Ottawa Area Integrated Regional Resource Plan

July 31, 2025

Connecting Today.
Powering Tomorrow.

Disclaimer

This document and the information contained herein is provided for informational purposes only. The IESO has prepared this document based on information currently available to the IESO and reasonable assumptions associated therewith, including relating to electricity supply and demand. The information, statements, and conclusions contained in this document are subject to risks, uncertainties, and other factors that could cause actual results or circumstances to differ materially from the information, statements, and assumptions contained herein. The IESO provides no guarantee, representation, or warranty, express or implied, with respect to any statement or information contained herein and disclaims any liability in connection therewith. Readers are cautioned not to place undue reliance on forward-looking information contained in this document, as actual results could differ materially from the plans, expectations, estimates, intentions, and statements expressed herein. The IESO undertakes no obligation to revise or update any information contained in this document as a result of new information, future events or otherwise. In the event there is any conflict or inconsistency between this document and the IESO market rules, any IESO contract, any legislation or regulation, or any request for proposals or other procurement document, the terms in the market rules, or the subject contract, legislation, regulation, or procurement document, as applicable, govern.

Table of Contents

List of Figures

List of Tables

List of Appendices

List of Acronyms

Acronym	Definition
APO	Annual Planning Outlook
BESS	Battery Energy Storage System
DER	Distributed Energy Resource
DESN	Dual Element Spot Network
DG	Distributed Generation
DR	Demand Response
DS	Distribution Station
eDSM	Electricity Demand Side Management
EV	Electric Vehicle
FIT	Feed-in-Tariff
GS	Generating Station
IESO	Independent Electricity System Operator
ISD	In-Service Date
IRRP	Integrated Regional Resource Plan
kV	Kilovolt
LAPS	Local Achievable Potential Study
LDC	Local Distribution Company
LDV	Light-Duty Vehicles
LMC	Load Meeting Capability
LTR	Limited Time Rating

Acronym	Definition
MTS	Municipal Transformer Station
MVA	Megavolt Ampere
MW	Megawatt
NERC	North American Electric Reliability Corporation
OEB	Ontario Energy Board
ORTAC	Ontario Resource and Transmission Assessment Criteria
RAS	Remedial Action Scheme
RIP	Regional Infrastructure Plan
SCADA	Supervisory Control and Data Acquisition
TS	Transformer Station
ULO	Ultra-Low Overnight

Executive Summary

This Integrated Regional Resource Plan (IRRP) addresses the electricity needs of the Ottawa Area Sub-Region over a 20-year horizon. Developed by the Independent Electricity System Operator (IESO) in collaboration with Hydro Ottawa Limited (Hydro Ottawa), Hydro One Networks Inc. (Distribution), and Hydro One Networks Inc. (Transmission), the plan outlines recommendations to ensure a reliable and cost-effective electricity supply that can support continued economic development and the City of Ottawa's decarbonization objectives.

The Ottawa Area Sub-Region includes the City of Ottawa and the Village of Casselman, and falls within the traditional territory of the Algonquins of Ontario, Kitigan Zibi Anishinabeg, Pikwakanagan First Nation, and Métis Nation of Ontario Region 5. This plan is part of Ontario's broader regional planning framework, now in its third cycle, and reflects the coordinated input of local distribution companies, transmission asset owners, and regional stakeholders.

The need for this IRRP was confirmed through the Scoping Assessment, which identified the Ottawa Area Sub-Region as requiring regional coordination and consideration of non-wires alternatives. The plan is shaped by the City's electrification and decarbonization targets, customer connection requests, and ongoing engagement with groups such as Invest Ottawa. These drivers signal a broader shift toward city-wide energy transformation, with particularly strong momentum in areas like Kanata-Stittsville.

This IRRP marks a notable evolution in planning by integrating electrification as a core assumption from the outset. Load forecasting was developed in collaboration with Hydro Ottawa and Hydro One Distribution, incorporating multiple scenarios with varying degrees of electrification. The selected reference forecast balances feasibility and risk, and reflects a likely trajectory of sustained load growth, winter-peaking demand, and increased system complexity.

In response, the plan provides a flexible sequence of near-, medium-, and long-term actions designed to manage uncertainty while ensuring the system remains prepared to accommodate growth. It reflects established planning best practices, including ongoing adaptation to evolving conditions. Key near-term investments include new transformer stations, line upgrades, and system reinforcements to address station and system capacity needs, asset replacement, and load security and restoration concerns.

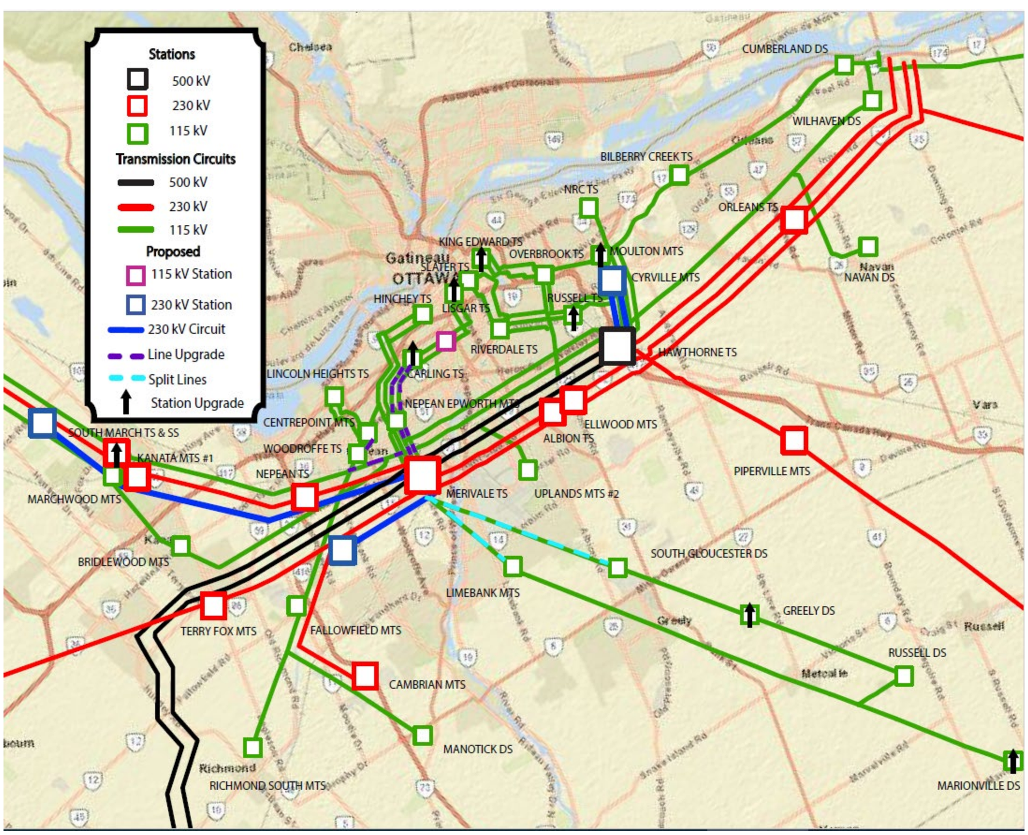
Non-wires solutions play an increasingly important role in the plan. Several large-scale Battery Energy Storage System (BESS) projects identified through the IESO's Long-Term Procurement I (LT1) will enhance reliability, voltage performance, and system resilience. In parallel, the Local Achievable Potential Study (LAPS) will inform targeted demand-side measures that may defer or reduce the need for major infrastructure upgrades, especially in the downtown core.

The recommendations outlined in this IRRP represent a balanced, cost-effective path forward that supports Ottawa's growth while maintaining reliability and customer value. Annual monitoring of load growth and system conditions will inform future updates and help determine when to initiate the next regional planning cycle. A summary of the recommendations can be seen in **Figure 1.**

In summary, the plan proposes to:

- Build new or upgrade Transformation Stations to increase station capacity:
    - Three new 230 kV stations: Kanata North area, Core West area and Cyrville MTS (converted from 115 kV)
    - One new 115 kV station: Core East area (a new MTS by converting from existing distribution station)
    - Station upgrades: Carling TS, Lisgar TS, King Edward TS, Moulton MTS, Russell TS, Greely DS, South March TS and Marionville DS
- Build new or upgrade transmission lines to connect new stations and increase System Capacity:
    - Two new 230 kV transmission lines to connect new stations (Kanata North and Core West areas) from Merivale TS
    - A new 230 kV switching station in Kanata North area
    - 115 kV transmission line uprating: portions of M4G and M5G
- Modify connection configuration to improve load security:
    - Install new circuit breaker at Merivale TS and separate L2M and M1R
    - Provide second supply to Nepean TS via new transmission circuit from Merivale TS.
- Transfer load between stations through the distribution system to balance and optimize the utilization of station capacity
- Integrate the eDSM program opportunities identified as part of LAPS
- Formalize adaptive pathways for each subsystem

Figure 1 | Map of Recommendations for Ottawa Area Sub-Region



1. Introduction

This IRRP documents the recommendations required to address the electricity needs for the Ottawa Area Sub-Region over the next 20 years. It was prepared by the IESO on behalf of a technical working group (Working Group) composed of the IESO, Hydro Ottawa, Hydro One Distribution, and Hydro One Transmission. Hydro Ottawa, a municipally owned utility that operates in the City of Ottawa (City) and in the Village of Casselman, and Hydro One Distribution are local distribution companies (LDCs) that serve customers in the sub-region. Hydro One is the transmission asset owner in the sub-region.

This sub-region also includes the following First Nations and Métis Nation of Ontario councils:

- Algonquins of Ontario
- Kitigan Zibi Anishinabeg
- Pikwakanagan First Nation
- Métis Nation of Ontario Region 5

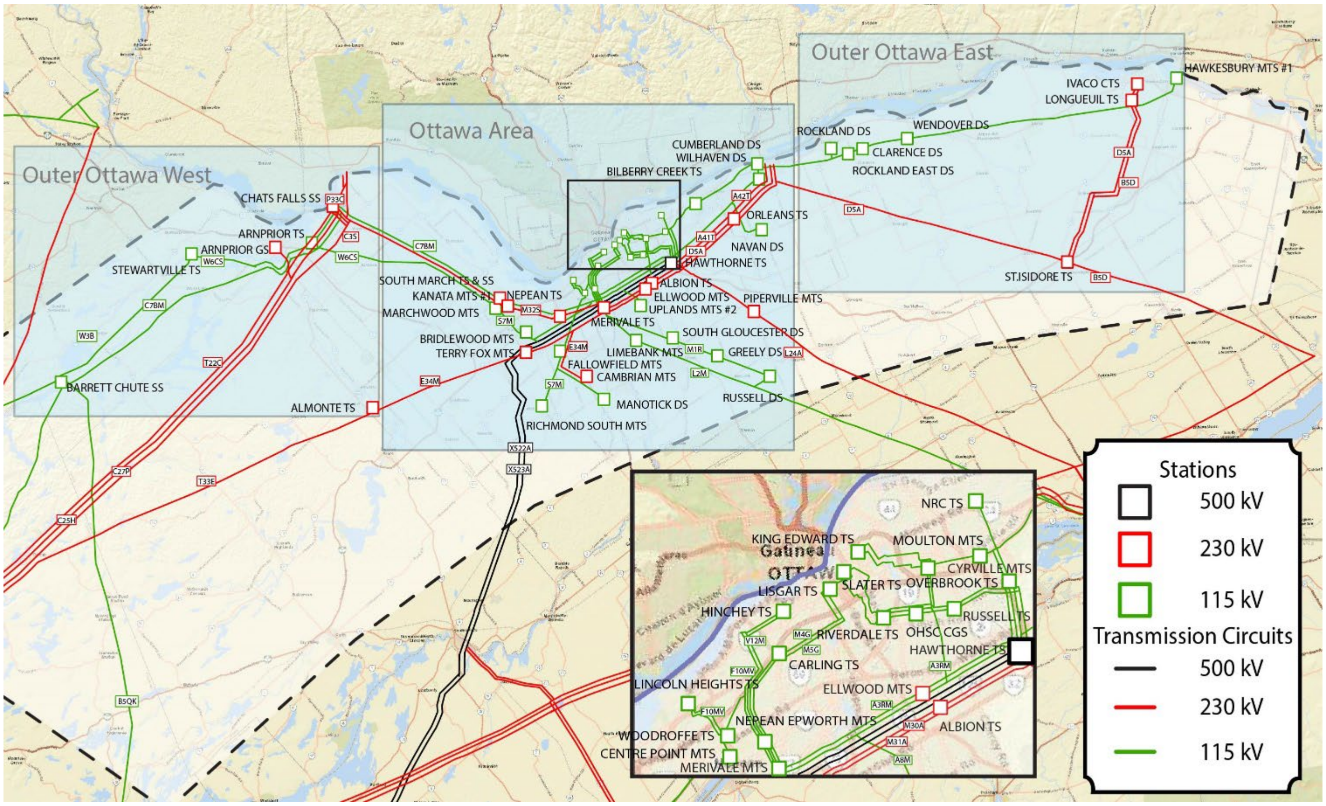
In Ontario, planning to meet the electrical supply and reliability needs of a large area or region is carried out through regional electricity planning, a process that was formalized by the Ontario Energy Board (OEB) in 2013. In accordance with this process, transmitters, distributers, and the IESO are required to carry out regional planning activities for 21 electricity planning regions across Ontario, at least once every five years. This is the third cycle of regional electricity planning, which resulted in the third IRRP for the Ottawa region.

For the purposes of regional planning, the Ottawa region has historically been subdivided into three major sub-regions, as shown in **Figure 2**. One of the main purposes of an IRRP is to foster collaboration where coordination between multiple stakeholders in a region is required. Hydro Ottawa is the main LDC that serves the electricity demand for the City of Ottawa. Hydro One Distribution supplies load in the surrounding areas of the sub-region. Both Hydro Ottawa and Hydro One Distribution receive power at the step-down transformer stations (TS) and distribute it to end users, including industrial, commercial, and residential customers.

The Scoping Assessment confirmed the need for regional coordination and the importance of evaluating non-wires alternatives to address emerging electricity needs. As a result, the Working Group determined that this IRRP will focus on the Ottawa Area Sub-Region, while the remaining sub-regions will be addressed through the Regional Infrastructure Plan (RIP) led by Hydro One Transmission as those sub-regions are predominantly served by Hydro One Distribution.

The Ottawa Area Sub-Region encompasses the City, including the Kanata, Nepean, and Orléans communities. To further simplify the organization and analysis, the Working Group further divided the sub-region into four subsystems based on their geographic and electrical characteristics. The four subsystems can be seen in **Figure 3** and this report will address each subsystem separately throughout. A more thorough description of each of the subsystems can be found in Section 4 (background) and Section 6 (needs).

Figure 2 | Overview of the Greater Ottawa Sub-Regions

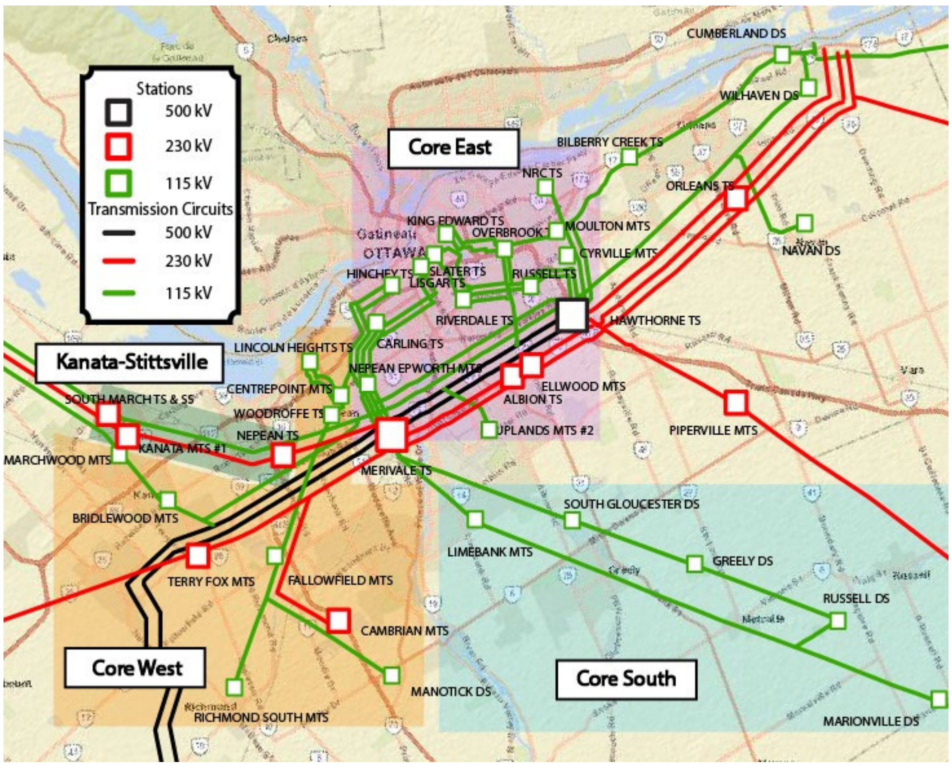


Every plan faces its own unique challenges, and this third cycle of regional planning for the Ottawa area is no exception. The City of Ottawa and the federal government have set ambitious decarbonization and electrification goals, which serve as a foundational input to this IRRP. These goals, supported by customer connection requests, projected growth trends, and consultations with economic sector participants such as Invest Ottawa, reflect a broader shift toward city-wide economic transformation — with particular momentum in areas like Kanata-Stittsville. While previous regional plans included electrification among several scenarios, this IRRP distinguishes itself by embedding electrification as a core planning assumption from the outset, recognizing both the uncertainty it introduces and the opportunity to plan proactively to meet emerging system demands.

The Working Group convened a series of discussions with the City and various energy stakeholders during the development of the plan, aiming to collaboratively shape the demand forecast and align on anticipated decarbonization trends. These conversations helped inform the demand forecasts developed by Hydro Ottawa and Hydro One Distribution. Several scenarios were developed with varying degrees of electrification. By balancing risk and feasibility, one of these scenarios was selected as the reference demand forecast that drove the needs, options, and recommendations found in this report. A high-growth scenario was also identified for sensitivity analysis.

The forecasted economic development, decarbonization, and electrification would result in a substantial increase in peak electricity demand over the next 20 years. Furthermore, the forecast indicates that the region will soon become winter-peaking, due in large part to the effects of transitioning heating from natural gas to electric or hybrid. This ultimately led to the identification of numerous needs in the sub-region that span the near-, medium-, and long -terms which refer to outlooks in the 5-, 10-, and 20-year horizons respectively.

Figure 3 | Overview of the Four Ottawa Area Subsystems



Anticipated electricity demand growth in Ottawa presents a planning challenge: ensuring the system is positioned to support organic growth and economic development, while avoiding the premature construction of assets that may not be needed in the near term. Missed opportunities to enable new connections or achieve the City's decarbonization targets could have lasting impacts. At the same time, overbuilding infrastructure too far in advance could result in unnecessary costs to electricity customers.

To manage these risks, this plan takes a flexible and phased approach — one that reflects good planning practice and builds on how the electricity sector in Ontario has adapted to uncertainty over time. This IRRP outlines a sequence of actions that can evolve as conditions change, providing a framework to respond to growth while managing uncertainty responsibly.

Multiple BESS projects in the sub-region have been recommended through the IESO's LT1 initiative. Once developed, these large-scale batteries will help improve voltage performance, enhance reliability, and provide added flexibility and resilience to the grid.

In addition, a LAPS is expected to inform targeted conservation and demand management opportunities. These measures may help defer large, costly upgrades — particularly in the downtown core — by reducing strain on existing infrastructure.

The firm recommendations in this IRRP are designed to address near-term system and station capacity needs, asset replacement requirements, and load security and restoration needs, while laying the groundwork for longer-term improvements. Annual monitoring of potential issues will provide additional input on when the next regional planning cycle should be initiated.

This report is organized as follows:

- A summary of the recommended plan for the region is provided in Section 2;
- The process and methodology used to develop the plan are presented in Section 3;
- The context for electricity planning in the region and the study scope are described in Section 4;
- Demand forecast scenarios, and electricity Demand Side Management (eDSM) and distributed generation assumptions, are described in Section 5;
- Electricity needs in the region are presented in Section 6;
- Alternatives and recommendations for meeting needs are addressed in Section 7;
- A summary of engagement activities is provided in Section 8; and
- The conclusion is provided in Section 9.

2. The Integrated Regional Resource Plan

This IRRP provides recommendations to address the electricity needs of the Ottawa Area Sub-Region over the next 20 years. The identified needs are based on the demand growth anticipated in the region and the capability of the existing transmission system, as evaluated through application of the IESO's Ontario Resource and Transmission Assessment Criteria (ORTAC) and reliability standards governed by the North American Electric Reliability Corporation (NERC). The IRRP's recommendations are informed by an evaluation of different options to meet the needs and consider reliability, cost, technical feasibility, and maximizing the use of the existing electricity system (where economically feasible). The plan also reflects feedback from stakeholders and seeks to balance the need to ensure the system is poised to enable growth — including economic development — with the risk of building investments too early.

The Ottawa Area Sub-Region electricity demand forecast, provided by the LDCs, projects sustained growth driven by municipal growth, commercial development, and the effects of electrification and decarbonization. The planned phase-out of gas heating in the region is also a major driver of the demand forecast and electricity supply needs in the sub-region, especially in later years of the demand forecast.

The IRRP recommendations are organized into a near-term plan and a set of ongoing or medium- to long-term initiatives. This structure reflects the varying degrees of forecast certainty, development lead times, and planning commitments required over different timeframes. By doing so, the IRRP offers clear guidance on immediate investment needs while maintaining flexibility to adapt over the medium and long term as electrification, energy efficiency, and development plans continue to evolve.

2.1 Near-Term Plan

The near-term plan consists of several recommendations to accommodate load growth, maintain reliability, and optimize asset replacement. Many of these needs are driven by the strong growth in the winter demand forecast. The major recommendations are summarized in **Table 1**.

Table 1 | Summary of Recommendations

Need Type	Affected Element(s)	Recommendation	High Level Planning Cost Estimate[1]
System Capacity (Transformation, Voltage Stability)	Kanata-Stittsville	Build new 230kV Transformer Station north of existing stations. Connect to C3S and new transmission line from Merivale TS. Interim station name: Kanata North Municipal Transformer Station (MTS).	$45M
		Build new 230kV transmission line from Merivale TS by rebuilding C7BM corridor, connecting Nepean TS and new Kanata North MTS	$185M
		Build a switching station that connects existing and new 230kV stations to improve resiliency and flexibility	$65M
System Capacity (Transformation)	Core East	Build new 115kV Transformer Station by converting existing distribution station. Connect to M4G and M5G. Interim station name: Bronson MTS.	$65M
System Capacity (Thermal Overload)	Core East	Upgrade portions of existing 115kV circuits M5G and M4G.	$35M
System Capacity (Transformation)	Core East	Convert Cyrville MTS (115kV) to 230kV thereby preserving capacity on autotransformers for growth on the 115kV downtown system	$75M
		Pursue eDSM program opportunities identified as part of LAPS to reduce demand and delay large scale infrastructure upgrades.	N/A

[1] All cost estimates are capital cost values

Need Type	Affected Element(s)	Recommendation	High Level Planning Cost Estimate[1]
System Capacity (Transformation)	Core West	Build new Transformer Station to meet demand growth and need for 28kV supply west of Merivale TS. Interim station name: Greenbank MTS.	$40M
		Build new 230kV transmission line from Merivale TS to supply new Greenbank MTS.	$50M
Load Security	Core South	Install new circuit breaker at Merivale TS and separate L2M and M1R	$30M
Planning	N/A	Working Group to produce Adaptive Pathways documents for each subsystem following the publishing of the IRRP. Utilize Annual Working Group meeting to refine and communicate the pathways to relevant stakeholders.	

A complete list of recommendations can be found in Section 7.8.

A high-level planning estimate based on 2025 capital costs for the proposed suite of solutions is approximately $900 million, with a recommended In-Service Date (ISD) ranging between 2029-2032, based on the growth forecast. The identified needs have been grouped to align with integrated solution sets, as outlined in Section 6 of this report. The recommendations from this report will be further prioritized during the RIP. The near-term recommendations represent critical first steps in expanding the electricity grid's capabilities to support the region's goals in a timely manner.

2.2 Medium-, to Long-Term Plan

While most of the recommended actions from the Ottawa Area Sub-Region IRRP are planned for the near-term (within the next five years), the sections below outline potential medium- to long-term recommendations beyond that horizon. The actions described below illustrate the adaptive pathways identified through this regional planning process. These pathways are subject to change and will be continuously re-evaluated as planning progresses, based on new information and actual load growth. Awareness of these plans is important to enable timely decision-making. Further details on the adaptive pathways, including the subway-style maps, are provided in Section 7. It is recommended that the Working Group finalize the long-term adaptive pathway plan for each subsystem following the completion of this cycle of regional planning.

Kanata-Stittsville Subsystem

To address the significant capacity needs at Kanata MTS, South March TS and, eventually, Nepean TS a new switching station is planned to interconnect these key sites. This switching station will provide critical resiliency, operational flexibility, and expandability for future load growth. Additionally, the station will serve as a hub for a new transmission line extending north to Chats Falls TS, pending upgrades at Chats Falls to support the connection. This project will not only diversify supply paths and increase the Load Meeting Capability (LMC) for the area, but also improve Ottawa's overall system strength.

The East Bulk Study, currently underway, is exploring potential reinforcements to strengthen the supply path into Ottawa. As part of this, the proposed switching station is being evaluated for its potential to support the expansion of the 230 kV network. In addition to enhancing regional integration, this connection would diversify supply sources and improve the overall resilience of the electricity system in the Ottawa area.

Core East Subsystem

Core East faces the most acute and widespread capacity challenges, particularly in the 115 kV downtown network. Due to physical constraints on system expansion, eDSM program opportunities identified in the LAPS could play a crucial role in regulating and managing downtown load growth. Long-term planning includes expanding Hawthorne TS, extending a mix of 115 kV and 230 kV circuits into the downtown core, and constructing additional supply stations to relieve pressure on aging infrastructure. A fourth autotransformer at Merivale TS is also under consideration, which would enhance transfer capability and reduce strain on nearby stations. To further alleviate pressure on the 115 kV system, a planned conversion of S7M will allow additional load to be shifted off the constrained network.

Core West Subsystem

With station overloads emerging across Marchwood, Fallowfield, Manordale, and others, the long-term strategy for Core West centres on the conversion of circuit S7M to 230 kV. This will relieve the 115 kV system, preserving capacity for downtown load growth while supporting suburban development. The new circuit can be extended to provide a second supply path to Terry Fox MTS and Cambrian MTS, enhancing reliability and operational flexibility. This conversion will also unlock the full potential of a large-scale BESS identified in the LT1 framework. Additional transmission work, including uprating portions of C7BM and F10MV, is planned to mitigate thermal overloads and enhance backbone performance.

Core South Subsystem

Future planning in Core South hinges on the findings of the East Bulk Study, with a possible 230 kV transmission line from the St. Lawrence area offering the potential to fully convert the pocket to 230 kV operation. Limebank MTS, forecast to exceed capacity in the medium term, will require a second supply path as load grows; monitoring and proactive circuit upgrades will be key. A new autotransformer station in western Ottawa is also under consideration, and its implementation will influence future planning and routing decisions for Core South.

3. Development of the Plan

3.1 The Regional Planning Process

In Ontario, preparing to meet the electricity needs of customers at a regional level is achieved through regional planning. Regional planning assesses the inter-related needs of a region—defined by common electricity supply infrastructure—over the near-, medium-, and long -term, and results in a plan to ensure cost-effective and reliable electricity supply. A regional plan considers the existing electricity infrastructure in an area, forecasts growth and customer reliability, evaluates options for addressing needs, and recommends actions.

The current regional planning process was formalized by the Ontario Energy Board in 2013 and is performed on a five-year cycle for each of the 21 planning regions in the province. The process is carried out by the IESO, in collaboration with the transmitters and LDCs in each region. The process consists of four main components:

1. A **Needs Assessment**, led by the transmitter, which completes an initial screening of a region's electricity needs and determines if there are electricity needs requiring regional coordination;
2. A **Scoping Assessment**, led by the IESO, which identifies the appropriate planning approach for the identified needs and the scope of any recommended planning activities;
3. An **IRRP**, led by the IESO, which proposes recommendations to meet the identified needs requiring coordinated planning; and/or
4. An **RIP**, led by the transmitter, which provides further details on recommended wires solutions.

Regional planning is not the only type of electricity planning in Ontario. Other types include bulk system planning and distribution system planning. There are inherent overlaps in all three levels of electricity infrastructure planning. Further details on the regional planning process and the IESO's approach to it can be found in Appendix A.

3.2 Ottawa Area Sub-Region IRRP Development

The process to develop the Ottawa Area Sub-Region IRRP started in March 2023, following the publication of the **Needs Assessment Report** in December 2022 by Hydro One and the **Scoping Assessment Outcome Report** in February 2023 by the IESO. The Scoping Assessment recommended that the needs identified for the Ottawa Area Sub-Region be considered through an IRRP in a coordinated regional approach, supported with public engagement. The Working Group was then formed to develop the terms of reference for this IRRP, gather data, identify needs, develop options, and recommend solutions for the region.

Given the significant uncertainty surrounding the impacts of electrification and decarbonization, the Working Group has taken several important steps to manage this risk. Recognizing Ottawa's unique combination of rapid urban growth, economic development opportunities, and decarbonization initiatives, it was clear that a flexible and forward-looking approach was necessary. As a first step, the LDC engaged a third-party consultant to develop a series of load forecast scenarios that incorporated full decarbonization by 2050. This process ensured that the forecasts accounted for electrification in a meaningful way and were developed with a high degree of objectivity and technical rigour. The resulting scenarios highlighted the challenge of managing substantial load growth over a relatively short period of time, which further reinforced the need for a more flexible planning approach.

The Working Group remains committed to ongoing monitoring of actual load growth, technological developments, and policy changes, ensuring the plan continues to reflect real-world conditions. This approach reflects a foundational aspect of electricity planning in Ontario — the recognition that flexibility and regular updates are essential in the face of evolving system needs. The adaptive approach outlined in this IRRP provides a structured yet flexible roadmap that enables the electricity system to grow in step with Ottawa's evolving demand, while maintaining reliability, cost-effectiveness, and resilience. It also aligns with the City of Ottawa's direction on electrification and supports local aspirations related to the energy transition.

4. Background and Study Scope

4.1 Previous Regional Planning Cycle

This is the third cycle of regional planning for the Ottawa Area Sub-Region. The previous cycle of regional planning for the Ottawa Area Sub-Region was carried out from 2018 to 2020 and resulted in the publishing of an IRRP and an RIP. Furthermore, between-cycle planning occurred in 2022 to revisit a previous recommendation for the Orléans area. The Working Group reconvened and decided not to refurbish Billberry Creek as previously recommended and will instead decommission the station and focus on new infrastructure in the Orleans area. The recommendations are described within the report.

The previous Ottawa Area Sub-Region IRRP was published in March 2020. The IRRP used a 20-year demand forecast and made recommendations to monitor long-term needs in the region, while providing clear direction on actions required in the near-term. This included several distribution load transfers and asset replacements as described below. Furthermore, the plan recognized the need for a long-term solution for the Kanata-Stittsville area but decided that interim measures in the forms of enhanced IESO led energy efficiency programs were more prudent at that stage. This plan picks up where the previous plan left off and provides the next steps for expanding the electricity system to meet growing demand.

The plan also identified two supply deficiencies in the southwest and southeast areas of the Ottawa Area Sub-Region. In the southwest, referred to as the Core West subsystem in this report, the Cambrian MTS station was brought into service in 2022. Originally identified in 2008 and approved by the IESO in 2016, this new station addresses growing demand in the area. In the southeast, a new station, Piperville MTS, is currently under construction. This station will relieve neighbouring stations and provide additional capacity to support emerging load growth in the region.

Additionally, to accommodate both load growth and the end-of-life considerations in the Orléans area, it is recommended that the Billberry Creek station be decommissioned. In its place, a new station—tentatively named Mer-Bleue MTS—will be required to serve the existing load, with an expected in-service date of 2027. Finally, the introduction of a new electrified municipal bus fleet will necessitate the construction of a bus charging station near Hawthorne TS, referred to as Hydro Road MTS in the current plan

2020 Ottawa Integrated Regional Resource Plan Recommendations

- Hydro Ottawa is to implement the North Kanata Retrofit Top-Up Program and the North Kanata Smart Thermostat Program, which are targeted commercial and residential energy efficiency programs. Hydro Ottawa is also planning distribution system transfers to reduce demand at heavily loaded stations.
- Hydro One is to replace Merivale TS Transformer T22 with one that is equivalent to T21.
- Hydro One is to proceed with the like-for-like refurbishment of Bilberry Creek TS, which is approaching its end-of-life, and expand the station to accommodate two additional breaker positions to supply Hydro Ottawa customers.

- Hydro One is to replace Slater TS T2 and T3, which are approaching their end-of-life, with larger transformers, approximately 100 megavolt amperes (MVA), as was done for the recent replacement of T1.
- Hydro One is to replace the two 75 MVA transformers at Albion TS, which are approaching their end-of-life, with similar size transformers.
- Hydro One is to replace the two 75 MVA transformers at Lincoln Heights TS, which are approaching their end-of-life, with similar size transformers.
- Hydro Ottawa is to plan and seek approval for a new 230 kV connected supply station in southeast Ottawa.

2020 Ottawa Regional Infrastructure Plan Recommendations

- Replace end-of-life transformers T1/T2 at Lincoln Heights TS: complete in 2024, 2023 respectively (45/60/75 MVA).
- Replace end-of-life transformers T3/T4 at Longueuil TS: in-service date of 2025.
- Replace end-of-life 115 kV breakers at Riverdale TS: In-service date of 2028.
- Increase transformation capacity in southeast Ottawa, with Hydro Ottawa building a transformer station: station named Piperville TS, expected in-service date 2026.
- Replace end-of-life transformers T1/T2 and circuit breakers at Albion TS.
- Replace end-of-life transformers at Russel TS.
- Determine limitation of low voltage-cables, upgrade cables at Overbrook TS: station Limited Time Rating (LTR) increased between cycles, which reflects this change.
- Upgrade Hawkesbury MTS station capacity.
- Refurbish Bilberry Creek TS end-of-life: the Working Group recommends decommissioning Billberry Creek in favour of new DESN, as described within the report.
- Replace T22 at Merivale TS: this project is ongoing and is part of the Merivale project, which is in service in 2029
- Voltage performance of 79M1 evaluated as part of next IRRP: moving to 2025 RIP

4.2 Bulk Planning and Other Developments

Beyond historical regional planning efforts, the Ottawa Area Sub-Region has also been the focus of bulk planning initiatives and other key developments.

2022 Gatineau Corridor Study

- Refurbish all 800 km of 230 kV circuits on the Gatineau Corridor identified as nearing end-of-life.
- Build a new double-circuit 230 kV transmission line into Dobbin TS (in Peterborough) from Clarington TS (in Oshawa), with a planned in-service date of 2029.

- Pursue up to 230 megawatts (MW) of additional system cost-effective energy efficiency in the Ottawa area over the 20-year planning horizon, while monitoring demand growth and resource acquisition activities in the Ottawa zone.
- Update and expand the use of remedial action schemes (RASs) in the Peterborough and Ottawa areas to meet planning standards and further improve the load meeting capabilities of both areas.
- Implementation of recommendations is ongoing.

2023 Orléans Area Study

To manage forecast risks from high electrification growth, maintain reliability, and defer major upgrades to Ottawa's 115 kV system beyond the third autotransformer at Merivale TS, an integrated solution package is recommended. This includes decommissioning Bilberry Creek TS, building a new 230 kV circuit from Hawthorne TS to Orléans TS, and upgrading Orléans TS to a 230 kV DESN.

IESO Long-Term 1 Procurement

During the IRRP process, the IESO launched its Long-Term 1 Procurement, which has led to competitive pricing for new resources, municipal support, and significant Indigenous participation and equity ownership in projects. The IESO entered into contracts with 13 selected proponents, securing approximately 2,200 MW of new capacity, set to come online between 2026 and 2028. Among these procurements are two large-scale BESS located in the Kanata-Stittsville and Core West subsystems to the west of Ottawa.

Although the IRRP evaluated batteries as part of the non-wires solutions process and found that they could not fully address the identified needs on their own, they offer valuable benefits, including improvements in voltage stability, peak demand management, and enhanced system reliability. This plan supports the technical advantages of these projects and acknowledges that a diversified system will be crucial for realizing the long-term vision of the electricity landscape.

Eastern Ontario Bulk Plan

- The IESO is carrying out an Eastern Ontario Bulk Study to assess the sufficiency of the bulk transmission system to reliably supply the demand growth expected in Greater Ottawa areas. The bulk plan will be coordinating with this IRRP regarding demand forecast and regional assumptions to ensure alignment and efficiency.
- The targeted completion of this bulk plan is Q1 2026.

4.3 Current Cycle of Regional Planning

The current cycle of regional planning began in 2023 with the publication of the Needs Assessment Report, where several needs requiring further regional coordination were identified. The 2023 Ottawa Scoping Assessment recommended an IRRP for the Ottawa Area Sub-Region to address needs in a coordinated manner. This report presents an integrated regional electricity plan for the next 20-year period starting from 2024.

This IRRP develops and recommends options to meet the electricity needs of the Ottawa Area Sub-Region in the near-, medium-, and long-term. The plan was prepared by the IESO on behalf of the

Working Group, and considers forecast electricity demand growth, eDSM, distributed generation (DG), transmission and distribution system capability, relevant community plans, condition of transmission assets, and developments on the bulk transmission system.

The transmission facilities included in the scope of this study are shown in **Table 2**, **Table 3**, and **Table 4**:

Table 2 | Transformer Stations

Albion TS	Bridlewood MTS	Cambrian MTS	Carling TS
Centrepoint MTS	Cumberland DS	Cyrville MTS	Ellwood MTS
Fallowfield MTS	Greely DS	Hawthorne TS	Hinchey TS
Kanata MTS	King Edward TS	Limebank MTS	Lincoln Heights TS
Lisgar TS	Manordale MTS	Manotick DS	Marchwood MTS
Marionville DS	Merivale MTS	Moulton MTS	National Aeronautical CTS
National Research Council CTS	Navan DS	Nepean Epworth MTS	Nepean TS
Piperville MTS	Orléans TS	Overbrook TS	Richmond South MTS
Riverdale TS	Russell DS	Russell TS	Slater TS
South Gloucester DS	South March TS	Terry Fox MTS	Uplands MTS
Wilhaven DS	Woodroffe TS	Hydro Road MTS	

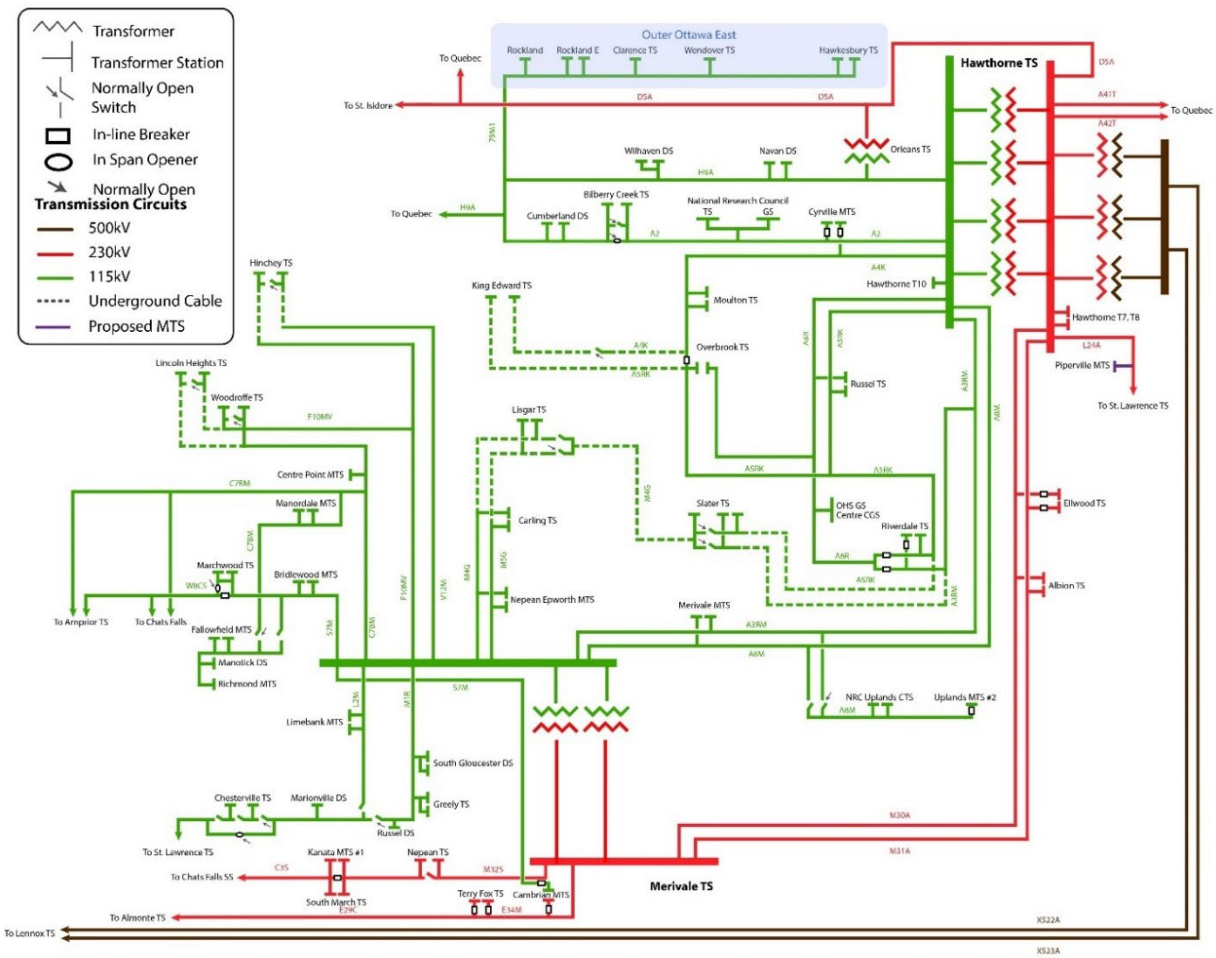
Table 3 | 115 kV Transmission Circuits

C7BM	F10MV	V12M	S7M	W6CS	A5RK
A4K	A6R	A8M	A3RM	A2	H9A
M1R	L2M	M4G	M5G		

Table 4 | 230 kV Transmission Circuits

E34M	D5A	L24A	B5D	M30A	M31A
M32S	C3S	L24A			

Figure 4 | Single Line Diagram of the Ottawa Area Sub-Region



The single line diagram of the Ottawa Area Sub-Region is shown in **Figure 4**. Note that the bulk system transfer capabilities on the Flow-into-Ottawa (FIO) interface into the region is not within the scope of this IRRP and was separately studied in the East bulk transmission plan. The schedule of bulk planning activities is identified through the IESO's **Annual Planning Outlook**.

Ottawa is a major load centre in eastern Ontario, which is primarily supplied by:

- two 500 kV circuits from Lennox TS in Lennox and Addington County
- two 230 kV circuits from St. Lawrence TS in Cornwall
- one 230 kV circuit from Chats Falls SS
- one 115 kV circuit from Barrett Chute GS
- one 115 kV circuit from Stewartville GS
- an inter-connection with Quebec's transmission system at Hawthorne TS, located in the east side of Ottawa

The transmission system serving Ottawa has several interfaces that can limit the ability to meet demand within the city and efficiently transfer power from generation and imports in eastern Ontario across the provincial grid. Ottawa's electricity needs are primarily met by a series of 230 kV and 115 kV transmission circuits that emanate from the Merivale TS and Hawthorne TS stations, which serve as the central hubs for the city's power supply.

Historically, Ottawa experiences peak demand during the summer, with loads reaching approximately 1,600–1,700 MW. However, over the next 20 years, demand is expected to grow significantly, and the region is forecast to transition into a winter-peaking area as early as 2030. There is minimal internal generation capacity in Ottawa, with only one transmission-connected generator—a 70 MW combined-cycle gas plant. In addition, there are several distribution-connected generators within the city, with the most notable being the Chaudière Falls hydroelectric plants, which collectively contribute around 90 MW of capacity

The Ottawa IRRP was developed by completing the following steps:

1. Preparing a 20-year electricity demand forecast and establishing needs over this timeframe.
    a. Examining the LMC and reliability of the existing transmission system, considering facility ratings and performance of transmission elements, transformers, local generation, and other facilities such as reactive power devices. Needs were established by applying ORTAC and NERC criteria.
    b. Assessing system needs by applying a contingency-based assessment and reliability performance standards for transmission supply in the IESO-controlled grid.
    c. Confirming identified asset replacement needs and timing with the transmitter and LDCs.
2. Establishing alternatives to address system needs including, where feasible and applicable, generation, transmission and/or distribution, and other approaches, such as non-wires alternatives including eDSM.
3. Engaging with the community on needs and possible alternatives.
    a. Evaluating alternatives to address near- and long-term needs.
    b. Considering the impact of the high forecast as a sensitivity of the flexibility and optionality of the potential alternatives.
4. Communicating findings, conclusions, and recommendations within a detailed plan.

5. Electricity Demand Forecast

Regional planning in Ontario is driven by the need to meet peak electricity demand requirements in a region. This section describes the development of the demand forecast for the Ottawa Area Sub-Region. It highlights the assumptions made for peak demand forecasts, including weather correction, the contribution of eDSM and DG, and the development of a high-growth scenario. The reference net extreme weather demand forecast is used in assessing the electricity needs of the area over the planning horizon; the high forecast scenario, used as the basis for a sensitivity analysis, is described further in Section 5.6.2.

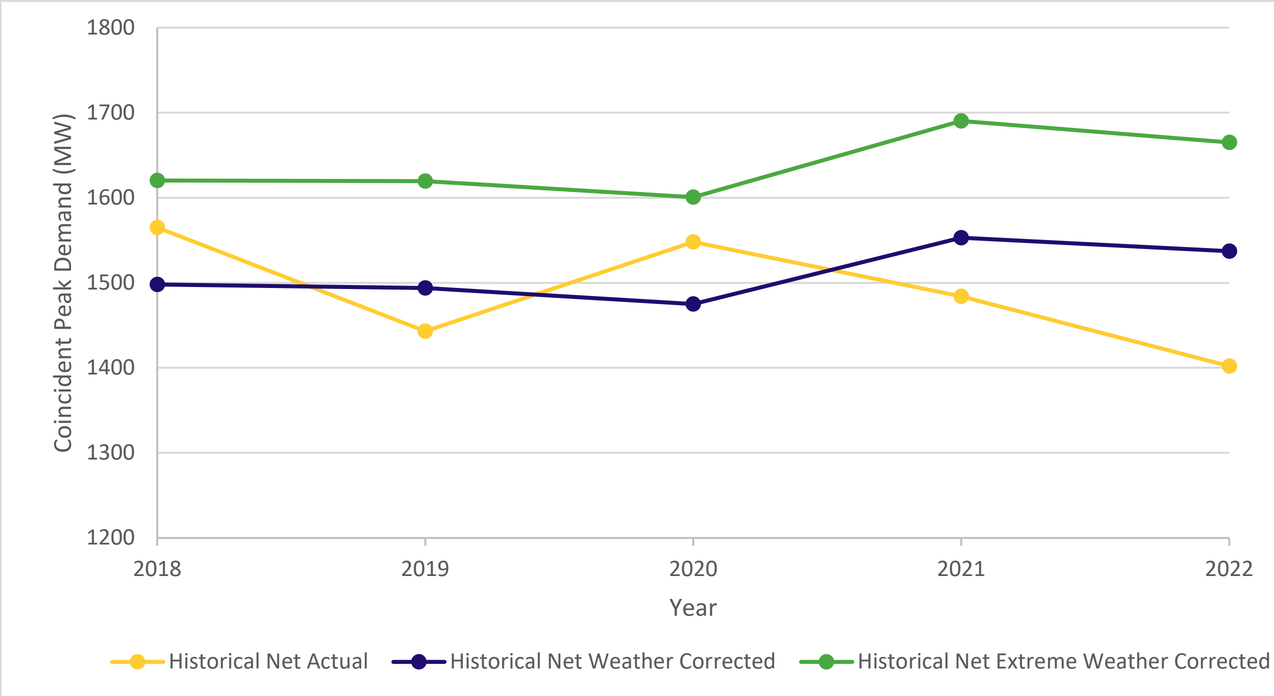
To evaluate the reliability of the electricity system, the regional planning process is typically concerned with the coincident peak demand for a given area. This is the demand observed at each station for the hour of the year in which overall demand in the study area is at its maximum. This differs from a non-coincident peak, which refers to each station's individual peak, regardless of whether these peaks occur at different times. Within the Ottawa Area Sub-Region, the peak loading hour for each year has historically occurred in the summer. However, with the recent and projected growth of electric heating, the region is projected to become winter-peaking.

5.1 Historical Demand

Summer peak electricity demand within the Ottawa Area Sub-Region has remained stable in the five years prior to this planning cycle. **Figure 5** shows the coincident net actual (as observed at the metering point), net median weather-corrected (adjusted to reflect median weather conditions), and net extreme weather-corrected (adjusted to reflect extreme weather conditions) historical demand. The summer net median weather-corrected demand has averaged 1,500 MW over the past five years, with the peak demand hour for each year occurring between approximately 3 PM to 5 PM.

Since the forecast was developed in 2023, only the 2022 values were available to create gross starting points. The starting points used the median weather corrected 2022 values, adding the effect of DG to make it a gross weather-corrected starting point.

Figure 5 | Historical Peak Demand in the Ottawa Area Sub-Region

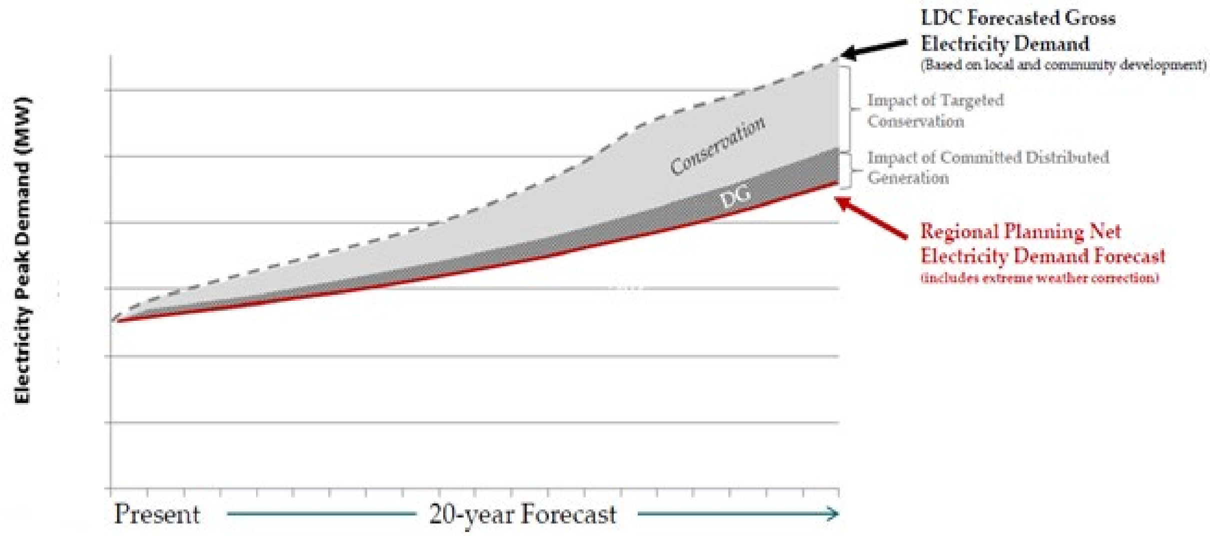


5.2 Demand Forecast Methodology

The steps taken to develop a 20-year IRRP peak demand forecast are depicted in **Figure 6**. Gross demand forecasts, which assume the weather conditions of an average year based on historical weather conditions (referred to as "normal weather"), were developed by the LDCs. These forecasts were then modified to reflect the peak demand impacts of provincial eDSM targets and DG contracted through previous provincial programs such as Feed-In Tariff (FIT) and microFIT and adjusted to reflect extreme weather conditions to produce a reference forecast for planning assessments. This net forecast was then used to assess the electricity needs in the region.

Additional details related to the development of the demand forecast are provided in Appendix B. The Ontario Energy Board has also published a **Load Forecast Guideline** for regional planning, through the **Regional Planning Process Advisory Group**.

Figure 6 | Illustrative Development of Demand Forecast



5.3 Gross LDC Forecasts

Each participating LDC in the Ottawa Area Sub-Region prepared gross demand forecasts at the station level. These gross demand forecasts account for increases in demand from new or intensified development, plus known connection applications. The LDCs cited alignment with municipal and regional official plans and credited them as a source for input data. LDCs were also expected to account for changes in consumer demand resulting from typical efficiency improvements and response to increasing electricity prices ("natural conservation"), but not for the impact of future DG or new conservation measures (such as codes and standards and eDSM programs), which are accounted for by the IESO (discussed in Section 5.45).

The gross LDC forecasts assume median on-peak weather conditions and loading that is coincident to each station. A coincident demand forecast was used instead of a non-coincident forecast because it better reflects the system-level peak, which is critical for planning shared infrastructure. While some individual stations may experience higher non-coincident peaks, these are typically captured in the winter forecast, which drives most station capacity needs. However, this approach can introduce some uncertainty, particularly for the winter period, and may understate summer needs in some areas—potentially shifting the summer need date slightly later.

LDCs have a better understanding of future local demand growth and drivers than the IESO, since they have the most direct involvement with the customers, connection applicants, and municipalities and communities that they serve. The IESO typically carries out demand forecasting at the provincial level. More details on LDC load forecast assumptions can be found in Appendix B.2 to B.6. **Figure 7** and **Figure 8** show the total reference and high-growth gross coincident demand forecasts provided by the LDCs for the Ottawa Area Sub-Region.

Hydro Ottawa worked closely with Enbridge Inc. to develop electrification scenarios dealing with the transition from natural gas to heat-pump based electrical heating. A full breakdown of each LDC's methodology can be found in the Appendix B and on the IESO's Ottawa engagement webpage.

Figure 7 | Total Summer Gross Coincident Demand Forecasts Provided by LDCs (Median Weather)

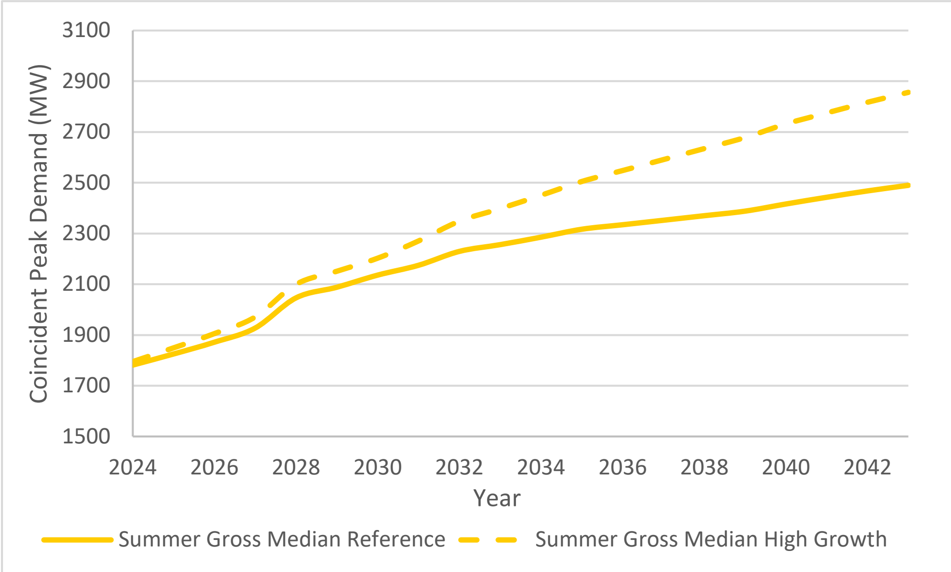
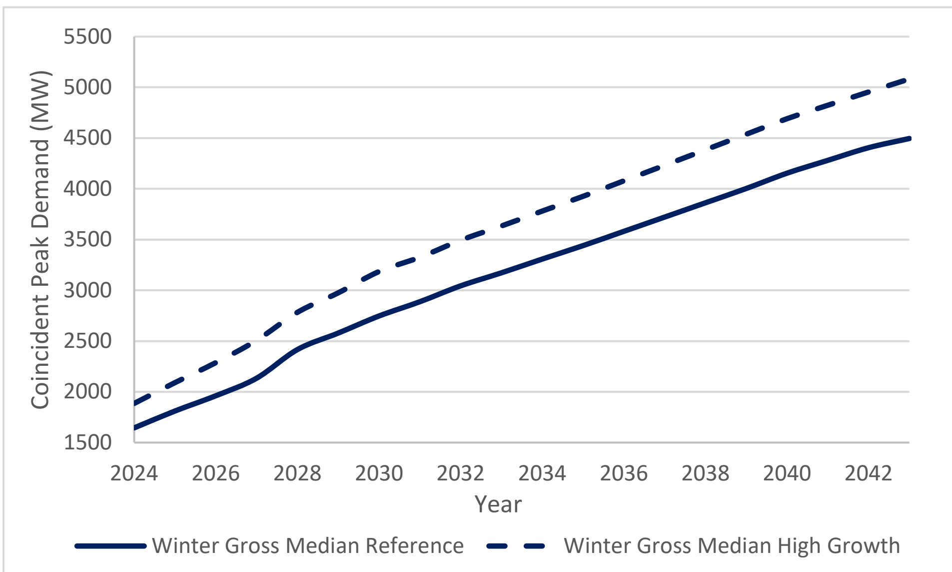


Figure 8 | Total Winter Gross Coincident Demand Forecasts Provided by LDCs (Median Weather)



5.4 Contribution of eDSM to the Forecast

Electricity Demand Side Management is a clean and cost-effective resource that helps meet Ontario's electricity needs and has been an integral component of provincial and regional planning. eDSM is achieved through both codes and standards amendments, as well as eDSM incentive program-related activities. These approaches complement each other to maximize results.

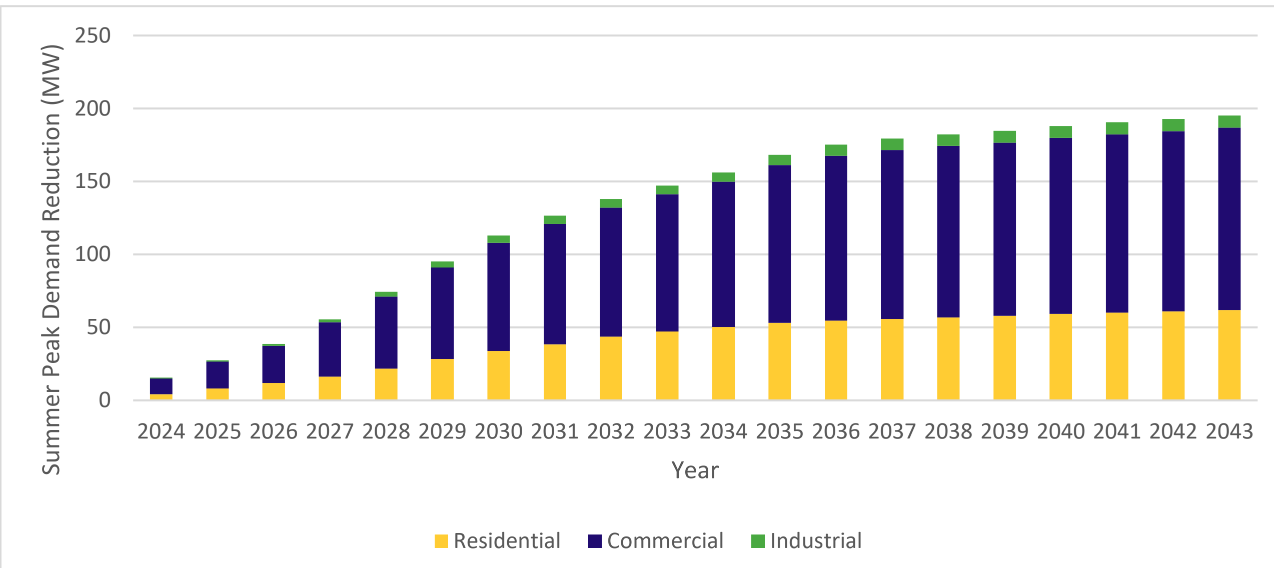
In alignment with the language of the November 7, 2024, directive to the IESO regarding a new energy efficiency framework for 2025–2036, this IRRP uses the term "electricity demand-side management" replacing "conservation and demand management (CDM)" used in previous IRRPs and other IESO planning reports.

The estimate of demand reduction due to codes and standards are based on expected improvement in the codes for new and renovated buildings, and through regulation of minimum efficiency standards for equipment used by specified categories of consumers (i.e., residential, commercial and industrial consumers).

The estimates of demand reduction due to program-related activities account for the IESO's 2021-2024 eDSM Framework, federal programs that result in electricity savings in Ontario, and forecasted long-term energy efficiency programs. At time of forecast development, the 2021 – 2024 eDSM framework was the main piece, in which the IESO centrally delivered programs to serve business and residential customers, including Indigenous communities, across the province.[2]

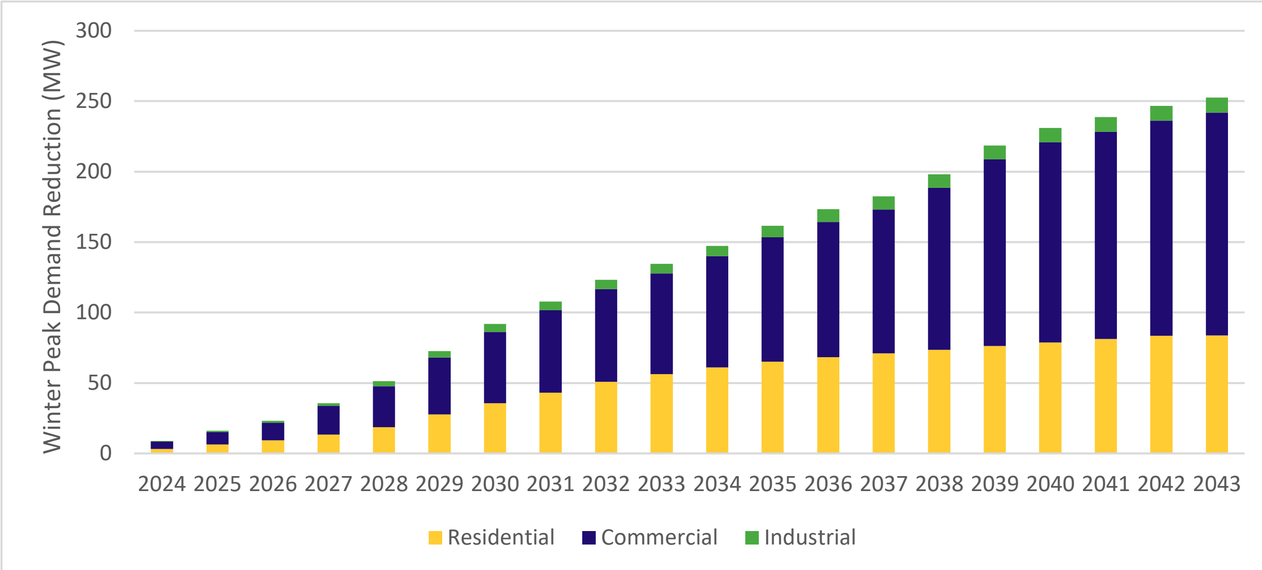
Figure 9 and **Figure 10** show the estimated total yearly reduction to the demand forecast due to conservation (from codes, standards, and eDSM programs) for each of the residential, commercial, and industrial consumers. Additional details are provided in Appendix B.4.

Figure 9 | Total Summer Forecast Peak Demand Reduction (Codes, Standards, and eDSM Programs)



[2] The IESO has received a directive to continue delivering eDSM programs for 2025-2036.

Figure 10 | Total Winter Forecast Peak Demand Reduction (Codes, Standards, and eDSM Programs)



5.5 Contribution of Distributed Generation to the Forecast

In addition to eDSM, DG in the Ottawa Area Sub-Region is also forecast to offset peak demand requirements. The introduction of Ontario's FIT Program increased the significance of distributed renewable generation that, while intermittent, contributes to meeting the province's electricity demands. The installed DG capacity by fuel type and contribution factor assumptions can be found in Appendix B. Most of the total contracted installed DG capacity in the Ottawa Area Sub-Region is solar and hydro, with the remainder being gas or wind facilities.

After reducing the demand forecast due to eDSM, as described in Section 5.4, the forecast is further reduced by the expected contribution from contracted DG, except for DG facility information provided directly by the LDCs. **Figure 11** and **Figure 12** show the impact of DG on reducing the Ottawa Area Sub-Region demand forecasts. Note that facilities without a contract with the IESO were not included in the DG peak demand reduction forecast, except for DG facility information provided directly by the LDCs.

Figure 11 | Summer Peak Demand Reduction Due to DG

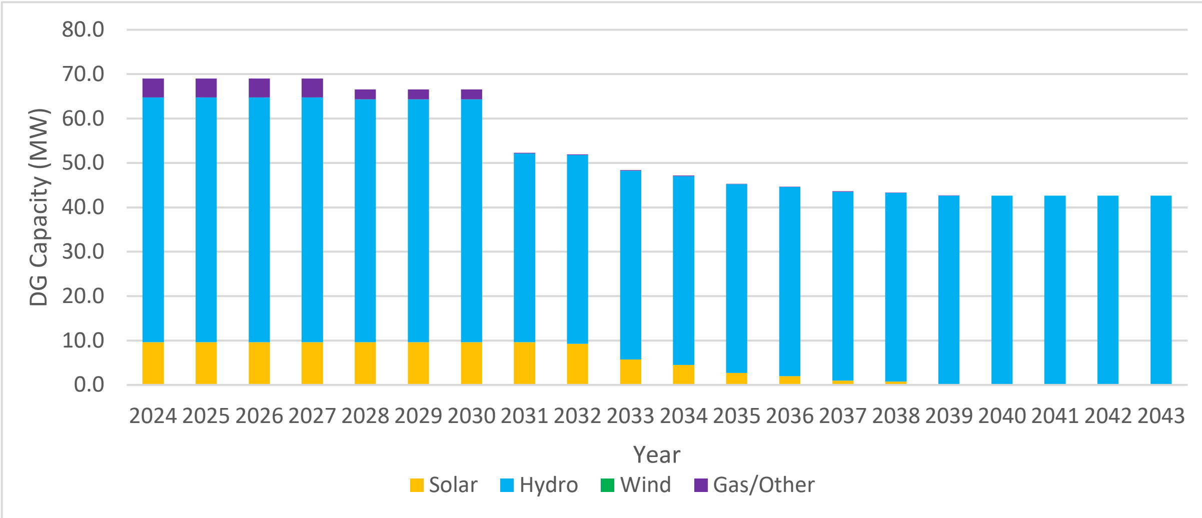
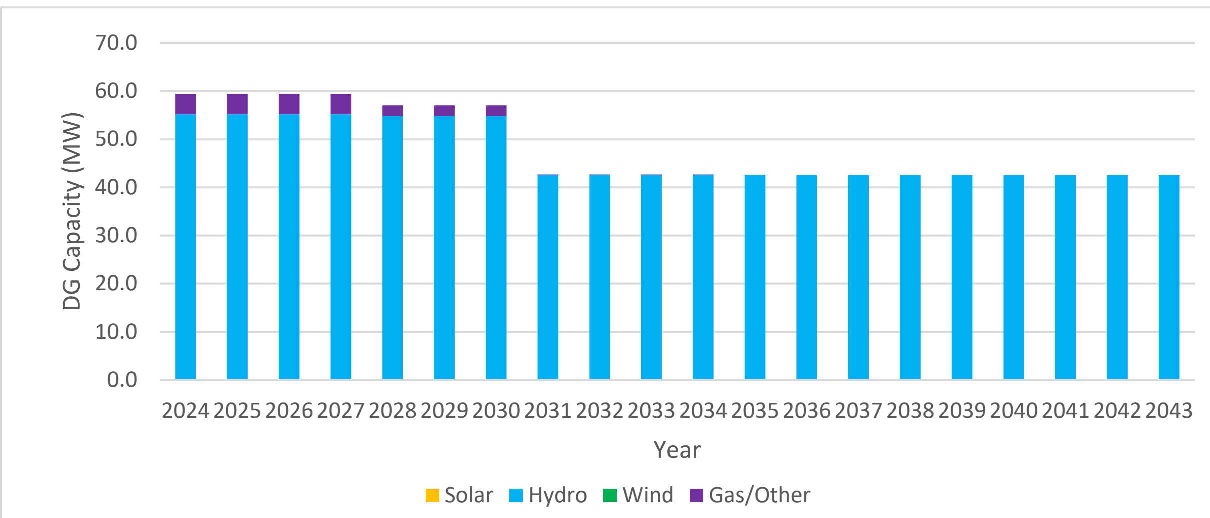


Figure 12 | Winter Peak Demand Reduction Due to DG



A decision was made within the Working Group to consider the expected lifespan of each distributed generation facility based on resource type, rather than assuming that facilities will not be re-contracted past their current contract end date. In alignment with the IESO 2024 Annual Planning Outlook, the assumption for resource expected lifespans was 25 years for solar, and 30 years for wind, natural gas and biogas.

A total of 115 MW of DG summer peak contribution and is identified for the Ottawa Area Sub-Region in 2024, reducing throughout the 2030s to 43 MW by 2043. In the winter, the DG peak contribution decreases from 70 MW in 2024 to 43 MW by 2043.

5.6 Planning Forecasts

After taking into consideration the combined impacts of eDSM and DG, a 20-year planning Reference and High forecast was produced for the Ottawa Area Sub-Region.

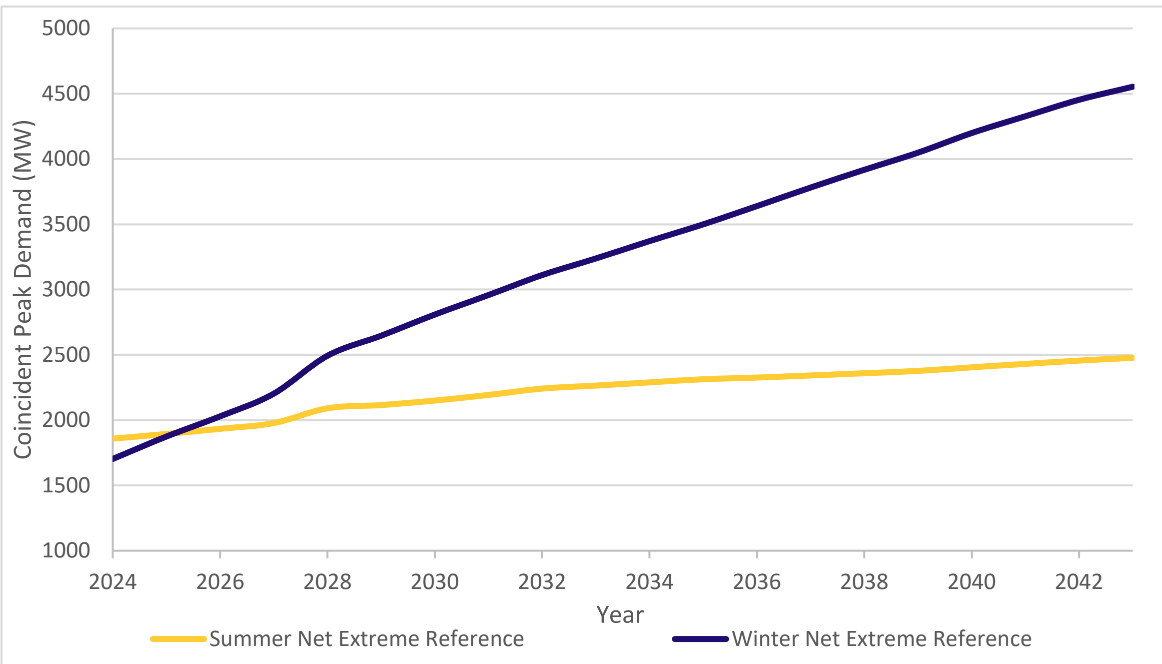
5.6.1 Net Extreme Weather (Planning) Forecast

The net extreme weather forecast, also known as the "planning" forecast, is created by adjusting the net median weather forecast (the gross demand forecast, plus the forecast DG and eDSM impacts as described above) for extreme weather conditions. The weather correction methodology is described in Appendix B.1.

Note that this planning forecast is coincident, meaning that each station forecast reflects its expected contribution to the regional peak demand level. This supports the identification of need dates for regional needs that are driven by more than one station.

The coincident net extreme weather forecast for the Ottawa Area Sub-Region is shown in **Figure 13**.

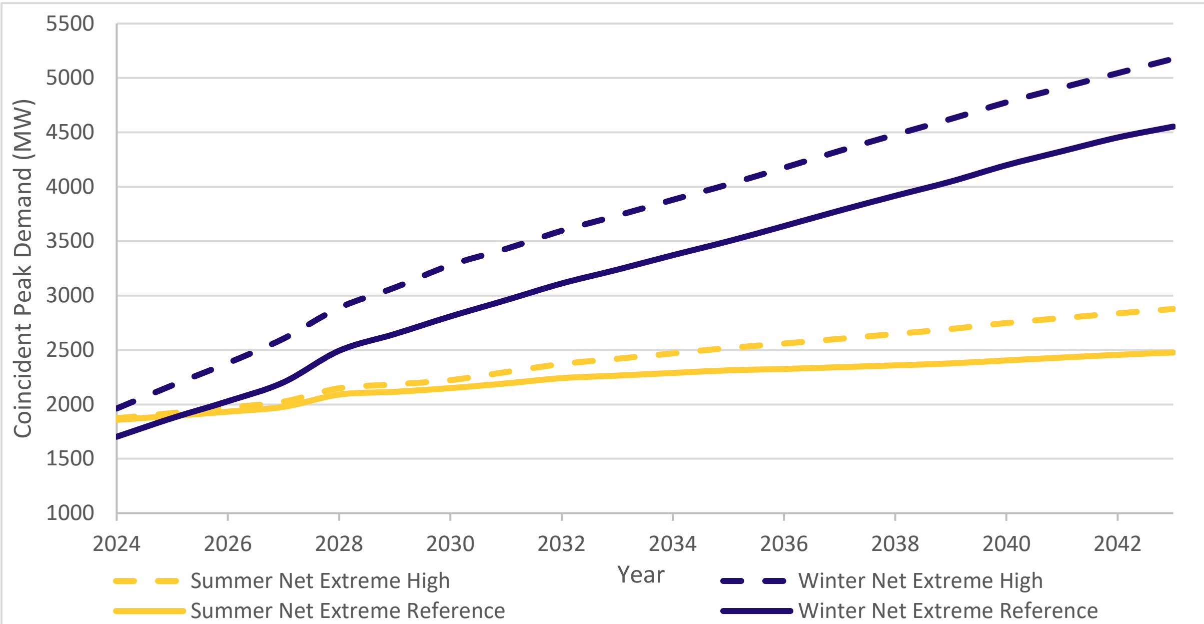
Figure 13 | Net Extreme Weather (Planning) Forecast for the Ottawa Area Sub-Region



5.6.2 High Forecast Scenario

The Working Group chose to develop a high-growth sensitivity scenario for the Ottawa Area Sub-Region. This scenario modifies assumptions around the adoption of electrification technologies and assumes a faster pace of decarbonization. While both the reference and high-growth scenarios aim for a net-zero future by 2050, they differ in the speed at which that transition occurs. The higher demand scenario was not used to drive firm recommendations in this IRRP; however, it served as a tool for the Working Group to identify potential future pinch points and the timelines in which they might emerge. This information is also valuable for communities working on Community Energy Plans for the Working Group as it determines areas to monitor in future planning cycles and for local stakeholders considering various regional projects. Additionally, during the course of this IRRP, the Working Group assessed the flexibility of the evaluated options to accommodate long-term growth.

Figure 14 | High Forecast Scenario for the Ottawa Area Sub-Region



The higher demand scenario, as seen in **Figure 14**, was not used to drive any firm recommendations for this IRRP; however, it was used to help the Working Group identify where the future pinch points may be and when they could materialize. This information can also be useful for communities conducting Community Energy Plans, for the Working Group in determining areas to monitor in future planning cycles, and for communities and stakeholders as they think about various projects in the region. Moreover, during this IRRP, the Working Group also considered the flexibility of evaluated options to accommodate greater long-term growth.

5.7 Hourly Forecast Profiles

In addition to the annual peak forecast, hourly load profiles (8,760 hours per year over the 20-year forecast horizon) for station(s) included in identified needs were developed to characterize the needs with finer granularity. The profiles were based on historical load data, adjusted for variables that impact demand, such as calendar day (i.e., holidays and weekends) and weather as well as future electrification. They were also based off of hourly load forecasts provided by the LDCs. The profiles were then scaled to match the IRRP peak planning forecast for each year. As described in Section 7, these profiles were used to quantify the magnitude, frequency, and duration of needs to better evaluate the suitability of generation and distributed energy resource options.

Additional load profile details, including hourly heat maps for each need, can be found in Appendix D. Note that this data is used to roughly inform the overall energy requirements needed to develop and evaluate alternatives; it cannot be used to deterministically specify the precise hourly energy requirements. Real-time loading is subject to various factors, like actual weather, customer operation strategies, and future customer segmentation. Demand patterns can change significantly as consumer behaviour evolves, new industries emerge, and trends like electrification are more widely adopted. Hence, these hourly forecasts are only used to select suitable technology types and roughly estimate costs for the needs and options studied in the IRRP. The Working Group will continue to monitor forecast changes as part of the implementation of the plan.

6. Needs

This section summarizes the needs identified through the IRRP process. The projected impacts of economic growth, decarbonization, and electrification—particularly the transition from natural gas to electric or hybrid heating—are expected to place increasing pressure on the electricity system, especially during winter months. In response, a range of electricity needs have been identified across near-, medium-, and long-term horizons.

6.1 Needs Assessment Methodology

Based on the planning demand forecast, system capability, the transmitter's identified asset replacement plans, and the application of ORTAC, NERC TPL-001-4, and Northeast Power Coordinating Council (NPCC) Directory #1 standards, the Working Group identified electricity needs that generally fall into the following categories:

- **Station Capacity Needs** describe the electricity system's inability to deliver power to the local distribution network through the regional step-down transformer stations during peak demand. The capacity rating of a transformer station is the maximum demand that can be supplied by the station and is limited by station equipment. Station ratings are often determined based on the 10-day LTR of a station's smallest transformer under the assumption that the largest transformer is out of service. A transformer station can also be more limited by downstream or upstream equipment (i.e., breakers, disconnect switches, low-voltage bus or high-voltage circuits).
- **System Capacity Needs** describe the electricity system's inability to provide continuous supply to a local area during peak demand. This is limited by the LMC of the transmission supply. The LMC is determined by evaluating the maximum demand that can be supplied to an area after accounting for limitations of the transmission elements (i.e., a transmission line, group of lines, or autotransformer), when subjected to contingencies and criteria prescribed by ORTAC, TPL-001-4, and NPCC Directory #1. LMC studies are conducted using power system simulation analyses.
- **Asset Replacement Needs** are identified by the transmitter using an asset condition assessment, which is based on a range of considerations, such as equipment deterioration due to aging infrastructure or other factors; technical obsolescence due to outdated design; lack of spare parts availability or manufacturer support; and/or potential health and safety hazards, etc. Replacement needs identified in the near- and early medium-term timeframe would typically reflect more condition-based information, while replacement needs identified in the medium to long term are often based on the equipment's expected service life. As such, any recommendations for medium- to long-term needs should reflect the potential for the need date to change as condition information is routinely updated.
- **Load Security and Restoration Needs** describe the electricity system's inability to minimize the impact of potential supply interruptions to customers in the event of a major transmission outage, such as an outage on a double-circuit tower line resulting in the loss of

both circuits. Load security describes the total amount of electricity supply that would be interrupted in the event of a major transmission outage. Load restoration describes the electricity system's ability to restore power to those affected by a major transmission outage within reasonable timeframes. The specific load security and restoration requirements are prescribed by Section 7 of ORTAC.

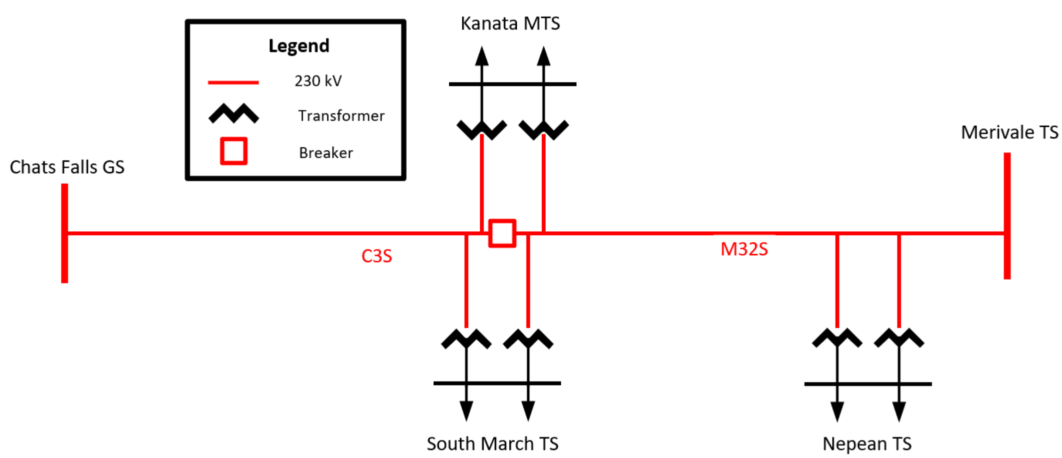
Technical study results for the Ottawa IRRP can be found in Appendix G. The needs identified are discussed in Sections 6.2 to 6.5, below, for each of the four subsystems.

6.2 Ottawa Subsystems

To support detailed technical analysis, the Ottawa Area Sub-Region has been further subdivided into four major subsystems: Kanata-Stittsville, Core East, Core West, and Core South. These subdivisions reflect the electrical connectivity of the transmission network and group together stations, supply circuits, and infrastructure that operate as electrically cohesive units. This approach allows for more accurate modelling of system performance, localized planning for station and System Capacity needs, and alignment with regional infrastructure development. Within each subsystem, further division into pockets is used where necessary to better reflect local electrical boundaries and simplify LMC assessments, as illustrated in **Figures 15–18**.

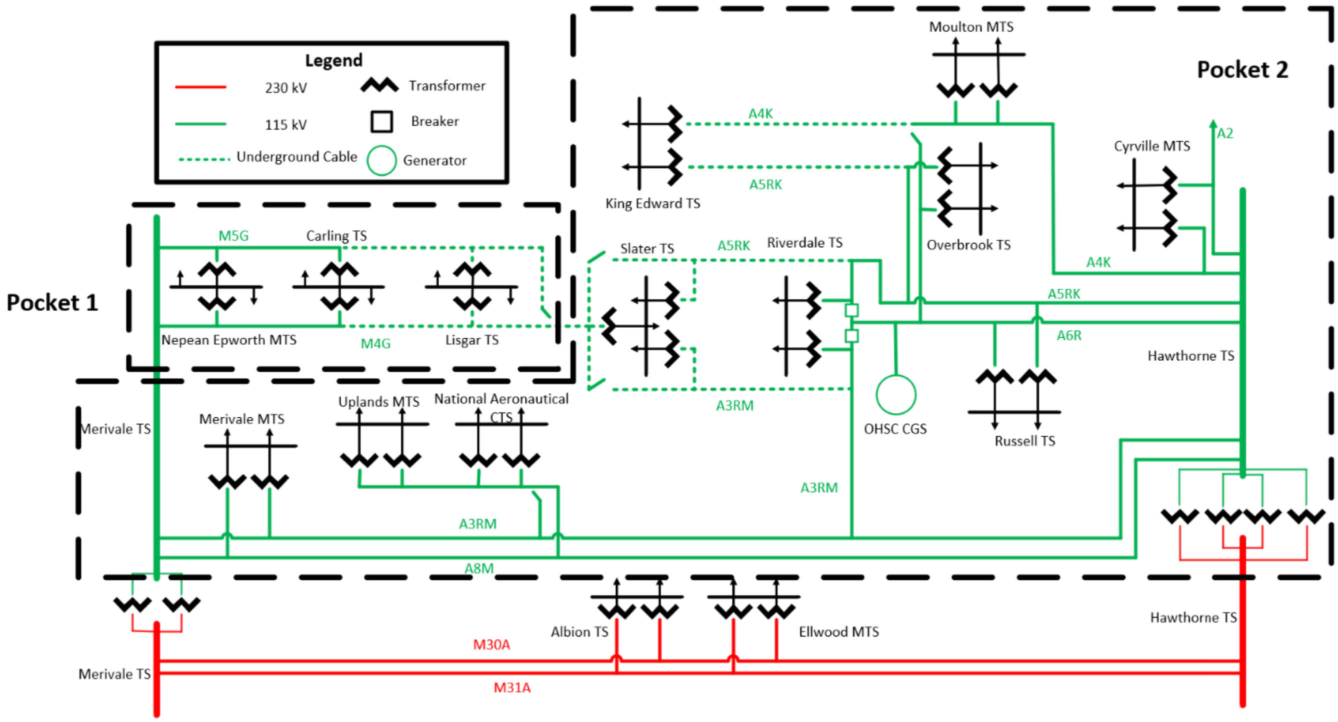
Located west of Merivale TS, the Kanata-Stittsville subsystem is supplied by two 230 kV circuits—one from Merivale TS and another from Chats Falls TS, which is approximately 25 km to the north and includes a hydroelectric generation component. These lines supply Kanata MTS and South March TS, both of which are projected to reach capacity in the near term and are identified as key station needs. As shown in **Figure 15** this subsystem's layout enables focused planning to address rising demand and operational risk. While Marchwood MTS and Bridlewood MTS are located geographically within this area, they are supplied via the 115 kV system and are therefore included in the Core West subsystem.

Figure 15 | Overview of the Ottawa Kanata-Stittsville area



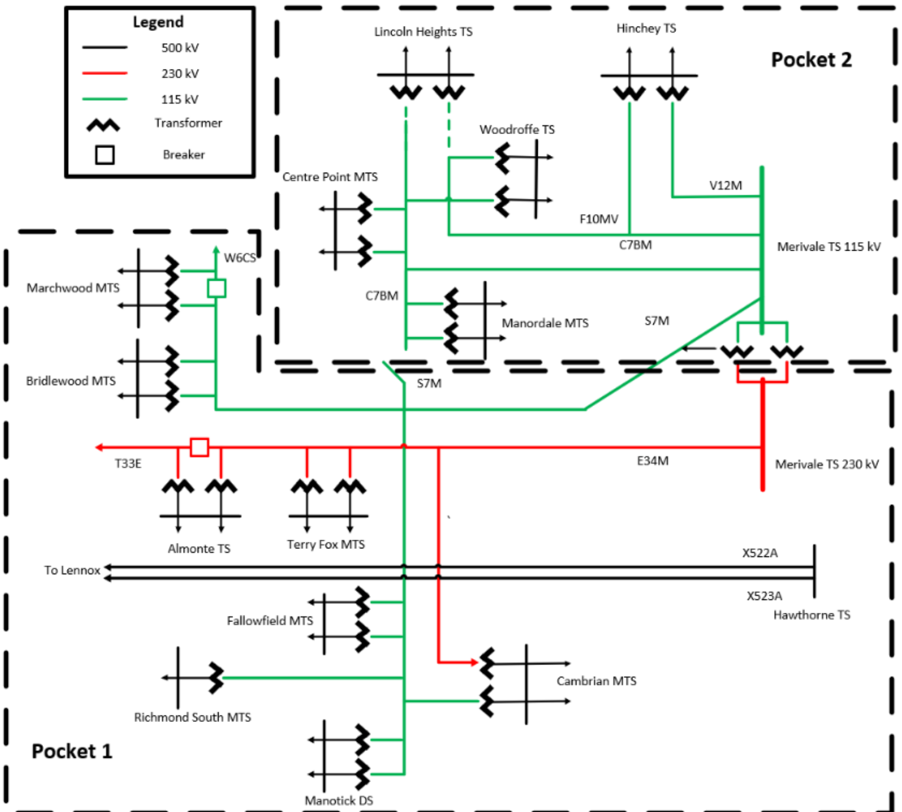
The Core East subsystem represents Ottawa's urban downtown core and is characterized by a large, interconnected 115 kV system. For the purposes of the technical studies and to support more manageable modelling, Core East is divided into two pockets. Pocket 1 consists of circuits M4G and M5G, which supply Nepean Epworth MTS, Carling TS, and Lisgar TS. Notably, M4G also provides one of three supplies to Slater TS. The remaining 115 kV circuits form Pocket 2, supplying the remaining downtown stations predominantly east of the Rideau River. **Figure 16** illustrates this breakdown, allowing for better assessment of local supply adequacy and reinforcement needs.

Figure 16 | Overview of the Ottawa Core East Area



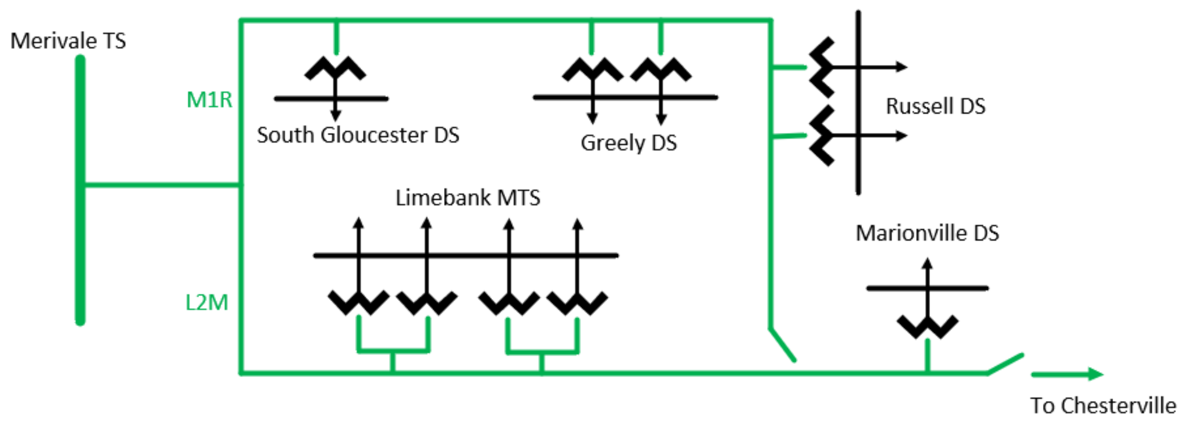
Core West has also been divided into two pockets to reflect the operational and electrical characteristics of the area. Pocket 1 includes stations supplied by 115 kV circuits S7M and W6CS, as well as 230 kV circuit E34M. All three connect at Cambrian TS, where a Fast Transfer Scheme (a RAS) is used to quickly restore load in the event of a circuit loss, avoiding the need for more expensive dual 230 kV supply infrastructure. This pocket includes several stations experiencing or approaching capacity limits. **Figure 17** depicts the full subsystem and pocket breakdown, supporting the identification of local needs and future conversion opportunities.

Figure 17 | Overview of the Ottawa Core West Area



The Core South subsystem comprises the area south of Ottawa's urban core and includes five supply stations served radially by two 115 kV circuits. The stations are relatively remote and less interconnected compared to those in other subsystems. **Figure 18** shows the simplified layout of this subsystem. The 2020 Ottawa IRRP identified the need for a new 230 kV station—Piperville MTS—to support rapid growth in the southeastern portion of the city. Connected to circuit L24A, Piperville MTS is expected to be energized in 2026 and will play a key role in alleviating station capacity constraints in the area and supporting long-term system reliability.

Figure 18 | Overview of the Ottawa Core South Area



6.3 Station Capacity Needs

Many station capacity needs emerge in the Ottawa Area Sub-Region, as shown in **Table 5** with the majority in the near/medium term.

Table 5 | Summary of Station Capacity Needs in the Ottawa Area Sub-Region

Time Horizon	Station	Subsystem	Emerging Year Summer	Emerging Year Winter	2043 Need Summer (MW)	2043 Need Winter (MW)
Near Term	Carling TS	Core East – Pocket 1	2028	2029	40	130
	Lisgar TS	Core East – Pocket 1	2025	2027	30	120
	Nepean Epworth MTS	Core East – Pocket 1	2031	2028	1	10
	Cyrville MTS	Core East – Pocket 2	-	2029	0	40
	King Edward TS	Core East – Pocket 2	2037	2026	10	160
	Moulton MTS	Core East – Pocket 2	2028	2028	3	30
	Riverdale TS	Core East – Pocket 2	2038	2028	8	110
	Ellwood MTS	Core East – Pocket 2	2024	2027	60	5
	Bridlewood MTS	Core West – Pocket 1	2032	2029	1	20

Time Horizon	Station	Subsystem	Emerging Year Summer	Emerging Year Winter	2043 Need Summer (MW)	2043 Need Winter (MW)
	Fallowfield MTS	Core West – Pocket 1	2024	2030	7	40
	Marchwood MTS	Core West – Pocket 1	2025	2025	8	40
	Centrepoint MTS	Core West – Pocket 2	2024	2026	2	20
	Manordale MTS	Core West – Pocket 2	2024	2025	3	20
	Greely DS	Core South	2024	2024	10	10
	Limebank MTS	Core South	-	2030	0	50
	Marionville DS	Core South	2026	2026	10	10
	Kanata MTS	Kanata-Stittsville	2024	2026	20	40
	South March TS	Kanata-Stittsville	2027	2027	20	100
Medium Term	Overbrook TS	Core East – Pocket 2	-	2032	0	90
	Hawthorne TS	Core East – Pocket 2	-	2031	0	60
	Hinchey TS	Core West – Pocket 2	-	2033	0	60
	Nepean TS	Kanata-Stittsville	-	2031	0	100
Long Term	Merivale MTS	Core East – Pocket 2	-	2039	0	7
	Uplands MTS	Core East – Pocket 2	-	2041	0	5
	Albion TS	Core East – Pocket 2	-	2035	0	40
	Cambrian MTS	Core West – Pocket 1	-	2038	0	20
	Richmond South MTS	Core West – Pocket 1	-	2037	0	10
	Terry Fox MTS	Core West – Pocket 1	-	2037	0	30
	Lincoln Heights TS	Core West – Pocket 2	-	2040	0	10
	Woodroffe TS	Core West – Pocket 2	-	2040	0	10

6.3.1 Station Capacity Needs Kanata-Stittsville Subsystem

Kanata MTS has an LTR of 54 MW and is forecast to exceed capacity by 2024 in summer and 2026 in winter. By 2030, the projected winter overload is 15 MW, indicating continued and significant growth in demand. This early emerging need reflects increasing development across the Kanata area, necessitating reinforcements or capacity upgrades within the near term.

South March TS, with a winter LTR of 120 MW and summer LTR of 105 MW, is forecast to reach capacity by 2027 in both seasons. By 2030 the winter overload is projected to reach 23 MW. The station's two 230/44 kV transformers, in service since 1971, are due for replacement between 2030–2032, and the Working Group is evaluating whether to replace them with larger 75/100/125 MVA units.

Nepean TS has a winter LTR of 170 MW and is expected to exceed this rating by 2031. Although there is no summer need forecasted, the station is facing a load security issue: winter peak demand is projected to exceed 150 MW by 2029, and with M32S as the sole supply, an outage would violate ORTAC criteria by resulting in a full load loss. Addressing this concern will require both capacity and contingency planning for secure operation in the Kanata-Stittsville area.

6.3.2 Station Capacity Needs Core East Subsystem

Carling TS has a summer LTR of 100 MW and a winter LTR of 132 MW. It is projected to exceed capacity in 2028 (summer) and 2029 (winter). By 2030, the winter overload is expected to reach 17 MW, driven by ongoing electrification in Ottawa's downtown core. It is important to note that both Carling TS and Lisgar TS have hydroelectric generation supplying each station which has been accounted for in the forecast but contributes to the variability of the station capacity need.

Lisgar TS has an LTR of 77 MW (summer) and 86 MW (winter), with capacity needs emerging as early as 2025 (summer) and 2027 (winter). By 2030, the projected winter overload reaches 40 MW, one of the highest in the region driven by winter heating load as well as large customer connections.

Nepean Epworth MTS has an LTR of 13 MW for both summer and winter. It is forecast to reach capacity in 2031 (summer) and 2028 (winter), with a 2 MW winter overload expected by 2030. This modest but significant overload reflects continued urban infill in the surrounding residential area, requiring minor station upgrades or targeted load transfers.

Cyrville MTS, rated at 45 MW, is forecast to exceed capacity in 2029 (winter). The projected winter overload by 2030 is 3 MW. While no summer need is currently identified, load growth in the adjacent industrial and commercial areas is expected to continue contributing to the station's winter peak constraint.

King Edward TS has LTRs of 92 MW (summer) and 96 MW (winter). The winter capacity need is projected to emerge by 2026, with the overload reaching 40 MW by 2030. Though the summer need emerges much later (2037), the station will require substantial reinforcement to manage escalating winter demand, especially from institutional and high-density residential growth downtown.

Moulton MTS is rated at 33 MW in both seasons. It is expected to exceed capacity by 2028 (both summer and winter), with an 8 MW winter overload forecasted for 2030. Located in a growing mixed-use area, the station will require capacity upgrades or operational measures to accommodate new developments.

Riverdale TS has a summer LTR of 118 MW and a winter LTR of 124 MW. While its summer need arises in 2038, winter constraints begin much sooner, with a need emerging in 2028 and a 20 MW overload projected by 2030. The area includes a mix of mature neighbourhoods and new high-rise developments, putting increasing strain on winter capacity.

6.3.3 Station Capacity Needs Core West Subsystem

Bridlewood MTS has an LTR of 23 MW in both summer and winter. Winter need is expected by 2029, with a 2 MW overload projected by 2030. The summer need follows in 2032. This modest overload is driven by steady residential development and densification in the surrounding suburbs.

Centrepoint MTS has an LTR of 13 MW for both seasons and is expected to exceed capacity by 2024 (summer) and 2026 (winter). By 2030, the winter overload is forecast at 5 MW, indicating a strong and persistent local demand requiring targeted capacity relief in the near term.

Fallowfield MTS is rated at 25 MW and is projected to reach its summer capacity by 2024, followed by winter needs emerging in 2030. An 11 MW summer overload is forecast for 2030. Situated near key growth corridors, this station will need reinforcement to manage short- and medium-term demand increases.

Manordale MTS has an LTR of 9 MW and is expected to exceed capacity by 2024 (summer) and 2025 (winter). The projected winter overload reaches 5 MW by 2030. The small size of the station and its location in a maturing neighborhood mean that even moderate demand growth results in capacity pressure.

Marchwood MTS is rated at 30 MW and is expected to exceed capacity in both 2024 (summer) and 2025 (winter). By 2030, the winter overload is projected to reach 17 MW, making it one of the most constrained stations in the Core West subsystem. Rapid suburban expansion and limited load transfer capability intensify the need for reinforcement.

6.3.4 Station Capacity Needs Core South Subsystem

Limebank MTS has an LTR of 89 MW and is forecast to reach capacity in 2030 (winter), the LTR is limited by a load security constraint, once this is remedied the LTR of the station increases significantly. By 2030, the projected winter overload is modest at 1 MW, but demand is expected to intensify as development continues along the expanding Limebank corridor. Early planning for reinforcement may help pre-empt longer-term constraints. Greely DS is expected to reach its LTR in 2024 and Marionville DS in 2026.

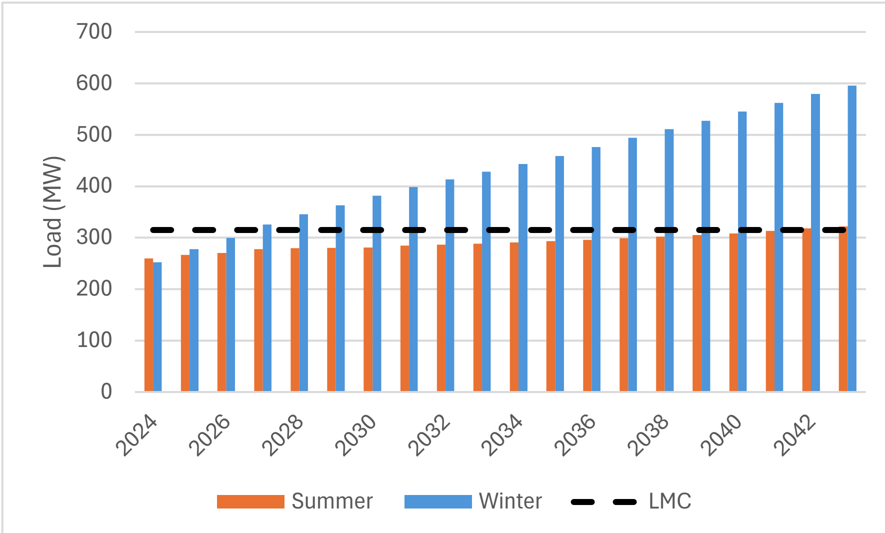
6.4 System Capacity Needs

6.4.1 System Capacity Needs Kanata-Stittsville Subsystem

This subsystem is supplied by two transmission circuits, one from Chats Falls (C3S) and one from Merivale TS (M32S). The loss of both of these circuits would mean all stations in the area (Kanata MTS, South March TS, and Nepean TS) would be out of power. This would be a load security consideration, the maximum allowable load lost by configuration for two elements is 600 MW and as their combined LTR is 312 MW in the summer and 345 MW in the winter. The subsystem only reaches 600 MW in the winter in 2043 which assumes a fully electrified heating load.

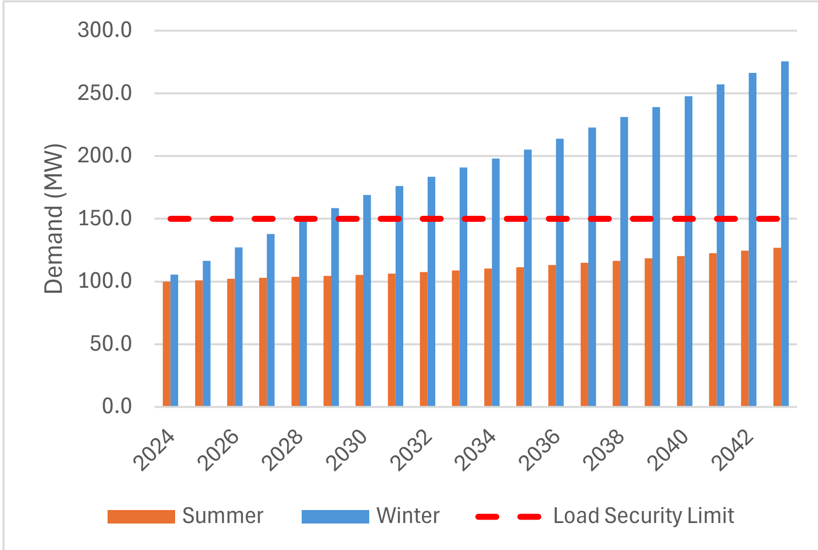
Losing either of the circuits supplying the area leads to voltage instability at varying load levels and it was found that the most limiting configuration is having M32S on outage followed by a contingency on C27P. This occurs at roughly 310 MW which is near the summer LTR for the subsystem as seen in **Figure 19**. There are no System Capacity needs for the summer forecast.

Figure 19 | Reference Forecast vs LMC for Kanata-Stittsville



There is also an additional load security issue in this subsystem as well. For an M32S contingency, beyond losing one of the two supply circuits for this subsystem, the entire load at Nepean TS is lost by configuration as well. Load security requires that no more than 150 MW can be lost for a single element contingency. **Figure 20** shows the Nepean TS forecast compared to this limit. This limit is not reached in the summer forecast, but is reached in 2029 in the winter forecast.

Figure 20 | Nepean Load Forecast vs Load Security Limit



6.4.2 System Capacity Needs Core East

Core East Pocket 1 is supplied by circuits M5G and M4G. The limiting phenomenon is a thermal overload on each circuit when the companion circuit is lost, as both Lisgar TS and Carling TS would be fully supplied by the remaining circuit. It was found that a contingency to M5G was more limiting, leading to an LMC of 223 MW, as seen in **Figure 21**.

Core East Pocket 2 consists of many more circuits and stations. The combined LTR of all the stations is about 600 MW, or just above 750 MW, including Slater TS. This is important because the summer forecast does not reach this figure, while the winter forecast exceeds it by over 600 MW as seen in **Figure 22**. The studies evaluating the system today find that voltage instability issues occur at a loading above the combined station LTR.

Figure 21 | Reference Forecast vs LMC for Pocket 1

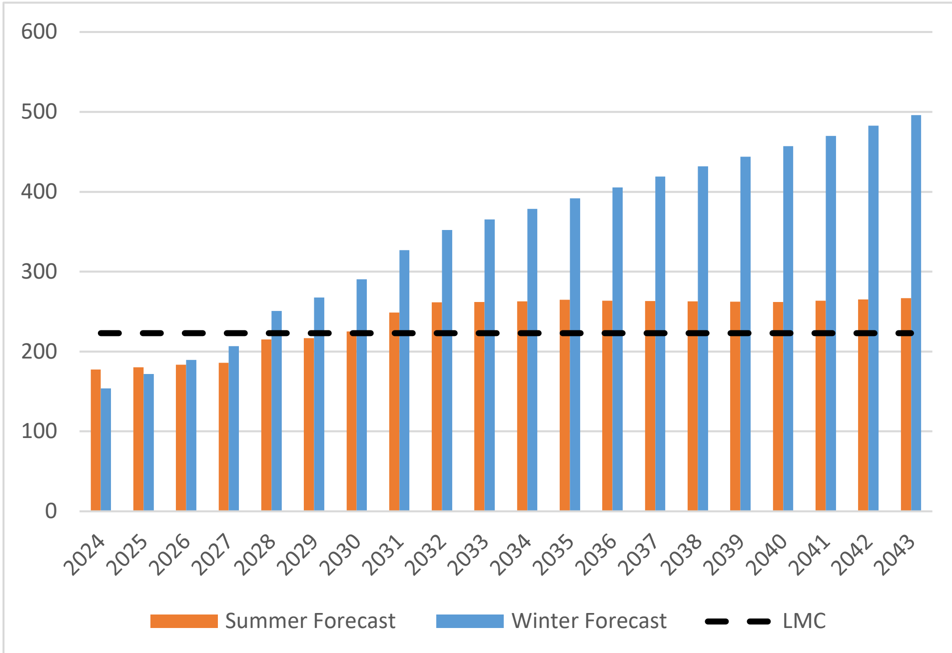
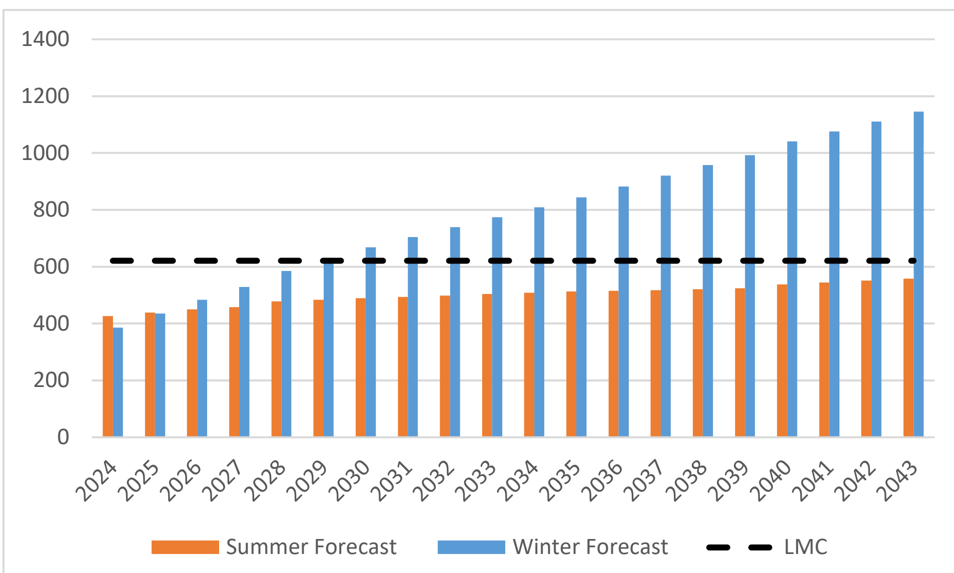


Figure 22 | Reference Forecast vs LMC for Pocket 2



6.4.3 System Capacity Needs Core West Subsystem

The Core West subsystem was found to have healthy voltages, and no voltage violations were found as part of the technical studies. The LMC of the two pockets was found to be limited by thermal overloads. For Pocket 1, which is made up of loads supplied by S7M, as seen in **Figure 17**, the most limiting contingency is a loss of E34M, which transfers Cambrian MTS onto S7M, leading to a thermal overload on the branch of circuit emanating from Merivale TS to the junction right before the circuit continues south, which is approximately 5km long. **Figure 23** shows that the forecast will not exceed the identified limit of approximately 250 MW in the summer but will do so in the winter in the medium-term.

As for pocket 2, the thermal overload identified as the most limiting occurs during a contingency to F10MV which places both Woodroffe TS and Lincoln Heights TS solely on C7BM, where thermal overloads begin to occur at around 230 MW of combined station load. The loss of C7BM also causes an overload on certain sections of F10MV, but is not more limiting. **Figure 23** and **Figure 24** illustrate the limits versus the expected forecast. In both cases, these needs occur only in the winter.

Figure 23 | Reference Forecast vs LMC for Core West Pocket 1

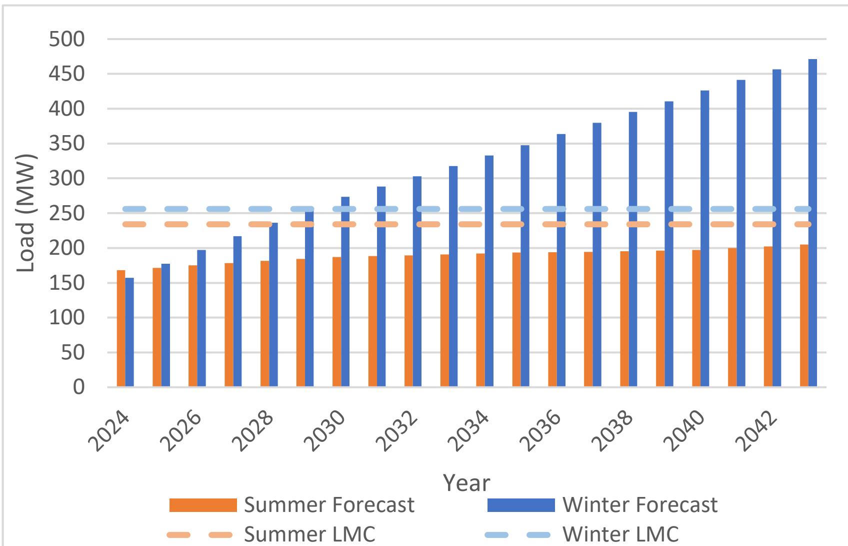
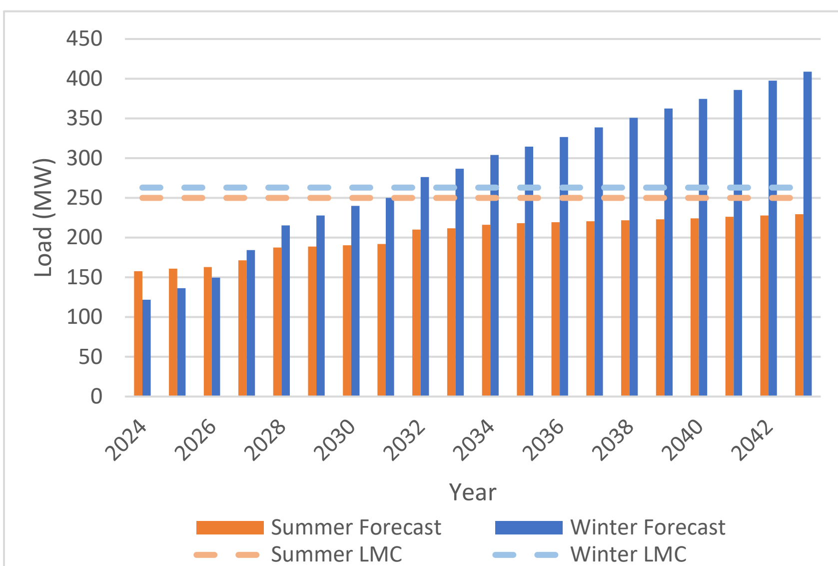


Figure 24 | Reference Forecast vs LMC for Core West Pocket 2

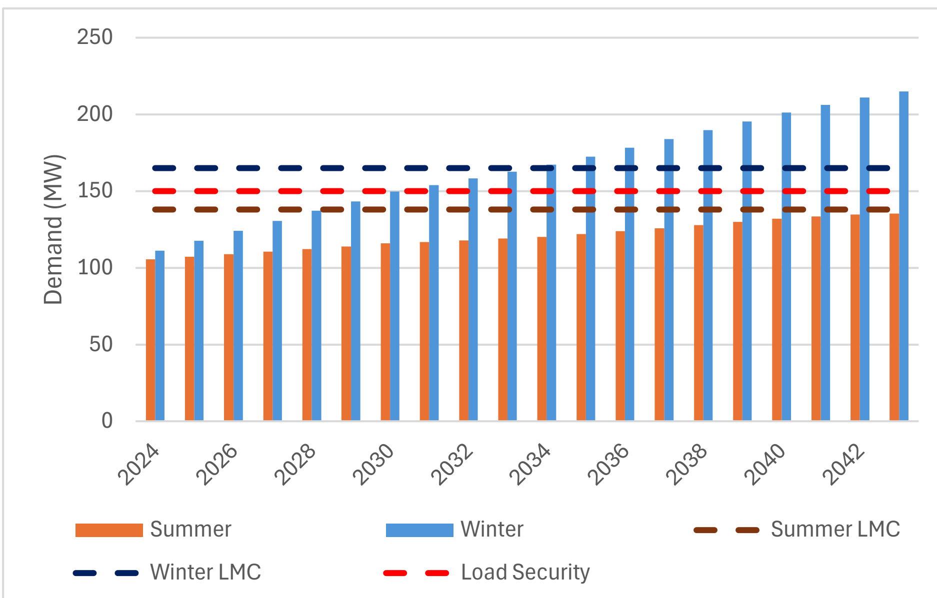


6.4.4 System Capacity Needs Core South Subsystem

There are no relevant contingencies to study in this area, since the loss of either circuit results in both circuits being tripped. This is due to L2M and M1R sharing a breaker position at Merivale TS. The limiting phenomenon in Core South is a thermal overload on the portion of L2M between Merivale TS and Limebank MTS, which occurs around the end of the medium term (2034). By scaling the stations how they are expected to grow in the next 20 years, this thermal overload happens at a load of 140 MW in the summer and 165 MW in the winter among the five stations in the subsystem. This overload is almost entirely caused by the loading on Limebank MTS. The second most limiting phenomenon in this subsystem would be voltage instability, but this limit is not approached in the 20-year forecast. The combined LTR of the stations in Core South is 160 MW in both summer and winter, meaning the limit of this subsystem is reached around the same time the station capacities would be reached.

Core South also has a limit on its total load growth of 150 MW, due to load security as seen in **Figure 25**. By design, the system must limit load loss to no more than 150 MW if a single element fails. In Core South, however, the two lines share a breaker position, so a contingency (fault) on one line causes both to be out of service. This effectively makes the two circuits a single element. As a result, this configuration becomes the most limiting factor in the winter.

Figure 25 | Reference Forecast vs LMC for Core South



6.5 End-of-Life/Asset Replacement Needs

6.5.1 Asset Replacement Needs Core East Subsystem

Lisgar TS has an LTR that is expected to be exceeded in 2026, based on the coincident forecast. Transformer T1 was in-serviced in 1974 and needs replacement. This replacement to a 45/60/75MVA transformer was planned to be in-serviced 2031–2033.

The Working Group determined that the transformer should be upgraded to a 60/80/100 MVA unit, instead of a 45/60/75MVA unit.

6.5.2 Asset Replacement Needs Core West Subsystem

Sections of circuit S7M have asset renewal needs. Decisions on the preferred option to address the asset renewal need should consider prefer supply configuration for the area. Two sections that need to be refurbished are Manotick JCT x Richmond MTS (5.2km) and STR 673N JCT x Manordale MTS (1.4km). The Working Group recommends the need be further reviewed to determine the preferred supply option for the area.

6.5.3 Asset Replacement Needs Core South Subsystem

No asset replacement needs were identified for Core South.

6.5.4 Asset Replacement Needs Kanata-Stittsville Subsystem

South March TS has an LTR that is expected to be exceeded in 2027 based on the coincident forecast.

South March has two 230kV/44kV, 50/67/83 MVA transformers in-serviced in 1971 which need replacement. The Working Group recommends to upgrade the transformers to 75/125 MVA units. This project is planned to have an in-service date of 2030–2032.

7. Plan Options and Recommendations

This section outlines the options considered and presents recommendations to address the electricity needs in the Ottawa Area Sub-Region. In developing the plan, the Working Group considered a range of integrated solutions, taking into account factors such as feasibility, cost, implementation timelines, system benefits, and consistency with the region's long-term electricity needs.

To meet the growing regional electricity demand, there are generally two types of approaches:

- Transmission/Distribution Infrastructure Expansion ("Wires" Options): These involve building new facilities or upgrading existing assets to increase the area's LMC. Examples include new transmission lines, autotransformers, step-down transformer stations, voltage control devices, or enhancements to existing infrastructure. Wires solutions may also encompass operational measures such as control actions or protection schemes that optimize system performance and mitigate reliability concerns.
- Demand Reduction, Management, or Local Generation ("Non-Wires" Solutions): These aim to reduce peak electricity demand so that it remains within the system's existing LMC. Examples include local utility-scale generation or energy storage, distributed energy resources (such as distribution-connected generation and demand response), demand-side management programs, and distribution-level load transfers.

Section 7.1 provides a detailed overview of the various types of options typically considered in Integrated Regional Resource Plans. Section 7.2 outlines the screening methodology used to identify which needs were most appropriate for further assessment of non-wires solutions. Sections 7.3 through Section 7.6 present the specific options that were developed and evaluated, leading to the Working Group's final recommendation.

7.1 Options Considered in IRRPs

Wires solutions are a core part of regional planning and are developed by identifying transmission upgrades or control measures tailored to address the specific technical limitations—such as voltage, thermal, or stability concerns—associated with each need. These solutions are shaped through collaboration with the Working Group.

While traditional wires infrastructure remains a reliable solution for addressing regional electricity needs, certain non-wires options may be better suited to specific types of needs and system characteristics. Selecting and sizing these alternatives—such as local generation or storage—requires additional analysis, including the development of an hourly load profile, as outlined in Section 5.7. The most appropriate technology and capacity are determined by examining the "unserved energy" profile, which highlights the portion of demand that exceeds the area's existing LMC. This profile provides key insights into the duration, frequency, magnitude, and total energy shortfall for each identified need. Visual representations of these characteristics for the Ottawa Area Sub-Region are provided in Appendix D.

High-level cost estimates for wires options are provided by the transmitter. For non-wires alternatives—such as generation or storage—cost estimates are based on industry benchmarks for capital and operating cost characteristics for each resource type and size. The costs for wires options presented are in terms of capital costs and represent a high level planning estimate while non-wires costs are net present value. In line with current policy direction and decarbonization goals, new natural gas-fired generation was not considered. Instead, battery energy storage, solar, and wind generation were evaluated as potential non-wires solutions.

Additional eDSM programming can also help decrease the net electricity demand. Expected peak demand savings from the 2021-2024 eDSM framework and subsequent frameworks (under the **Save on Energy brand**) are already included in the load forecast, as discussed in the Section 5.4. As part of this framework and the new 2025-2036 framework, the IESO was enabled to deliver a new program to address regional and/or local system needs. The **Local Initiative Program** is now one tool that is available to target the delivery of additional eDSM savings at specific areas of the province with identified system needs. LDCs can also use the Ontario Energy Board's Non-Wires Solutions Guidelines for Electricity Distributors to leverage distribution rates to help address distribution and transmission system needs using non-wires alternatives.[3] Generally, incremental eDSM measures are suitable for needs where growth is slow and the magnitude of the overload relative to the total demand is very small (i.e., on the order of few percent per year). These considerations are discussed further in Section 7.2, as part of the screening of options that was conducted.

For both wires and non-wires options, the upfront capital and operating costs are compiled to generate levelized annual capacity costs ($/kW-year). A cash flow of the levelized costs for the options are compared over the lifespan of the wires option (typically 70 years for transmission infrastructure). The net present value (in 2024 CAD dollars) of these levelized costs are the primary basis through which feasible options are compared.

It's important to note that planning-level cost estimates carry a significant margin of uncertainty, as they are developed without detailed engineering design or field assessments. These estimates are intended to support high-level comparisons between options during the IRRP process, rather than provide precise project costs. The RIP, which follows the IRRP and/or supports specific projects, includes more detailed analysis and provides an opportunity to refine cost estimates for wires solutions. The IESO remains actively involved in the Working Group during the RIP and engages with the transmitter if significant differences in cost estimates arise. In cases where downstream barriers—such as regulatory challenges around cost-sharing or the need to address local reliability constraints—limit the implementation of otherwise cost-effective solutions, pilot or demonstration projects may be pursued to explore their feasibility.[4]

The list of assumptions made in the economic analysis can be found in Appendix F.

---

[3] More information about the eDSM Guidelines is available on the Ontario Energy Board's **website**

[4] Barriers to non-wires alternatives and recommendations to address them were a part of the **Regional Planning Process Review**

7.2 Screening Options

As explained in Section 7, an array of options can be developed to meet local needs during an IRRP, but options are ultimately evaluated to recommend the option that is most cost effective, or the option that best balances cost and risk mitigation when substantial additional risks not captured by the Planning forecast are present. This process is complemented by considerations for stakeholder preferences and feedback.

Screening occurs early in the IRRP study after local reliability needs are known but before options analysis. It helps direct time-intensive aspects of detailed non-wires analysis (hourly need characterization, options development, financial analysis, and engagement) toward the most promising options. The three-step, high-level approach is shown in **Figure 26**, and the results of its application to the Ottawa Area Sub-Region IRRP needs are summarized in **Table 6** and then further described in **Table 7** and in the sections below.

More details on the steps and inputs used in the screening mechanism can be found in Appendix C.

Figure 26 | IRRP Screening Mechanism

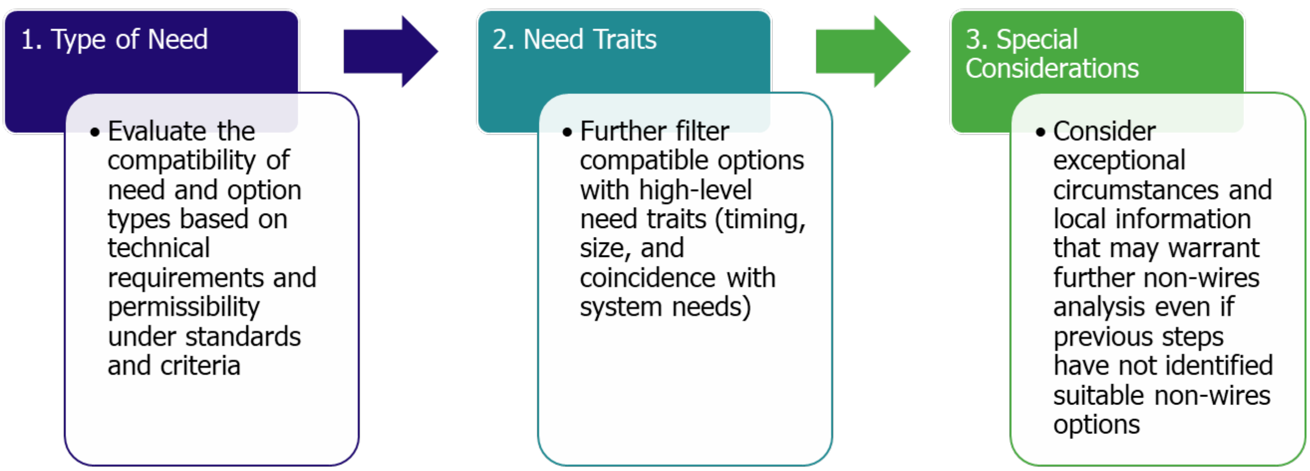


Table 6 | Options Screening Results for Station Capacity Needs

Need	Screened In	Screened Out
Station Capacity	• eDSM • Distributed generation • Wires options	• Demand response – due to magnitude and timing of needs, and limited DR capacity historically offered in this area • Operational measures

Table 7 | Options Screening Results for System Capacity Needs

Need	Screened In	Screened Out
System Capacity: Thermal, Voltage, Load Security	• eDSM • Distributed generation • Transmission-connected generation • Wires options	• Demand response – due to magnitude and timing of needs, and limited DR capacity historically offered in this area • Operational measures due to complexity of Ottawa system

7.2.1 Non-Wires Options for the Station Capacity Needs

A range of non-wires solutions—including transmission-connected generation, BESS, demand response, and hybrid approaches—were considered as part of the planning process. Given the significant forecasted load growth and the resulting number of station capacity needs, a practical screening approach was necessary to focus on the most feasible and impactful options. While eDSM programs alone are unlikely to significantly defer most of the identified needs, they remain important for slowing the pace of demand growth—supporting the timely development of long-term infrastructure solutions.

Due to the time and resources required for in-depth evaluation, it was not practical to assess non-wires options at every individual station. Instead, needs were grouped and prioritized based on where non-wires solutions—such as wind, solar, and battery storage—were most likely to be viable. This focused analysis was conducted for station groups within the Kanata-Stittsville, Core East Pocket 1, and Core East Pocket 2 subsystems.

7.2.2 Non-Wires Options for the System Capacity Needs

Among the System Capacity needs identified, four circuits were found to be limited by thermal constraints. Based on the current range of non-wires solutions, none were considered feasible for addressing these specific limitations. In contrast, the voltage stability concern identified in the Kanata-Stittsville subsystem was well suited for non-wires options and was therefore examined in greater detail. Additionally, two major battery storage projects—each exceeding 100 MW—have been proposed in the Ottawa area. Their potential impact on the regional electricity system has been assessed, with findings and observations outlined below.

7.3 Options and Recommendations for the Kanata-Stittsville Subsystem

The Kanata-Stittsville subsystem, while relatively straightforward in design, is facing rapid load growth and is expected to reach its LMC in the near term. Technical studies show that the loss of either of the two existing supply circuits—particularly from Merivale TS—would cause voltage stability issues under peak conditions, and a contingency at Nepean TS is projected to become a load security concern by 2029 in the winter if the electrification load materializes are projected.

To meet increasing demand and improve reliability, a new transformer station and an additional 230 kV transmission circuit are required. A preferred option has been identified to connect a new "Kanata North" station to C3S from Chats Falls TS and a new 230 kV circuit from Merivale TS, potentially achieved by rebuilding M32S or C7BM. This not only adds transformation capacity but also helps relieve pressure at Kanata MTS and South March TS while supporting future growth at nearby stations like Marchwood and Bridlewood.

A key component of the recommended solution is the development of a switching station in the area. The switching station will serve as a central hub, enabling better contingency response, operational flexibility, and future expansion potential, including the ability to connect additional infrastructure or circuits as system needs evolve. Consistently highlighted during public engagement, the switching station responds directly to local priorities around improving resiliency and reliability. Strategically, it also positions the system to accommodate future upgrades, including a potential second connection to Chats Falls or integration with a broader 230 kV network, depending on outcomes from the East Bulk Study.

While large-scale non-wires alternatives such as wind, solar, and nuclear were considered, they were found to be potentially economically practical but technically infeasible for the identified needs. A combination of a renewable resource and a BESS requires a substantial amount of land. However, this approach does not address station capacity needs. While it may provide energy to support load growth, the electricity is still constrained by the capacity of the station's transformers. As a result, new transformation stations are still required. However, with consideration of system benefits (i.e. avoided provincial capacity and energy), it is *possible* that these provide ratepayer value, though a larger bulk system study is needed to inform where to optimally place utility-scale resources to address provincial needs.

A proposed BESS project from the LT1 procurement—originally intended for another municipality—has been relocated to the Kanata-Stittsville area, where it can deliver greater grid benefit by discharging during peak periods and improving load-serving capability. This means that the Kanata-Stittsville area will be reinforced with both wires and non-wires solutions.

In summary, the recommended plan for Kanata-Stittsville includes:

A new transformer station north of the existing Kanata MTS,

A new 230 kV transmission line from Merivale TS, 18km

Connection to the existing C3S line,

A strategically located switching station,

Station upgrades at South March TS, and

A second supply to Nepean TS

Together, these elements form a resilient and scalable infrastructure solution that addresses near-term needs while establishing a strong foundation for long-term system performance.

Figure 27 | Kanata-Stittsville Recommendations

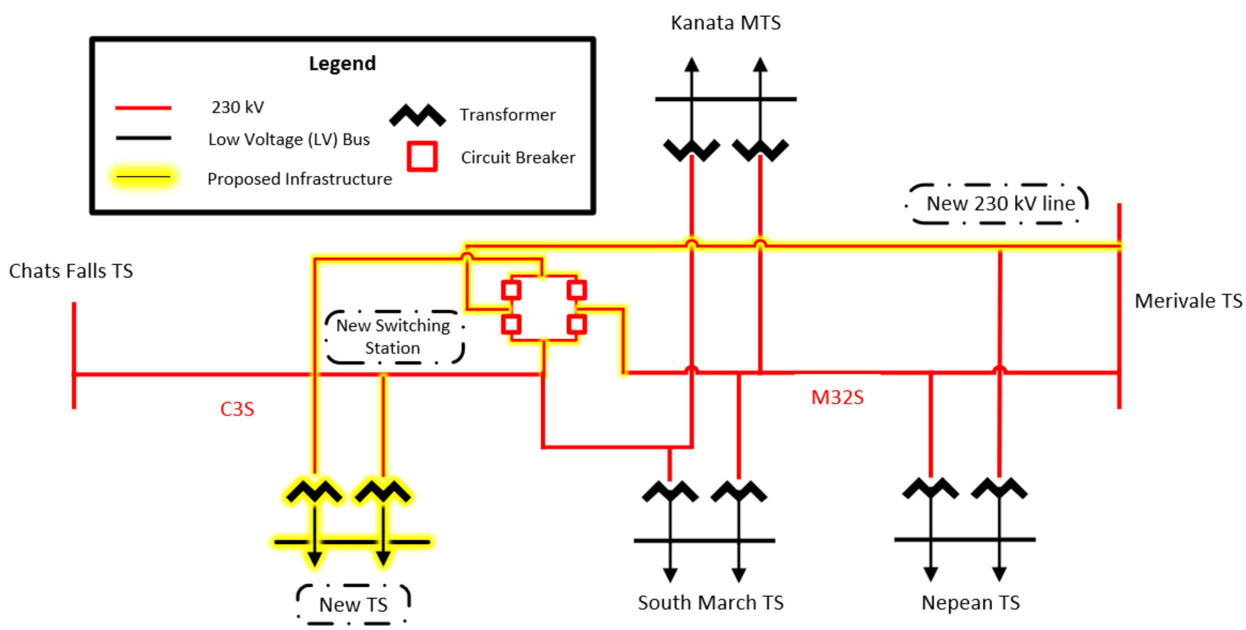


Table 8 | Wires Options for Kanata-Stittsville Subsystem

#	Description	High Level Planning Cost Estimate[5]
1	New 230 kV circuit to connect to the new station and Nepean TS from Merivale TS. The new station will tap to C3S	$185M+$45M
2	New 230 kV circuit from Merivale TS to switching station at South March TS. Nepean TS becomes double supply, all other stations connect to the switching station including a new station	$250M+$45M
3	Station transfer Kanata MTS to new station	$5-10M
4	Station transfer South March TS to new station	$0-5M
5	Station upgrade at South March TS	$40M

[5] All cost estimates are capital cost values

7.4 Options and Recommendations for the Core East Subsystem

7.4.1 Core East Subsystem – Pocket 1

Capacity needs in Pocket 1—especially at Lisgar TS, Carling TS, and Nepean Epworth MTS—are projected to emerge within five years and intensify during winter. Demand at Lisgar and Carling is expected to exceed LTRs by 30–40 MW, requiring a stepwise approach across the short, medium, and long term.

Near-term relief could come from transferring load to Nepean Epworth MTS, which is connected to Merivale TS, where about 15 MW of spare capacity is available. While Slater TS also has capacity, only Lisgar TS is a feasible candidate for transfers due to the lack of distribution ties.

Station upgrades offer another path:

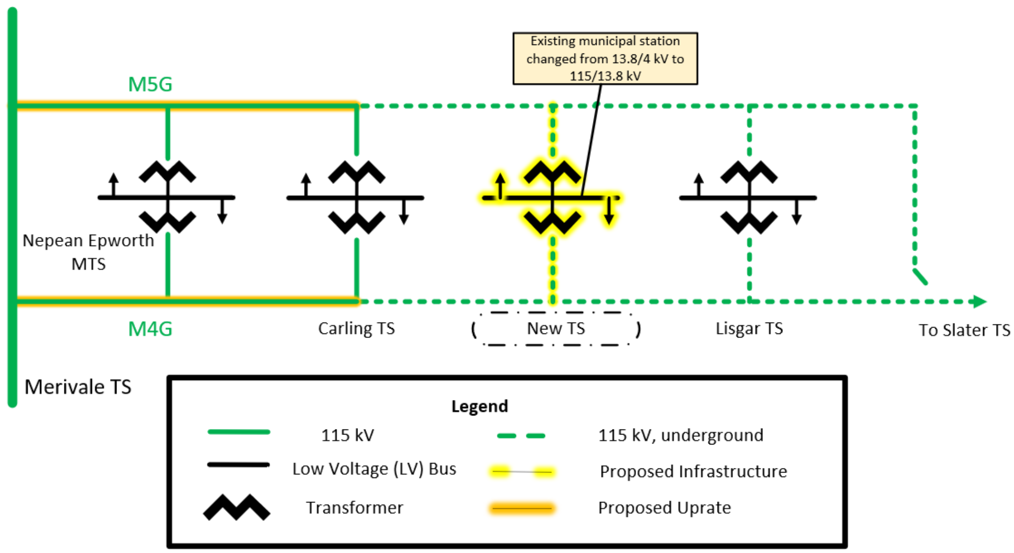
- At Carling TS, an upgrade could mitigate low-voltage limitations.
- At Lisgar TS, replacing transformer T2 and associated equipment could add ~45 MW.

Other options, such as relocating Carling TS to V12M and F10MV, were found to offer limited benefit due to space constraints and their inability to add new capacity.

Building a new transformer station and transmission lines in this dense area is technically viable but faces steep costs and logistical challenges. However, a promising alternative is to convert Bronson Station from a municipal distribution station to a 115 kV DESN station. Located between Carling TS and Lisgar TS along the M4G/M5G corridor, Bronson MTS could relieve adjacent stations via load transfers and by servicing future load. It is situated in a convenient location close to the 115 kV transmission lines but will require new transformers and significant cable connections. The approximate cost for this conversion is $65 million. This option would require uprating M4G and M5G to address thermal constraints.

Given the densely populated area, wind and/or solar options were screened out as feasible NWA's given the size of the need, and the land-use requirement of the facility that would be required to serve this need. However, A BESS-only NWA was assessed as a possible option, though it would only provide transmission deferral value through deferring investment by 2 years, but at a significant cost of $3.8 to 4.2B. Accordingly, the most practical solution for Pocket 1 is a combination of station expansions, targeted load transfers, and development of Bronson MTS.

Figure 28 | Core East Pocket 1 Recommendations



7.4.2 Core East Subsystem – Pocket 2

Pocket 2 encompasses much of Ottawa's downtown and is supplied by a tightly integrated 115 kV network. Nearly all stations are forecast to reach capacity within 20 years, particularly in winter, posing a major long-term planning challenge.

Given the urban density, expanding the network—especially with 230 kV infrastructure—is technically complex and expensive. Required upgrades at Hawthorne TS, the use of underground cables, and land constraints for new stations further limit this pathway.

Instead, the focus is on maximizing existing infrastructure and pursuing targeted improvements while managing the pace of demand growth. Near-term investments include:

- King Edward TS: ~35 MW through breaker and cable upgrades
- Albion TS: potential expansion through transformer upgrades

The upcoming LAPS will help identify eDSM opportunities, including energy efficiency, demand response, and behind-the-meter solar and storage measures. Demand reduction remains the most effective way to delay or avoid large-scale upgrades—every deferred megawatt reduces long-term cost and complexity.

A medium-term solution is to convert Cyrville TS to 230 kV using circuits D5A and a new A25, which would alleviate 115 kV constraints and allow for relocation of Cyrville MT's transformers to Moulton TS, upgrading both stations in the process.

An ongoing project at Merivale will add a third autotransformer by 2029 which will help support growth in the medium/longer term. It is possible to install a fourth autotransformer in the future, but beyond that, capital investments exceeding $1 billion could be unavoidable if demand continues rising.

Build a new 115kV Transformer Station east of Carling TS by converting existing Bronson distribution station

Connect the new Transformer Station to existing 115 kV transmission circuits M4G and M5G

Uprate sections of M4G and M5G, 12km

Proceed with station upgrades at Albion TS, Carling TS, Lisgar TS, Russel TS, King Edward TS

Proceed with distribution load transfers at Riverdale TS, Nepean Epworth MTS, Ellwood MTS

Convert Cyrville MTS from 115kV to 230kV station

Repurpose Cyrville MTS transformers at Moulton TS for station rating increase

Leverage insights from the LAPS to help slow demand growth in the downtown core, while continuing to monitor load trends between planning cycles

Figure 29 | Core East Recommendations

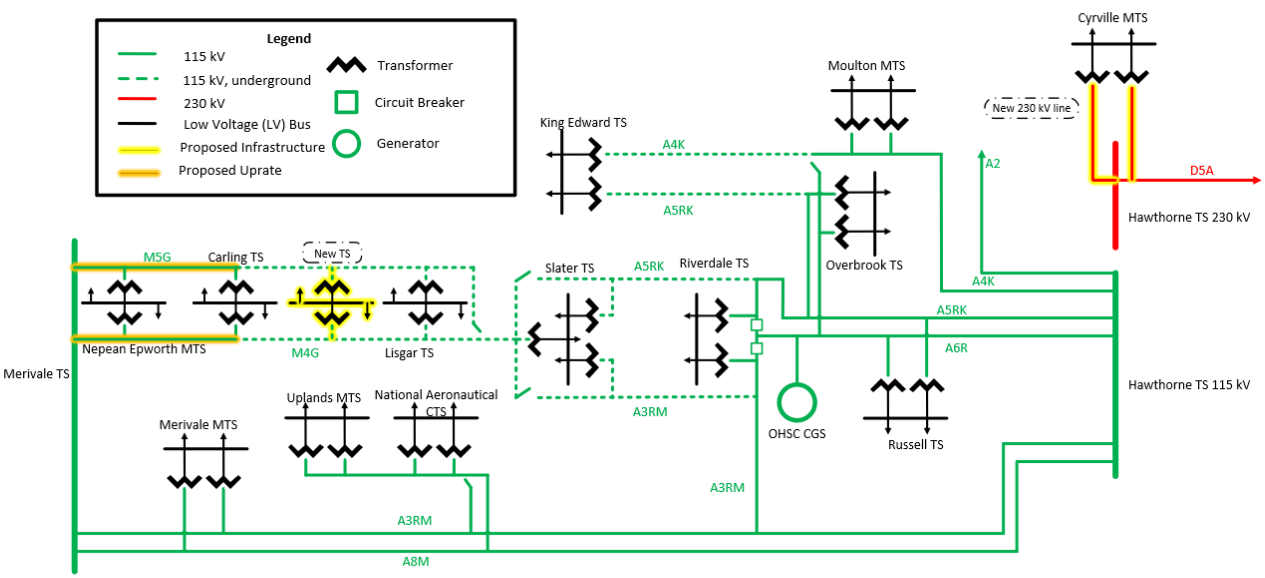


Table 9 | Wires Options for Core East Subsystem

#	Description	High Level Planning Cost Estimate[6]
1	New 115kV Transformer Station Connected to M5G and M4G, Convert Existing Bronson Station	$35M + $65M
2	Connect Carling TS to V12M and F10MV	$30M
3	Convert Cyrville TS to 230kV	$40M
4	Distribution Load Transfers – Hydro Ottawa/Hydro One Distribution	$0-5M per station

7.5 Options and Recommendations for the Core West Subsystem

7.5.1 Core West Subsystem – Pocket 1

For the area supplied by circuits S7M, W6CS, and E34M, three near-term station capacity needs have been identified—Bridlewood MTS, Marchwood MTS, and Fallowfield MTS—with three more expected in the long term.

Bridlewood MTS and Marchwood MTS are located in or near the Kanata-Stittsville area. Addressing their needs should align with broader upgrades planned for Kanata-Stittsville. As described in Section 7.3, the recommended approach for Kanata-Stittsville involves building a new 230 kV transformer station, supplied by a new 230 kV circuit from Merivale TS, which would also provide a secondary supply to Nepean TS. Since South March TS and Kanata TS will also benefit from additional capacity in the area, to address Bridlewood and Marchwood's capacity needs in the short term, the Working Group recommends implementing distribution load transfers—an efficient and cost-effective solution compared to building or upgrading stations.

Fallowfield MTS requires additional consideration. Several factors shape the recommendation:

- Circuit breakers were upgraded in 2018.
- Part of the S7M line has already been refurbished for future 230 kV operation.
- Load growth is expected in the area immediately north of the station, particularly for 28 kV distribution supply.

Based on these factors, multiple options were considered: upgrading the station, transferring load to Cambrian MTS, or transferring to a future new station. The Working Group recommends a phased approach:

- Short term: Transfer load to Cambrian MTS.

---

[6] All cost estimates are capital cost values

- Medium term: Shift load to a new station north of Fallowfield MTS.
- Long term: Upgrade Fallowfield MTS to 230 kV (requires conversion of S7M to 230 kV operation).

A separate thermal overload concern was identified in Pocket 1 during a contingency involving the loss of E34M and the transfer of Cambrian MTS load onto S7M. To address this long-term need, the Working Group assessed both wires and non-wires options and views the voltage conversion of S7M and the stations in the area to 230 kV would offer several benefits:

- Converting stations to 230 kV would result in increased station capacity to support future load growth.
- Shifting load from the 115 kV system to the 230 kV system would preserve load growth capacity for other stations, particularly those in densely built areas like the downtown core, where expansion is difficult.
- A new circuit could provide a second supply to Terry Fox MTS, which, like Nepean TS, currently relies on a single supply circuit with measures in place to allow for faster restoration.

To manage costs and avoid asset stranding, the S7M conversion should be implemented in phases. The Working Group recommends converting only the southern section of S7M, maintaining the northern portion that supplies Bridlewood MTS and Marchwood MTS and retaining its open-point connection to C7BM to preserve to ensure the 115kV generation connections northwest of the city are maintained.

The first step in the transition involves constructing a new 230 kV circuit from Merivale TS westward to the new station, which could later be extended to supply Terry Fox MTS. Station upgrades would follow at Manotick DS, Richmond South MTS, and Cambrian MTS, with the circuit initially connecting at the S7M junction. Once complete, these upgrades will provide a second 230 kV source to key stations, significantly improving system resilience.

In the medium-term, thermal overload risks remain on the Merivale TS end of S7M during an E34M outage. Until the full conversion is completed, interim relief could be provided through non-wires alternatives and distribution load transfers from Cambrian MTS to the new station if demand rises quickly.

Finally, the Working Group reviewed the proposed Trail Road BESS battery project, announced under the LT1 procurement. While it will support overall grid resilience, it connects to E34M and would not relieve loading on S7M unless a direct connection is also established.

7.5.2 Core West Subsystem – Pocket 2

Two smaller stations in this pocket—Manordale MTS and Centrepoint MTS—are facing capacity constraints. Due to growing demand and specific large customer requests, there is a need for 28 kV distribution in the area. However, both stations currently operate at only 8 kV, making them unable to meet this requirement. As a result, a new transformer station is needed.

One option considered was redeveloping Manordale MTS as a DESN station, but this was deemed unfeasible due to space limitations at the site. The alternative is to construct a new station at a different location. While a final site has not yet been selected, Hydro Ottawa is actively evaluating several options and is responsible for determining the final location.

The northern portion of the system was found to have thermal overloads. The main stations contributing to this are Lincoln Heights TS and Woodroffe TS and are not forecast to reach their capacity until the winter in the long-term. Therefore, the most economical solution is to simply uprate the segments of cables identified.

Build a new 230kV Transformer Station west of Merivale TS

Build a new 230kV transmission line westwards from Merivale TS along existing corridor, 5 km

Connect the new Transformer Station to E34M and new transmission circuit

Uprate sections of M4G and M5G, 10km

Uprate sections of C7BM and F10MV, 8km

Incorporate BESS resulting from LT1 procurement to improve area’s voltage and reliability

Figure 30 | Core West Recommendations

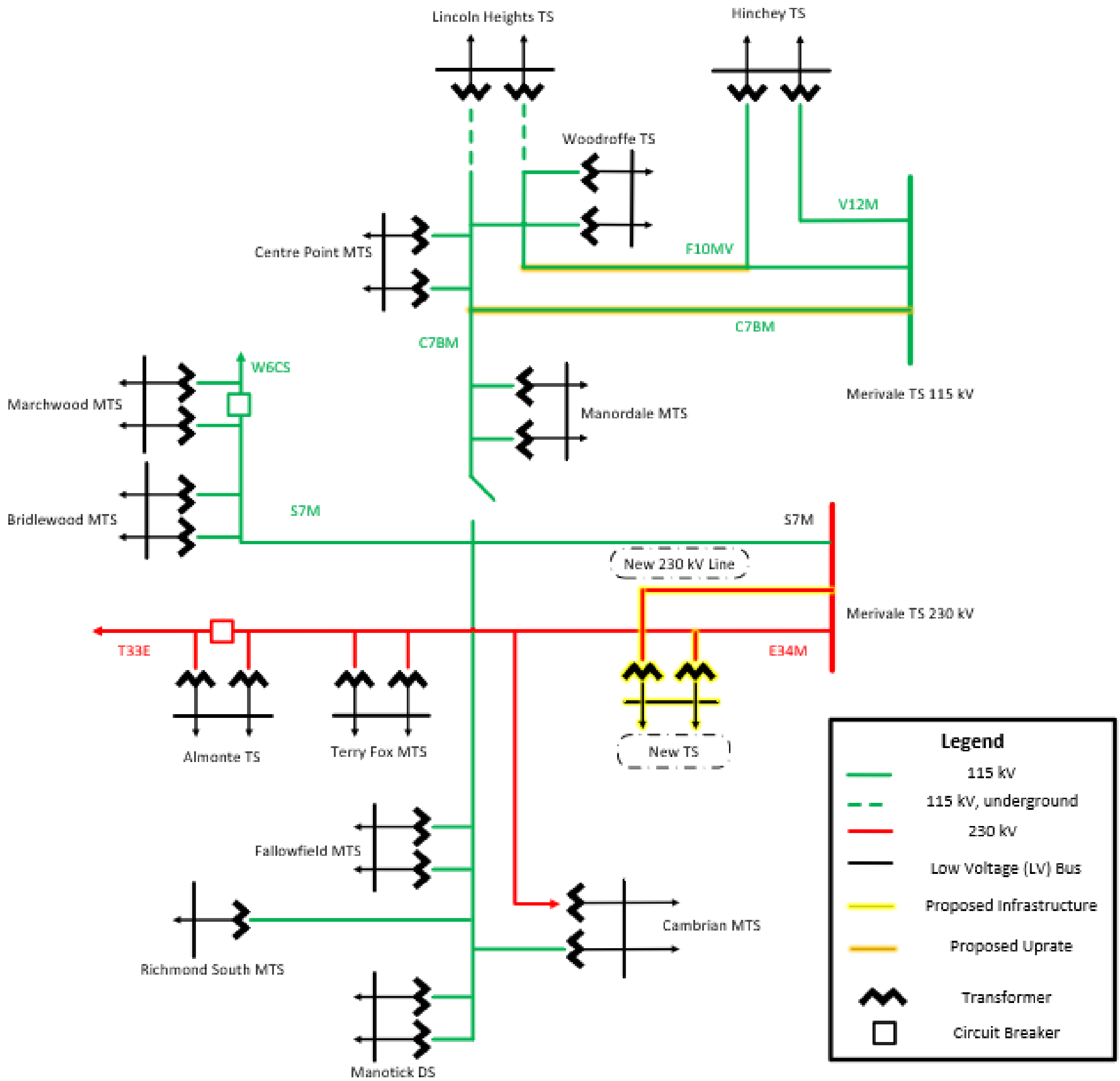


Table 10 | Wires Options for Core West Subsystem

#	Description	High Level Planning Cost Estimate[7]
1a	Fully Convert S7M to 230 kV	-
2a	New 230kV Circuit to S7M STR Junction, Convert Southern Portion of S7M to 230kV, Keep Existing 115kV S7M Connecting to W6CS	$100M
2b	New 230kV Circuit to Connect Terry Fox MTS and new Greenbank MTS	$90M
2c	New 230 kV Circuit to Terry Fox, Convert Southern Portion of S7M to 230 kV, Keep Existing 115 kV S7M Connecting to W6CS	$140M
3a	Fully uprate C7BM and F10MV	$50M
4a	Reconductor S7M, keep 115kV	$15M
5	Distribution Load Transfers – Hydro Ottawa/Hydro One Distribution	$0-5M per station

7.6 Options and Recommendations for the Core South Subsystem

Three stations in Core South—Limebank MTS, Greely DS, and Marionville DS—are forecast to exceed their long-term ratings (LTRs) within the next five years, requiring immediate action to address upcoming capacity shortfalls.

Given the scale and timing of these needs, station transfers and upgrades were the only solutions considered, as building a new station was deemed cost-prohibitive relative to projected demand outlook. In the near term, minor overloads at Limebank MTS can be addressed through distribution-level load transfers to Piperville MTS, which is scheduled for energization in 2026 and will be connected to the 230 kV L24A circuit. This transfer also reduces loading on the 115 kV system, contributing to better overall system balance.

For Marionville DS, the recommended action is to install a second transformer to increase capacity. At Greely DS, the proposed solution involves enabling supervisory control and data acquisition (SCADA) monitoring, allowing for an increase in respected transformer limits and improving station performance.

To meet load security requirements in Core South, the most effective strategy is the installation of a breaker between circuits L2M and M1R at Merivale TS. This change would ensure that a loss of both

[7] All cost estimates are capital cost values

circuits would only occur under a double contingency, which is significantly less likely and subject to a higher load rejection threshold of 600 MW.

For medium-term System Capacity needs, three main options were assessed:

1. Uprating segments of circuit L2M between Merivale TS and Limebank MTS to avoid thermal overloads.
2. Converting Limebank MTS to a 115 kV DESN, supplied by M1R and L2M. While Limebank's projected peak load remains below 150 MW (permissible under single contingency criteria), the station has four transformers, and adding a second supply would significantly improve system reliability.
3. A long-term option involves converting Limebank MTS to a 230 kV DESN, supplied by two new circuits from the St. Lawrence region. However, this would require comprehensive bulk system studies to determine the feasibility of extending 230 kV infrastructure from the St. Lawrence area to Merivale TS. As such, this remains a long-term vision rather than a near- or medium-term solution.

Build a new breaker position at Merivale TS and separate circuits M1R and L2M

Proceed with station upgrades at Greely DS and Marionville DS

Distribution load transfer from Limebank TS to Piperville TS

Figure 31 | Core South Recommendations

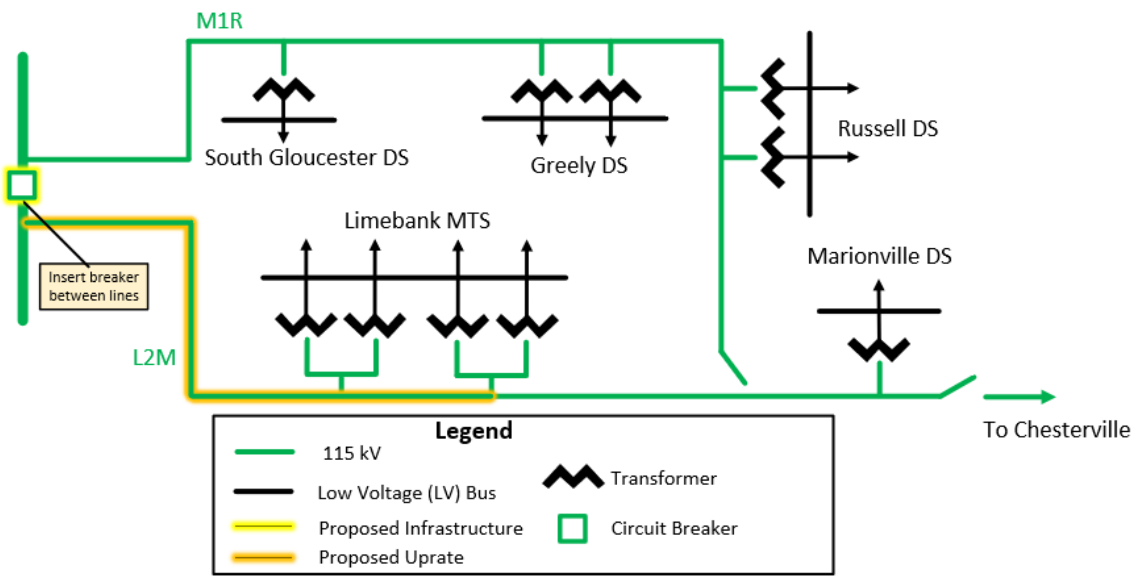


Table 11 | Wires Options for Core South Subsystem

#	Description	High Level Planning Cost Estimate[8]
1	New breaker position at Merivale TS to separate L2M and M1R	$30M
2	Uprate segments of L2M from Merivale TS to Limebank MTS	$25M
3	Convert Limebank MTS to 115 kV DESN	N/A
4	Convert Limebank MTS to 230 kV DESN	N/A
5	Station transfers	$5M
6	Station upgrades	$12M+$3M

[8] All cost estimates are capital cost values

7.7 Long-Term Considerations

7.7.1 Kanata-Stitsville Subsystem

This subsystem, defined by the 230 kV transmission circuits and transformer stations that supply the Kanata-Stittsville area, is experiencing a period of rapid economic development, which will require accessible and reliable electricity. A number of investments—including a new transformer station, transmission circuit, switching station, and potential BESS site—have been recommended in this report to help meet these goals. These investments are designed to increase both station and System Capacity, improve resiliency via the switching station, and enhance power quality and flexibility through the proposed BESS project.

Once these investments are implemented, the Kanata-Stittsville Subsystem will consist of one transmission circuit from the Chats Falls area (C3S), two circuits from Merivale TS (including M32S and the proposed new circuit), four transformer stations to supply power, and a strategically located BESS which can help meet peak demand and support voltage stability in the area.

The long-term vision for this subsystem continues to reinforce each component. The new circuit and switching station significantly improve supply from the Merivale side but do not yet enhance the supply path from Chats Falls. As such, a future consideration is to extend the new transmission circuit to Chats Falls TS, which would increase the LMC of the subsystem and provide a second path for hydroelectric generation to reach Ottawa loads. In general, the growth projected by demand forecasts will require reinforcement of Ottawa's western supply, which is being explored under the East Bulk Plan. One promising option includes the development of a new autotransformer station—similar to Merivale TS and Hawthorne TS—in western Ottawa. The proposed switching station has been recommended with this potential in mind and is being designed to accommodate a connection to this new substation, further strengthening the capability and flexibility of the Kanata-Stittsville system.

If demand grows at a faster pace than forecast—particularly due to unforeseen industrial or large commercial developments—a second transformer station beyond what is currently planned (e.g., in addition to Kanata North MTS) may be required. A more detailed assessment of the Kanata study area will help clarify the actual capacity available within this new configuration and determine the timing and scope of future infrastructure.

7.7.2 Core East Subsystem

This subsystem is defined by the 115 kV network that supplies most of Ottawa's downtown core. Given the complexity and limited physical space for new infrastructure in the downtown area, the focus of this plan is to maximize existing assets and strategically pursue upgrades to avoid large-scale overhauls. This plan recommends increasing station capacity by upgrading Carling TS, Lisgar TS, and Riverdale TS, while also gaining additional capacity through the conversion of Bronson TS from a distribution station to a transmission supply point, and converting Cyrville MTS from 115 kV to 230 kV.

The Working Group recommends implementation of the additional cost-effective eDSM potential that will be identified in the LAPS, which promote non-wires alternatives to mitigate load growth, including energy efficiency programs, distributed energy resources (DERs), and demand response initiatives. Additional optimization is possible by leveraging Slater TS, which is centrally located and supplied by three independent circuits. Slater's robust configuration makes it a strong candidate for load transfers, and future development should be encouraged near this area to capitalize on its reliability and existing capacity.

Monitoring the evolution of winter peak demand will be critical. If these trends materialize as expected, a major decision will be required, as the 115 kV network alone cannot accommodate long-term growth in its current configuration. One response may involve installing a fourth autotransformer at Merivale TS to support increasing inter-pocket transfers. More broadly, planners will need to decide between:

1. Introducing a new 230 kV supply path into the downtown core;
2. Converting select segments of the 115 kV system to 230 kV; or
3. Build new transmissions lines into the downtown core.

All options would ultimately require significant expansion work at Hawthorne TS, which serves as a key transmission node for the eastern subsystem.

The long-term vision for the broader region anticipates that most expansion will occur west of Ottawa, reducing the need for major downtown build-outs. With the implementation of the upgrades and strategies outlined in this plan, the Core East subsystem will largely be able to rely on enhanced operational efficiency and, at most, require one to two new transformation stations to support long-term growth.

7.7.3 Core West Subsystem

Following the uprate of C7BM and F10MV the rest of the stations in Pocket 2 of the Core West subsystem will be able to grow to their LTR which is sufficient for the 20-year demand forecast. The area will also have a new 230kV transformer station that will help offload the smaller stations in the area. The long-term vision for this subsystem is to expand the 230kV transmission circuit west. By doing so, it allows for multiple successive investments. These include providing a second supply to Terry Fox MTS, converting S7M to 230kV, and providing a second supply to Cambrian MTS as well. Further, depending on the outcomes of the Bulk Study, a potential 230kV autotransformer station will allow for expansion in this area to meet growing demand.

7.7.4 Core South Subsystem

The future of this subsystem will depend on the outcome of the East Bulk study. A potential 230kV transmission line from St. Lawrence presents to opportunity to convert the entire pocket.

The load at Limebank MTS is to be monitored and will eventually require a second supply. The circuits will also need to be uprated as the load grows.

A new auto-transformer station in the west of Ottawa would also impact how this system is planned and depend again on the East Bulk Study.

7.8 Summary of Recommended Actions and Next Steps

The Working Group recommends the actions summarized in **Table 12** to meet identified needs in the Ottawa Area Sub-Region IRRP.

Table 12 | Summary of the Near-Term Plan for the Ottawa Area Sub-Region IRRP

Need Type	Affected Element(s)	Recommendation	High Level Planning Cost Estimate[9]
System Capacity (Transformation)	Core East Pocket 1	Build new Transformer Station by converting existing Distribution Station. Connect to M4G and M5G. Interim station name: Bronson MTS.	$65M
System Capacity (Thermal Overload)	M4G, M5G	Uprate portions of M5G and M4G.	$35M
System Capacity (Transformation)	Core East Pocket 2 A5RK, A6R, A4RK, A3RM, A8M, A2	Convert Cyrville MTS (115kV) to 230kV thereby preserving capacity on autotransformers for growth on the 115kV downtown system. Pursue eDSM program opportunities as part of LAPS to reduce demand and delay large-scale infrastructure upgrades.	$75M TBD
Station Capacity	Carling TS	Upgrade secondary cables to increase station rating. Distribution load transfer to new Bronson MTS.	$40M $0-5M
Station Capacity	Lisgar TS	Increase station rating by upgrading limiting LV element	$20M
Station Capacity	Riverdale TS	Distribution load transfer to new Bronson MTS.	$0-5M
Station Capacity	Nepean Epworth MTS	Distribution load transfer to Merivale MTS.	$100K
Station Capacity	King Edward TS	Upgrade cables to increase station rating.	$40M

[9] All cost estimates are capital cost values

Need Type	Affected Element(s)	Recommendation	High Level Planning Cost Estimate[9]
Station Capacity	Cyrville MTS	Station voltage conversion from 115kV to 230kV to increase station rating.	$75M
Station Capacity	Moulton MTS	Repurpose 115kV transformers from Cyrville MTS voltage conversion to increase station rating. Estimate does not consider any circuit upgrade that may be required.	$5M
Station Capacity	Ellwood MTS	Distribution load transfer to Albion TS.	$0-5M
System Capacity (Transformation, Voltage Stability)	Kanata-Stittsville	Build a new Transformer Station north of existing stations. Connect to C3S and new transmission line from Merivale TS. Interim station name: Kanata North MTS. Build a new 230kV transmission line from Merivale TS by rebuilding C7BM corridor, connecting Nepean TS and the new Kanata North MTS. Build a switching station that connects existing and new 230kV stations to improve resiliency and flexibility.	$45M $185M $65M
Load Security	Nepean TS	Provide second supply to Nepean TS via new transmission circuit from Merivale TS. Same circuit that is being built to supply new Kanata North MTS.	$5M
Station Capacity	Kanata MTS Marchwood MTS	Distribution load transfer to new Kanata North MTS.	$6-8M
End-of-Life Station Capacity	South March TS	Upgrade transformers at South March TS to increase station rating.	$40M
System Capacity (Thermal Overload)	Core West Pocket 1 F10MV, C7BM	Uprate portions of C7BM and F10MV.	$50M

Need Type	Affected Element(s)	Recommendation	High Level Planning Cost Estimate[9]
System Capacity (Transformation)	Core West Pocket 2	Build a new Transformer Station to meet demand growth and need for 28kV supply west of Merivale TS. Interim station name: Greenbank MTS.	$40M
		Build new 230kV transmission line from Merivale TS to supply new Greenbank MTS.	$40M
Station Capacity	Centrepoint MTS Fallowfield MTS Manordale MTS	Distribution load transfer to new Greenbank MTS.	$0-5M
Station Capacity	Bridlewood MTS	Distribution load transfer to Terry Fox MTS.	$0-2M
Load Security	Core South L2M, M1R	Install a new breaker at Merivale TS and separate L2M and M1R.	$30M
Station Capacity	Marionville DS	Install a second transformer to increase station rating.	$12M
Station Capacity	Greely DS	Install SCADA transformer monitoring to increase station rating.	$3M
Station Capacity	Limebank MTS	Distribution load transfer to Piperville MTS.	$5M
Planning	N/A	Working Group to produce Adaptive Pathways documents for each subsystem following the publishing of the IRRP.	

8. Community and Sector Engagement

Engagement is critical in the development of an IRRP. Providing opportunities for input in the regional planning process enables the views and perspectives of the public, which for these purposes, refers to market participants, municipalities, stakeholders, communities, Indigenous communities, customers and the general public, to be considered in the development of the plan, and helps lay the foundation for successful implementation. This section outlines the engagement principles and activities undertaken to date for the Ottawa Area Sub-Region IRRP.

8.1 Engagement Principles

The IESO's **External Relations Engagement Framework** is built on a series of key principles that respond to the needs of the electricity sector, communities and the broader economy. These principles ensure that diverse and unique perspectives are valued in the IESO's processes and decision-making. We are committed to engaging with purpose to foster trust and build understanding as the energy transition continues.

Figure 32 | The IESO's Engagement Principles

8.2 Engagement Tactics

To ensure that the IRRP reflects the needs of market participants, municipalities, stakeholders, communities, Indigenous communities, customers and the general public, engagement tactics involved:

- Leveraging the **Ottawa Area Sub-Region engagement webpage** to share information including engagement opportunities, meeting materials, input received and the IESO's response to feedback;

- Leading targeted discussions with key municipal staff to help inform the engagement approach for this planning cycle;
- Hosting public webinars at major junctions in the plan development to share plan details, understand feedback and answer questions, and;
- Providing written updates through email and IESO's weekly Bulletin updates to all subscribers.

8.3 Engagement Approach

Four public engagement webinars were held at major stages during the Scoping and IRRP development to give interested parties an opportunity to hear about its progress and provide comments on key components of the plan. Unique to the IRRP was a Local Achievable Potential Study (LAPS) for the Ottawa Area taking place in parallel. Feedback on the Local Achievable Potential Study was solicited during the webinar on "Needs and Potential Wire Options."

Public engagement webinars were attended by several representatives from the City of Ottawa, community representatives, businesses, Indigenous communities, and other stakeholders with an identified interest, and written feedback was collected following a comment period after each webinar. The four stages of engagement at which input was invited were:

1. The draft scoping outcome assessment report to share the planning approach before delving into the full IRRP study.
2. The draft engagement plan, electricity demand forecast, and early identified needs – to set the foundation of this planning work.
3. The defined electricity needs for the region and potential wire options to meet the identified needs, as well as
4. The analysis of all feasible wire and non-wire options and draft IRRP recommendations.

Comments received during the development of the IRRP primarily focused on:

- Accounting for growth and economic development projects across the region;
- Ensuring climate impacts are accounted for throughout the development of the IRRP, and;
- Exploring alternative solutions, such as non-wire options, to meeting the area's electricity needs.

Feedback received during the written comment periods for these webinars helped to guide further discussions throughout the development of this IRRP, as well as add due consideration to the final recommendations, and are outlined in the stages below.

8.3.1 Scoping Assessment

As part of the 2020 Ottawa Sub-Region IRRP, the Technical Working Group recommended to monitor the City of Ottawa's Energy Evolution mandate in future planning cycles. During the monitoring, the Technical Working Group recommended to advance the planning cycle. When regional planning kicked off, the draft 2023 Scoping Assessment Outcome Report recommended focused discussions to take place with the City of Ottawa, the local distribution companies and the IESO on the impacts of Energy Evolution and GHG emission targets on the demand forecast.

Once the draft report was completed, an email communication was sent to all subscribers of the Greater Ottawa Region, including municipalities, Indigenous communities, and those with an identified interest in regional issues, to announce the commencement of a new planning cycle and encourage participation on the Greater Ottawa Scoping Assessment Report finalization. A public webinar was held in February 2023 to provide an overview of the regional electricity planning process, the draft report and proposed approach.

Feedback received during this milestone encouraged the IESO to obtain data from large customers electrification plans and to review opportunities for distributed energy resources to reduce electricity demand. The Technical Working Group confirmed a process to collect input from municipalities, businesses, Indigenous communities and other interested parties will take place in the next milestone. The Technical Working Group also committed to explore opportunities for distributed energy resources and will enhance engagement to increase opportunities for input. The final Scoping Assessment was posted in March 2023, identifying the need for a coordinated regional planning approach for the Ottawa Area.

8.3.2 Demand Forecast

Following finalizing the Scoping Assessment, the Technical Working Group began the development of Ottawa's electricity demand forecast. IRRP recommendations are typically driven by the Reference Demand Forecast, which includes firm loads (current and planned), organic growth, residential, electrification and energy plans, and industrial growth. The Technical Working Group sought input from the City of Ottawa and large electricity customers (including school boards). The reference forecast assumes most likely electrification adoption rates based on current policies and includes eDSM forecasts based on provincial and federal policies, as well as the impact of existing and expected DERs in Ottawa.

In parallel, the Technical Working Group determined the need to develop a High Growth Demand Forecast to capture growth and trends that are less certain such as full decarbonization of the city or large-scale customer connections. To achieve this, the City of Ottawa, the local distribution companies and the IESO participated in several focused discussions to capture the effects of economic development, electrification and decarbonization in the city. Hydro One Transmission and Enbridge Gas Inc. participated in these "Decarbonization Focus Group" meetings as observers. In 2023 the IESO piloted an approach in both the Toronto and Ottawa IRRPs, to engage Enbridge Gas Inc. throughout the demand forecasting process as an observer. The observer's role was limited to subject matter experts providing feedback on the discussions where applicable. The purpose of the "Decarbonization Focus Group" was to determine a high growth demand forecast for the Ottawa Area that reflects the full decarbonization of the city.

During this time, six meetings from March to December 2023 took place within the Decarbonization Focus Group to obtain insights including shared experience with decarbonization. Key discussion items raised included the importance of visibility into planned major energy efficiency projects and understanding how to share updates on when this load is materializing. After gathering all insights, Hydro Ottawa engaged a third-party consultant to capture the effects of electrification and decarbonization into five forecasts. The reference and high growth forecast scenarios were chosen and all forecasts were shared through the launch of a broader public engagement initiative. Communications to IESO subscribers of the Greater Ottawa Region ensured all interested parties were made aware of the opportunity for input.

During this milestone, key information shared was that the electricity demand is growing significantly in the Ottawa area with demand estimated to grow by 33% in the winter and 166% in the summer by 2043. The primary drivers of growth are economic growth and decarbonization initiatives which promote the intensification of electricity use, resulting in a substantial demand increase, particularly in the winter. The reference forecast will be used to drive recommended solutions, however the Technical Working Group will identify options for long-term electricity needs and high-growth scenarios, refining these options in future planning cycles and activating them as growth occurs.

Based on the feedback through this engagement initiative, a key priority was to ensure the IRRP considered climate impacts into the demand forecast and incorporated resiliency into recommended actions. The Technical Working Group ensures the forecast reflects extreme weather conditions in various scenarios, which includes the system's ability to respond to disturbances, and committed to ongoing discussions about resiliency throughout plan development. Additionally, feedback was centred around ensuring alternative solutions, such as non-wire options, are explored. The Technical Working Group committed to evaluating wire and non-wire options and sharing the analysis as planning work advances. Additionally, the IESO informed the public that details about the Local Achievable Potential Study underway for the Ottawa Area will be shared in future engagements.

8.3.3 Electricity Needs and Potential Wire Options

During this milestone, the Technical Working Group identified significant station capacity, System Capacity, end-of-life, load restoration and load security needs throughout the Ottawa area, with several of these needs emerging in the near-term. Therefore, the Technical Working Group determined it was necessary to prioritize options that met near- and medium-term needs. Given the magnitude and timing of the near- and medium-term needs, potential wire options were developed and shared with the community at this milestone with a commitment to presenting a comprehensive analysis for all feasible wire and non-wire options later.

Feedback at this stage of the engagement sought to further clarify the options analysis stage of the IRRP, particularly if wire and non-wire options would be considered as alternatives to each other. Additionally, feedback received urged for resiliency to be considered when finding options to meet needs. The Technical Working Group confirmed wire and non-wire options, or any combination of both, will be evaluated to meet the area's needs. Additionally, the Technical Working Group acknowledges the importance of resiliency and will consider this in the detailed options analysis.

Feedback was also solicited for the Local Achievable Potential Study and the community recommended to broaden the scope of the study. The project team for the local APS confirmed several considerations raised, including leveraging Dunsky's 2022 provincial DER potential study, inclusion of thermal storage, consideration of decreasing costs of technologies overtime and more were incorporated into the report. The IESO also clarified that front-of-meter DER was being considered outside of the Local Achievable Potential Study in the IRRP and explained why vehicle-to-grid technology was excluded. Engagement with the City of Ottawa and the Decarbonization Focus Group were undertaken as part of this milestone.

8.3.4 Options Analysis and Draft Recommendations

During this milestone, the Technical Working Group shared the options analysis for all feasible wire and non-wire options and shared the draft recommendations. The draft recommendations included two new transmission lines within existing corridors, two new stations and two significant upgrades to existing stations. Informed by feedback about resiliency, the draft recommendations also include a switching station to improve transmission reliability by rerouting power during outages or maintenance, minimizing disruptions and enhancing grid flexibility.

The outreach strategy for this milestone included briefing various City of Ottawa staff as well as councillors whose riding is located where the draft recommendations are. A public engagement webinar was hosted to share the detailed analysis and draft recommendations, as well as an update on the Local Achievable Potential Study and a suite of Save on Energy programs available to Ottawa small businesses and residents. A touchpoint with the Decarbonization Focus Group was hosted to solicit feedback into the final IRRP.

8.4 Involving Municipalities in the Plan

Throughout the IRRP engagement, valuable feedback was received and incorporated into the final IRRP including:

- Enhancing webinar materials to share technical updates in a digestible manner.
- Undergoing a Local Achievable Potential Study which would study the potential of behind-the-meter options, including distributed energy resources, with the commitment to hosting a webinar later in Q3 to share the findings and next steps of the study.
- Including the City of Ottawa's Energy Evolution plans in the reference and high forecast scenarios.
- Incorporating information about economic development in Ottawa, particularly around the Kanata North area.
- Incorporating feedback around resiliency into the recommendation of a switching station to enhance transmission reliability.

8.5 Engaging with Indigenous Communities

To raise awareness about the regional planning activities underway and invite participation in the engagement process, regular outreach was made to Indigenous communities within the Ottawa Area Sub-Region throughout the development of the plan. This includes the communities of the Algonquins of Ontario, Pikwakanagan First Nation, and Métis Nation of Ontario Region 5.

The IESO remains committed to an ongoing, effective dialogue with communities to help shape long-term planning in regions all across Ontario.

9. Conclusion

This report documents an IRRP that has been carried out for the Ottawa Sub-Region of the OEB’s Greater Ottawa planning region. The IRRP identifies electricity needs in the sub-region over the 20-year period from 2024-2043 and recommends preferred solutions to address near-term needs. The Working Group recommends Hydro One initiate a RIP. The Working Group will continue to provide support throughout the RIP process, and assist with any regulatory matters that may arise during plan implementation.

The IRRP also identifies actions to monitor, defer, and address remaining needs and to inform the next regional planning cycle. The Ottawa Sub-Region Working Group will continue to meet at regular intervals to monitor developments in the sub-region and track progress toward the plan deliverables. In the event that underlying assumptions change a new regional planning cycle may be initiated sooner than the OEB mandated five-year schedule.