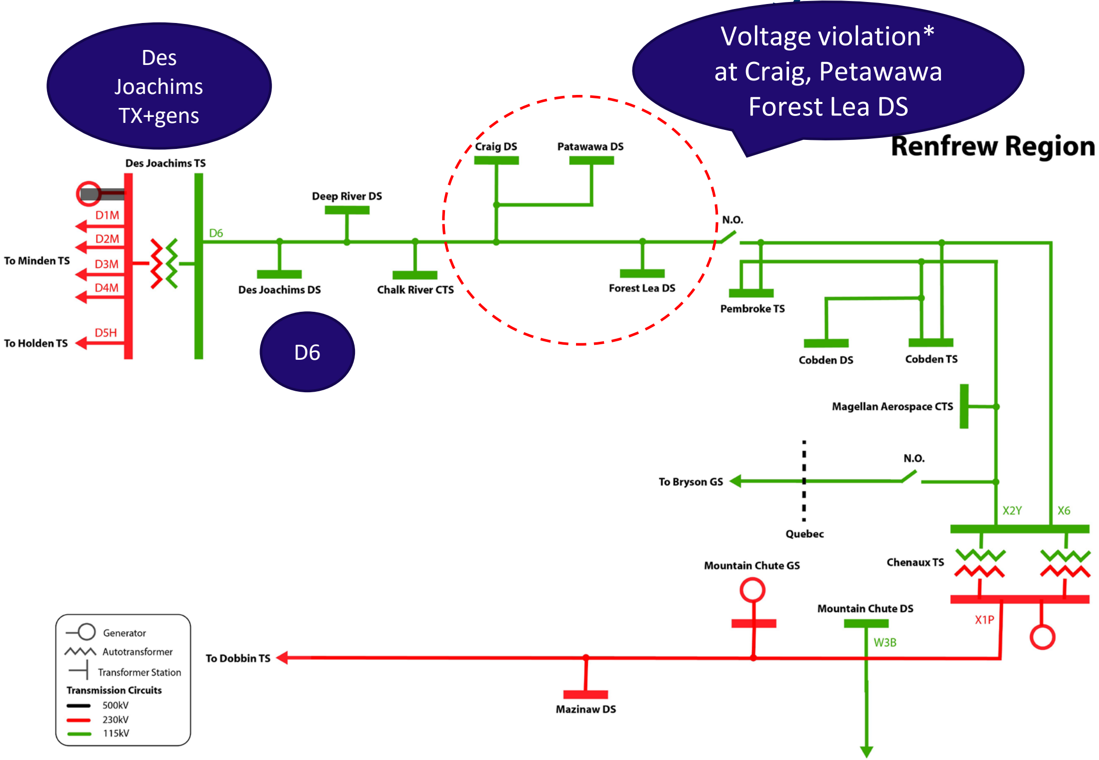
System Today – LMC Des Joachims

Item	Des Joachims Area
Definition	D6 Loads
Limiting Phenomena	Voltage Decline at Petawawa
System Topology	Loss of Des Joachims TS and Generators
System Today	LMC for Des Joachims side is 78MW[1]



[1]Reactive support of 20MX would increase Des Joachims side LMC by 12 MW to 90MW

Des Joachims 115kV LMC - Voltage



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Petawawa Updated Forecasts