



Renfrew Scoping Assessment Outcome Report

August 13, 2021



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1. Introduction

This Scoping Assessment Outcome Report is part of the Ontario Energy Board's (OEB or Board) regional planning process. The Board endorsed the Planning Process Working Group's Report to the Board in May 2013 and formalized the regional planning process and timelines through changes to the Transmission System Code and Distribution System Code in August 2013.

The new cycle of the regional planning process for the Renfrew region started on March 19, 2021. The Needs Assessment¹ is the first step in the regional planning process and was carried out by the Working Group and led by Hydro One Networks Inc. (Hydro One). The report, which was finalized on May 17, 2021, identified a number of needs (reliability, end-of-life, and performance) and recommended that further regional coordination is required. Results from the Needs Assessment were used as an input into the Scoping Assessment (SA) to determine the nature of the planning process required.

During the SA, the Technical Working Group reviewed the nature and timing of known needs to determine the most appropriate planning approach, as well as the best geographic grouping of the needs in order to efficiently facilitate further studies. The planning approaches considered include:

- An Integrated Regional Resource Plan (IRRP) – through which a greater range of options, including non-wires alternatives, are to be considered and/or closer coordination with communities and stakeholders is required;
- A Regional Infrastructure Plan (RIP) led by the transmitter – which considers more straightforward wires only options with limited engagement; or
- A local plan undertaken by the transmitter and affected local distribution company (LDC) – for which no further regional coordination is needed.

This Scoping Assessment report:

- Lists the needs requiring more comprehensive planning, as identified in the Needs Assessment report;
- Reassesses the areas that need to be studied and the geographic grouping of the needs;
- Determines the appropriate regional planning approach and scope for each sub-region (when applicable) where a need for regional coordination or more comprehensive planning is identified;
- Establishes a terms of reference for an IRRP if an IRRP is required; and
- Establishes the composition of the Working Group for each sub-region recommended for an IRRP (when applicable).

¹ Link to Needs Assessment

https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwjpkPHxhePxAhVGG80KHZvRBEoQFnoECAQQA&url=https%3A%2F%2Fwww.hydroone.com%2Fabouthydroone%2FCorporateInformation%2Fregionalplans%2Frenfrew%2FDocuments%2FNeeds-Assessment-Report_2nd-cycle.pdf&usq=AOvVaw2PVJ4DkKapKotgEXSiBJKG



2. Working Group

The Scoping Assessment was carried out with the following participants:

- Independent Electricity System Operator (IESO)
- Hydro One Networks Inc. (Hydro One Transmission)
- Hydro One Networks Inc. (Hydro One Distribution)
- Ottawa River Power Corp. (Embedded to Hydro One Distribution)

3. Categories of Needs, Analysis, and Results

3.1 Overview of the Region

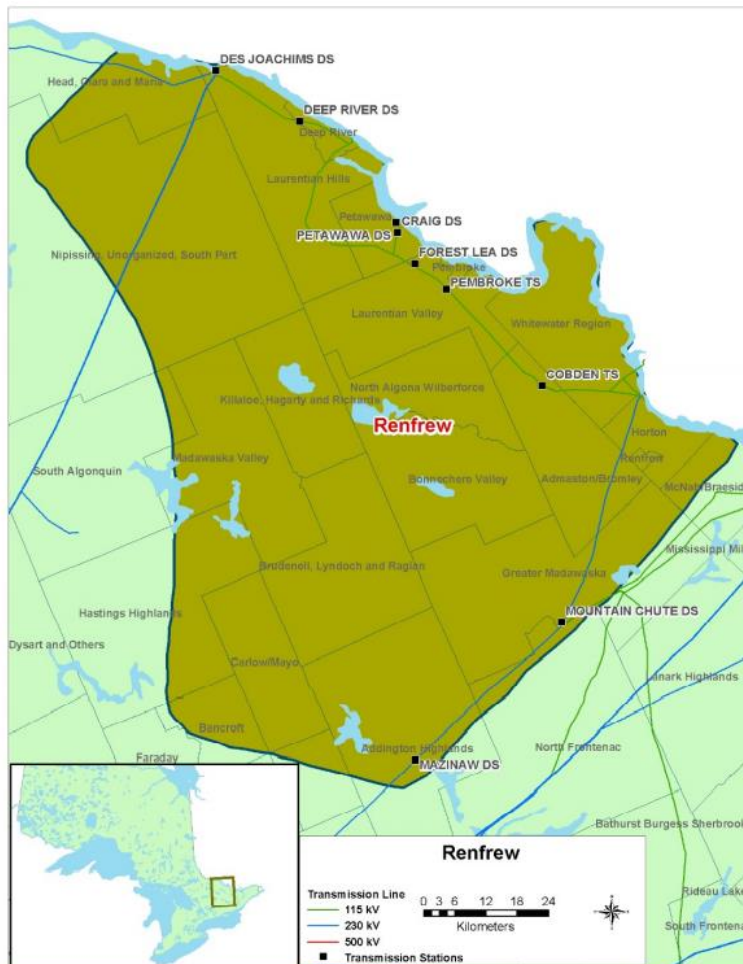
The Renfrew region is located in eastern Ontario, west of Ottawa. The Renfrew region includes all or part of the following municipalities: Township of Admaston/Bromley, Township of Bonnechere Valley, Township of Brudenell, Lyndoch, and Raglan, Township of Greater Madawaska, Township of Head, Clara, and Maria, Township of Horton, Township of Killaloe, Hagarty, and Richards, Township of Laurentian Valley, Township of Madawaska Valley, Township of McNab/Braeside, Township of North Algona Wilberforce, Township of Whitewater Region, Town of Arnprior, Town of Deep River, Town of Laurentian Hills, Town of Petawawa, Town of Renfrew, and City of Pembroke.

For electricity planning purposes, the planning region is defined by electricity infrastructure boundaries, not municipal boundaries.

With respect to Indigenous communities and organizations, this region includes Algonquins of Pikwakanagan and Algonquins of Ontario Consultation Office. The Huron Wendat Nation of Quebec has expressed their interest in the Renfrew area due to their historical presence in southern Ontario. The Renfrew region also includes the MNO Ottawa Region Métis Council, with the MNO High Land Waters Métis Council located close by to the south.

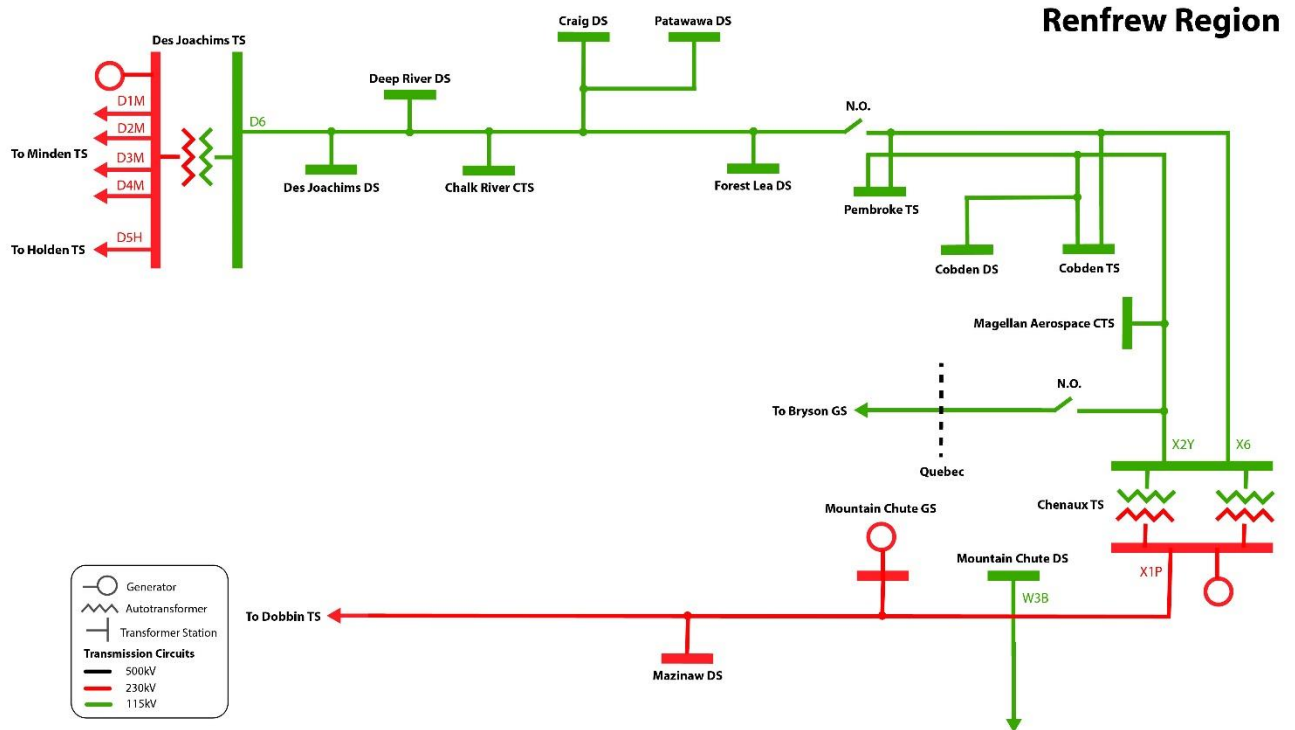
An overview of the Renfrew region and the location of the electrical infrastructure is shown in Figure 3-1. The Renfrew region is winter-peaking (i.e., electricity demand is highest during the winter months), and is characterized by steady forecast growth.

Figure 3-1 | Overview of the Renfrew Region



The region is supplied from 115 kV and 230 kV transmission lines and stations that connect at the Chenux Transformer Station (TS) from the East and Des Joachims TS from the West. A switch located at Pembroke TS separates the 115 kV system between East and West. The switch is normally open meaning the two regions are isolated from each other during normal operations. The distribution system consists of voltage levels 44 kV, 13.8 kV, and 12.5 kV. The main generation facilities located in the region are Chenux Generation Station (GS), Mount Chute GS, and Des Joachims GS. An overview of the electrical infrastructure that currently supplies the region is provided in the single line diagram in Figure 3-2.

Figure 3-2 | Electricity Infrastructure in the Renfrew Region



3.2 Background of the Previous Planning Process

The regional planning process was formalized by the Ontario Energy Board (OEB) in August 2013. To prioritize and manage the process, Ontario was organized into 21 regions based on electricity infrastructure boundaries; each of which were assigned to one of three groups based on urgency of need, where Group 1 regions were being reviewed first. The Renfrew region was part of the Group 3 planning regions.

In March 2016, Hydro One Transmission published the first Needs Assessment report for the Renfrew region. The scope of the report included a review of system capability, reliability assessments, and asset sustainment timelines for the region. The report identified no near- or mid-term needs. Although no further coordinated regional planning was required, the performance of circuit X1P was monitored closely for the next planning cycle as frequent sustained outages would lead to islanding of the western system.

This current, second regional planning cycle started with the Needs Assessment report published by Hydro One in May 2021. The needs identified in the Needs Assessment report form the basis of the analysis for this Scoping Assessment and are discussed in further detail in Section 3.3.

3.3 Needs Identified

Hydro One's Needs Assessment provided an update on needs identified in the previous planning cycle and the implementation of projects recommended to address them. Furthermore, it identified a number of new needs in the Renfrew region based on the most up-to-date sustainment plans and a new 10-year demand forecast. A summary of the current projects and plans underway to respond to existing needs, plus the new needs, are outlined below.

3.3.1 Projects and Plans Underway

The Needs Assessment report lists the needs identified from the previous planning cycle, and provides an update on the status of project implementation. Table 3-1 below summarizes this. These projects provide a basis for future assessments and should be accounted for in this planning cycle.

Table 3-1 | Needs Identified in the Previous Cycle and Implementation Plan Update

NA	Specific Need	Solution and Timing
Renfrew Region	<ul style="list-style-type: none">End-of-life Chenux TS transformers	<ul style="list-style-type: none">Transformer replacement T3, T4 (new 200/115 kV 75/100/125 MVA)In-service in 2021
	<ul style="list-style-type: none">End-of-life D6 Line	<ul style="list-style-type: none">Complete line refurbishment between Des Joachims TS and Petawawa/ Craig DS (all EOL assets, conductor to be 411 kcmil)In-service in 2022

The previous planning cycle also recommended that the performance of the X1P circuit be monitored by Hydro One. Based on this between-cycle activity, Hydro One has indicated that the performance is adequate to supply the load in the area in accordance with their Customer Delivery Point Performance Standards².

3.3.2 Needs to be Addressed in Current Planning Cycle

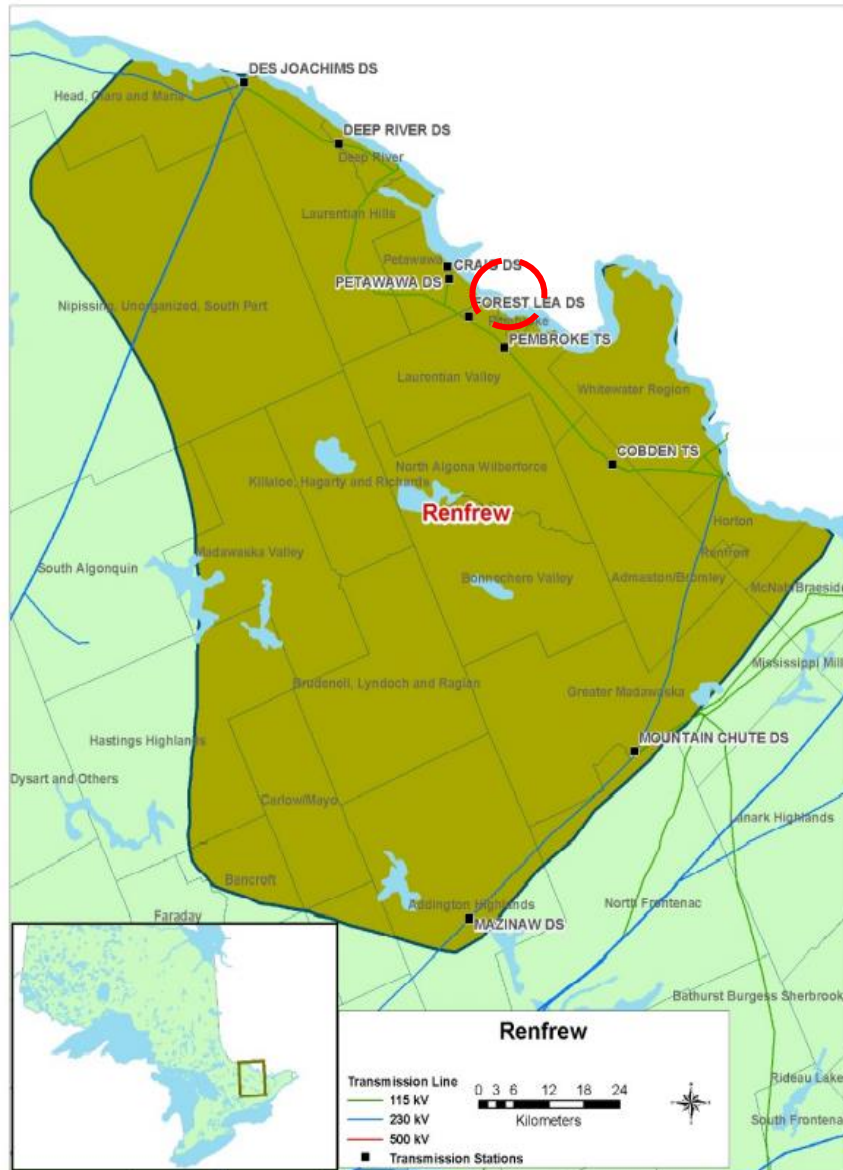
The Needs Assessment then identified new or updated needs in the Renfrew region using the 10-year station-level demand forecast provided by the local distribution companies (LDCs), updated end-of-life asset condition information, as well as the conservation and demand management (CDM) and distributed generation (DG) forecast provided by the IESO. Table 3-2 below lists these regional needs and their timing. Their location is shown in Figure 3-3.

² Link to Standard: <https://www.google.ca/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwi7g-LBhuPxAhWXGs0KHYa3CcQQFnoECAIQAA&url=https%3A%2F%2Fwww.rds.oeb.ca%2FCMWebDrawer%2FRecord%2F469606%2FFile%2Fdocument&usq=A0Vaw05jco170AKMsGyyM1JGrzE>

Table 3-2 | Updated Regional Needs Identified in the NA

Need #	Station/Circuit	Description of Need
1	Pembroke TS	Supply capacity exceeded in 2019

Figure 3-3 | Geographic Location of Needs Identified in the Needs Assessment



3.3.3 Analysis of Needs

The Working Group has outlined the needs in the Renfrew region and potential planning approaches to address them.

Pembroke TS – Station Capacity Need

The station capacity of Pembroke TS is approximately 47 MW based on its summer long-term rating (LTR). The method of determining the LTR was revised in 2020 resulting in a change from the 2016 LTR. The 2019 non-coincident summer peak load on Pembroke TS was 48 MW and is forecasted to grow to 52 MW in the mid term based on the load forecast collected during the Needs Assessment.

Options to address this need can include energy efficiency, non-wires solutions, distribution load transfers, new transformer station capacity or combinations of these. For this reason, an IRRP is best suited to further examine this need and recommend solutions to address this need.

Recommendation

There is a need to evaluate integrated solutions to address the region's near-term capacity need. Though relatively small in magnitude, these needs will involve multiple stakeholders (LDCs, transmitter, community members, and municipalities) and could trigger investments impacting local ratepayers. Therefore, an IRRP of a smaller scope, focused on the need identified at Pembroke TS, is proposed with a 12 month timeframe.



4. Conclusions and Next Steps

The Scoping Assessment concludes that an IRRP be undertaken to address the needs in Renfrew region. The draft Terms of Reference for the Renfrew IRRP is attached in Appendix 2.

Appendix 1 – List of Acronyms

Acronym	Definition
CDM	Conservation and Demand Management
DG	Distributed Generation
FIT	Feed-in-Tariff
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resource Plan
kV	kilovolt
LAPS	Local Achievable Potential Study
LDC	Local Distribution Company
MNO	Métis Nation of Ontario
MW	Megawatt
NERC	North American Electric Reliability Corporation
NPCC	Northeast Power Coordinating Council
OEB	Ontario Energy Board
ORTAC	Ontario Resource and Transmission Assessment Criteria
RIP	Regional Infrastructure Plan
TS	Transformer Station

Appendix 2 – Renfrew Region IRRP Terms of Reference

1. Introduction and Background

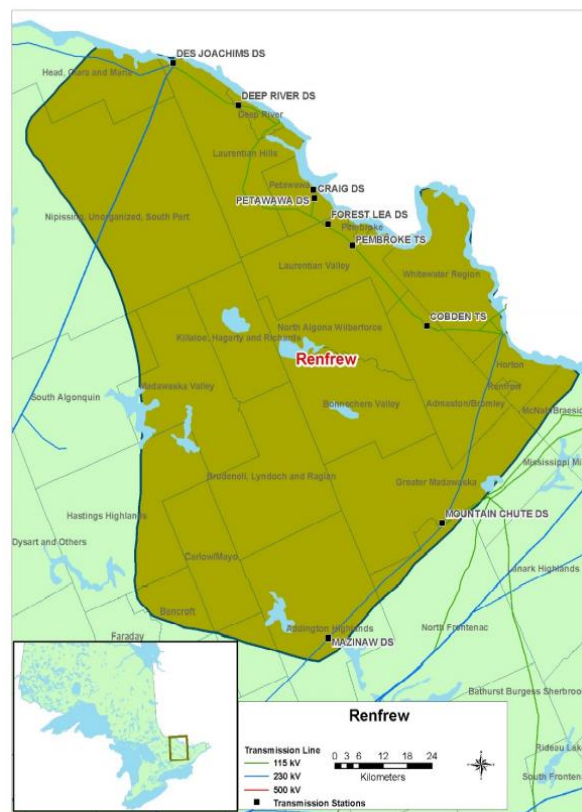
These Terms of Reference establish the objectives, scope, key assumptions, roles and responsibilities, activities, deliverables, and timelines for an Integrated Regional Resource Plan of the Renfrew region.

Based on the potential for demand growth within this region, limits on the capability of the transmission capacity supplying the area, and opportunities for coordinating demand and supply options, an integrated regional resource planning approach is recommended.

Renfrew Region

The Renfrew region is winter-peaking and it roughly encompasses the Districts of Renfrew County. The approximate geographical boundaries of the region are shown in Figure A-3.

Figure A-3 | Overview of the Renfrew Region



The region includes all or part of the following municipalities:

- Township of Admaston/Bromley
- Township of Bonnechere Valley
- Township of Brudenell/Lyndoch, and Raglan
- Township of Greater Madawaska
- Township of Head, Clara, and Maria
- Township of Horton
- Township of Killaloe, Hagarty, and Richards
- Township of Laurentian Valley
- Township of Madawaksa Valley
- Township of McNab/Braeside
- Township of North Algona Wilberforce
- Township of Whitewater Region
- Town of Arnprior
- Town of Deep River
- Town of Laurentian Hills
- Town of Petawawa
- Town of Renfrew
- City of Pembroke.

The Renfrew region also includes the following First Nations communities:

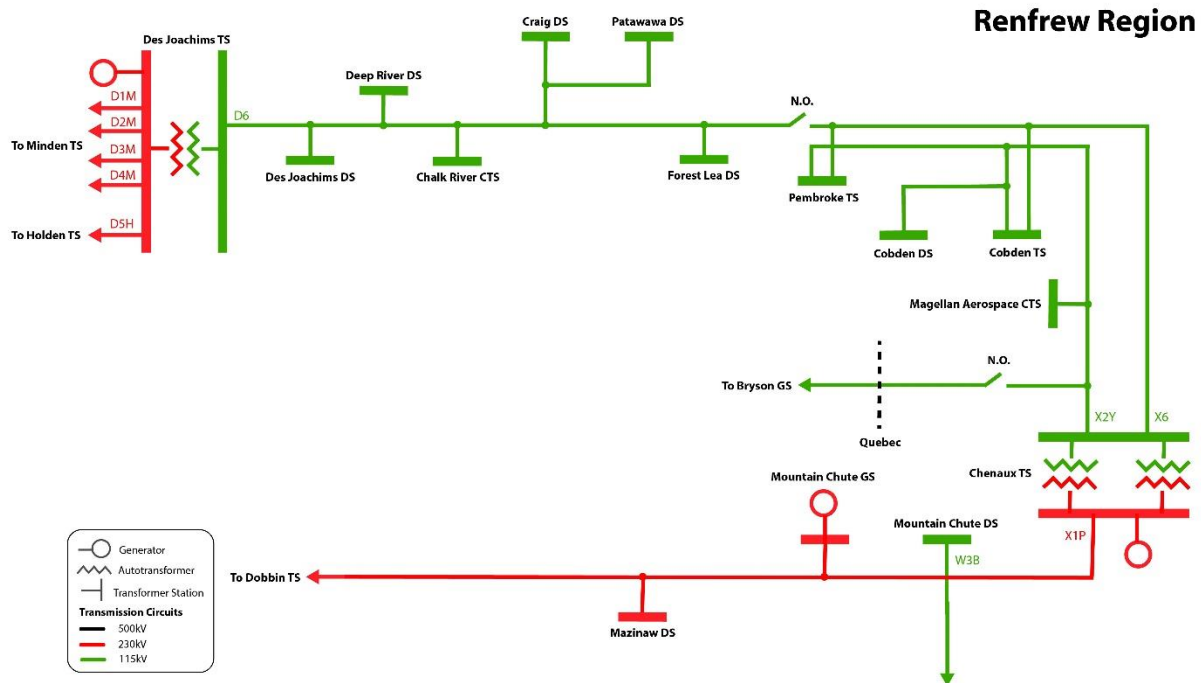
- Algonquins of Pikwakanagan
- Algonquins of Ontario (AOO Consultation Office)
- Huron Wendat
- MNO Ottawa Region Métis Council
- MNO High Land Waters Métis Council

Engagement on this regional plan may be extended to include additional communities outside of the IRRP area boundaries.

Renfrew Electricity System

The electricity system supplying the Renfrew region is shown in Figure A-4.

Figure A-4 | Renfrew Electricity System



Background

In the last regional planning cycle, the Renfrew region Needs Assessment was published in March 2016. Studies conducted during the development of these plans found that there were no pressing needs for the region at that time. It was noted that circuit X1P would be monitored more closely to ensure its reliability as an outage on the line would result in islanding of a portion of the system.

The most recent Needs Assessment identified a number of end-of-life considerations and Hydro One has laid out plans to address the aging infrastructure. In particular, refurbishment of the D6 circuit including all end-of-life assets and the replacement of the Chenaux T3, T4 transformers and associated assets. This work will be undertaken by Hydro One and is estimated to be completed by 2022.

The Needs Assessment for the Renfrew region also identified a near-term capacity need for Pembroke TS. Distribution options were discussed in the Needs Assessment as a possible solution. While none have been identified at this time, any feasible distribution options will be taken into consideration as part of the larger planning process.

2. Objectives

1. To assess the adequacy of electricity supply to customers in the Renfrew region over the next 20 years.
2. To develop a flexible, comprehensive, integrated electricity plan for the Renfrew region.
3. To develop an implementation plan, while maintaining flexibility in order to accommodate changes in key assumptions over time.

3. Scope

This IRRP will develop and recommend an integrated plan to meet the needs of the Renfrew region. The plan is a joint initiative involving Hydro One Distribution, Hydro One Transmission, Ottawa River Power Corp. and the IESO, and will incorporate input from community engagement. The plan will integrate forecast electricity demand growth, conservation and demand management in the area with transmission and distribution system capability, end-of-life of major facilities in the area, relevant community plans, other bulk system developments, and generation uptake, and will develop an integrated plan to address needs.

This IRRP will address regional needs in the Renfrew area. While planning activities will focus on Pembroke TS, the following existing infrastructure is included in the scope of this study:

- Stations—Pembroke TS, Des Joachims DS, Des Joachims TS, Deep River DS, Chalk River CTS, Craig DS, Patawawa DS, Forest Lea DS, Cobden DS, Cobden TS, Magellan Aerospace CTS, Chenux TS, Mountain Chute DS, Mzinaw DS, Dobbin TS
- Lines—D6, X2Y, X6, X1P

The Renfrew IRRP will:

- Prepare a 20-year electricity demand forecast for the appropriate stations and establish needs over this timeframe
- Examine the load meeting capability and reliability of the existing transmission system supplying the Renfrew region, taking into account facility ratings and performance of transmission elements, transformers, local generation, and other facilities such as reactive power devices
- Establish feasible integrated alternatives including a mix of CDM, generation, transmission and distribution facilities, and other electricity system initiatives in order to address the needs of the Renfrew region
- Evaluate options using decision-making criteria including but not limited to: technical feasibility, economics, reliability performance, environmental and social factors

4. Data and Assumptions

The plan will consider the following data and assumptions:

- Demand Data
 - Historical coincident peak demand information
 - Historical weather correction, median and extreme conditions
 - Gross peak demand forecast scenarios
 - Coincident peak demand data including transmission-connected customers
 - Identified potential future load customers
 - Customer/load segmentation information (e.g. residential, commercial, industrial) by TS
- Conservation and Demand Management
 - Conservation forecast for LDC customers, based on region's share of current energy efficiency programs
 - Potential for CDM at transmission-connected customers' facilities
- Local resources
 - Existing local generation, including distributed generation, district energy, customer-based generation, Non-Utility Generators and hydroelectric facilities as applicable
 - Existing or committed renewable generation from [previous] Feed-in-Tariff (FIT) and non-FIT procurements
 - Future district energy plans, combined heat and power, energy storage, or other generation proposals
- Relevant local plans, as applicable
 - LDC Distribution System Plans
 - Community Energy Plans and Municipal Energy Plans
 - Community Climate Action Plans
 - Municipal Growth Plans
 - Indigenous Community Energy Plans
- Criteria, codes and other requirements
 - Ontario Resource and Transmission Assessment Criteria (ORTAC)
 - Supply capability
 - Load security
 - Load restoration requirements
 - NERC and NPCC reliability criteria, as applicable
 - OEB Transmission System Code

- OEB Distribution System Code
- Reliability considerations, such as the frequency and duration of interruptions to customers
- Other applicable requirements
- Existing system capability
 - Transmission line ratings as per transmitter records
 - System capability as per current IESO PSS/E base cases
 - Transformer station ratings (10-day LTR) as per asset owner
 - Load transfer capability
 - Technical and operating characteristics of local generation
- End-of-life asset considerations/sustainment plans
 - Transmission assets
 - Distribution assets
- Other considerations, as applicable

5. Technical Working Group

The core Technical Working Group will consist of planning representative/s from the following organizations:

- Independent Electricity System Operator (*Team Lead for IRRP*)
- Hydro One Transmission
- Hydro One Distribution
- Ottawa River Power Corporation

Authority and Funding

Each entity involved in the study will be responsible for complying with regulatory requirements as applicable to the actions/tasks assigned to that entity under the implementation plan resulting from this IRRP. For the duration of the study process, each participant is responsible for their own funding.

6. Engagement

Integrating early and sustained engagement with communities and stakeholders in the planning process was recommended to and adopted by the provincial government to enhance the regional planning and siting processes in 2013. These recommendations were subsequently referenced in the 2013 Long Term Energy Plan. As such, the Technical Working Group is committed to conducting plan-level engagement throughout the development of the Renfrew IRRP.

The first step in engagement will consist of the development of a public engagement plan, which will be made available for comment before it is finalized. The data and assumptions as outlined in Section

4.0 will help to inform the scope of community and stakeholder engagement to be considered for this IRRP.

7. Activities, Timeline, and Primary Accountability

Activity	Lead Responsibility	Deliverable(s)	Timeframe
1. Prepare Terms of Reference considering stakeholder input	IESO	Finalized Terms of Reference	Q3 2021
2. Develop the planning forecast		Long-term planning forecast scenarios	Q3/Q4 2021
Establish historical coincident (for the region) and non-coincident (for Pembroke TS) peak demand information	IESO		
Establish historical weather correction, median and extreme conditions	IESO		
Establish gross peak demand forecast	LDCs		
Establish existing, committed and potential DG	IESO, LDCs		
Establish near- and long-term conservation forecast based on planned energy efficiency activities and codes and standards	IESO		
Develop planning forecast scenarios for sensitivity analyses	IESO		
3. Reconfirm load transfer capabilities from Pembroke TS	LDCs	Load transfer capabilities under normal and emergency conditions	Q4 2021

Activity	Lead Responsibility	Deliverable(s)	Timeframe
4. Provide and review relevant community plans, if applicable	LDCs, First Nations and IESO	Relevant community plans	Q4 2021
5. Complete system studies to identify needs <ul style="list-style-type: none"> - Obtain PSS/E base case - Include bulk system assumptions as identified in Key Assumptions - Apply reliability criteria as defined in ORTAC to demand forecast scenarios - Confirm and refine the need(s) and timing/load levels 	IESO, Hydro One Transmission	Summary of needs based on demand forecast scenarios for the 20-year planning horizon	Q1 2022
6. Develop options and alternatives		Develop flexible planning options for forecast scenarios	Q2 2022
Conduct a screening to identify which non-wires options warrant further analysis	IESO		
Produce hourly forecasts for Pembroke TS to enable detailed needs characterization and support options development	IESO		
Develop screened-in energy efficiency options	IESO and LDCs		
Develop screened-in local generation/demand management options	IESO and LDCs		
Confirm the transmission and distribution alternatives: advancement of EOL transformer replacement plans and/or load transfers	IESO, Hydro One Transmission and LDCs		
Develop portfolios of integrated alternatives	All		

Activity	Lead Responsibility	Deliverable(s)	Timeframe
Technical comparison and evaluation	All		
7. Plan and undertake community & stakeholder outreach and engagement	IESO	Community and Stakeholder Engagement Plan Input from local municipalities, First Nation communities, and Métis organizations	Ongoing
Early engagement including with local municipalities and First Nation communities within study area, First Nation communities who may have an interest in the study area, and the Métis organizations	All		Q4 2021/Q1 2022
Develop communications materials	All		Q3 2021/Q4 2022
Undertake community and stakeholder engagement	All		Q4 2021/Q4 2022
Summarize input and incorporate feedback	All		Ongoing throughout development of IRRP
8. Develop long-term recommendations and implementation plan based on community and stakeholder input	IESO	Implementation plan Monitoring activities and identification of decision triggers Procedures for annual review	Q3 2022
9. Prepare the IRRP report detailing the recommended near, medium and long-term plan for approval by Technical Working Group	IESO	IRRP report	Q3 2022

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