DECEMBER 12, 2024

Ottawa Area Sub-Region Regional Electricity Planning

Engagement Webinar #2
Electricity Needs and Potential Wire Options

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Greater Ottawa Land Acknowledgement

The IESO acknowledges that the Greater Ottawa Region is the un-ceded traditional territory of the Algonquin Anishinabeg and the people of the Algonquin Anishinabeg Nation.

The IESO would also like to acknowledge all First Nations, Inuit and Métis peoples and their valuable past and present contributions to this land.

Agenda

1. Greater Ottawa Land Acknowledgement
2. Ontario's Electricity Sector and IESO's Role
3. Recap: Regional Electricity Planning & the Demand Forecast
4. Electricity Needs
5. Potential Wire Options
6. Local Achievable Potential Study
7. Next Steps & Discussion

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We work with:

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

<<< **Communities** >>>

Summary

- **Electricity demand is growing significantly** in the Ottawa area due to economic growth and decarbonization policies.
- The growing demand for electricity results in **large-scale electricity infrastructure needs that will require large-scale solutions.**
- **Various options are being considered** to meet the electricity needs, including non-wires and wires options.
- Options that can address the near- and medium- term needs will be **prioritized**, and signposts will be identified to monitor forecast changes and contemplate additional actions required if higher demand growth materializes.
- The Technical Working Group has developed **potential wire options to meet emerging near-term needs while ensuring all potential wire and non-wire options are thoroughly evaluated.** In Q1 2025, a detailed options analysis will be shared, including non-wire options.
- **Your input will help ensure that any additional information or considerations are included as part of this and future engagements.**

Seeking Input

Regional planning:

- What perspectives do you have on the potential wire options?
- What additional information should be considered in the evaluation of non-wire options?
- Are there any additional information that should be provided in future engagements to help understand municipal perspectives and insights?

Local Achievable Potential Study (APS):

- Feedback on scope, methodology, and potential uses for the APS that the IESO should consider.
- Additional data sources or regional policies/trends that should be considered.

The IESO welcomes written feedback until **Thursday, January 2, 2025.** Please submit feedback to engagement@ieso.ca.

Recap: Regional Electricity Planning Process & the Demand Forecast

Electricity Planning in Ontario

Provincial/Bulk System Planning

Addresses provincial electricity system needs and policy directions.

Underway: Eastern Ontario Bulk Study

Regional Planning

Addresses local electricity system needs at the transmission system level.

Underway: Ottawa Area Sub-Region

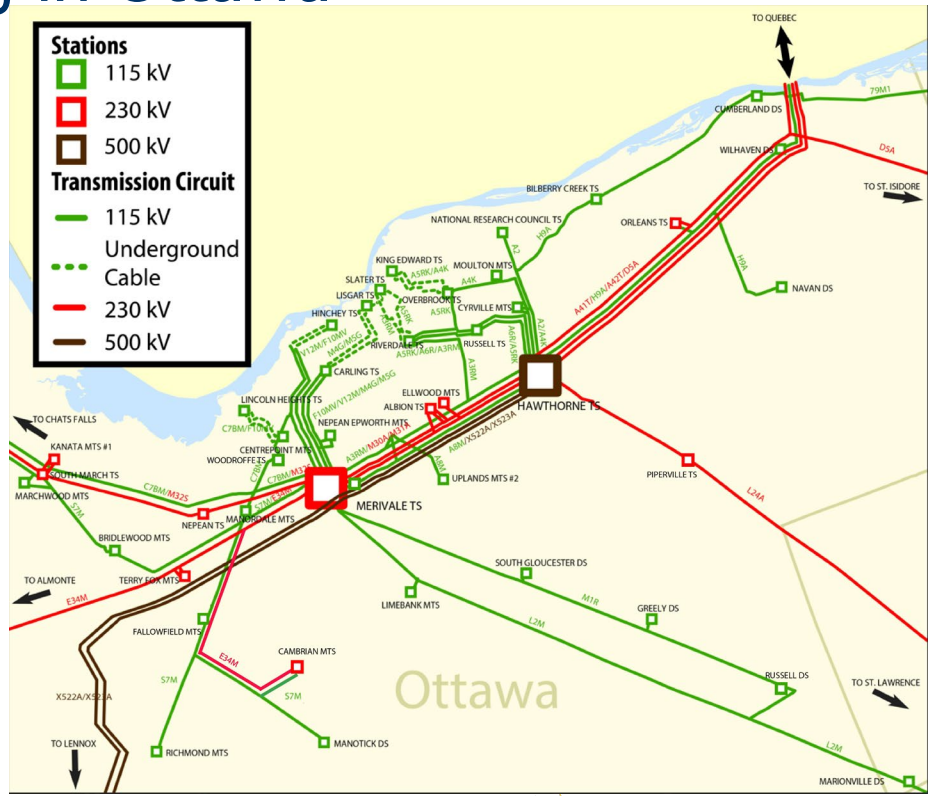
Distribution Planning

Addresses local electricity system needs and priorities at the distribution system level.

Led by local distribution companies.

Regional Electricity Planning in Ottawa

- Regional planning has commenced for the Ottawa Area.
- As part of the regional planning process, an Integrated Regional Resource Plan (IRRP) – is being developed for the Ottawa Area by a Technical Working Group, led by the IESO, and consisting of Hydro Ottawa and Hydro One Distribution and Hydro One Networks Inc.
- Informed by feedback, the IRRP will consider population growth, economic development, alignment with Ottawa's Official Plan, community energy plans and local plans such as **Energy Evolution Net Zero** and **Climate Change Action Plan**, to identify the region's electricity demand and identify solutions to ensure a reliable supply of electricity over the next 20 years.



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Background on Electricity Planning in Ottawa

In Ottawa's last cycle of regional planning, recommendations included:

- Implementing energy efficiency programs to reduce demand until long-term solutions are employed.
- Building new stations and replacing several transformers approaching end-of-life.
- Conducting a study of the Ottawa 115kV system to address emerging supply capacity needs and monitoring the city's Energy Evolution plan.

These recommendations have ensured a reliable supply of electricity to the Ottawa area while providing a clear framework to guide future planning cycles.

Continued demand growth is requiring more planning. This study will focus on addressing transmission system needs within Ottawa and ensuring the system can support expected demand growth driven by electrification policies.

In parallel, a new Eastern Ontario bulk study is underway. The regional planning work will focus on addressing needs in the broader bulk transmission network that spans across eastern regions including to and from Ottawa. The bulk study will ensure alignment with the regional planning work, particularly with respect to the long-term options.

Components of an IRRP

Demand Forecast	Needs	Potential Solutions	Recommendations
How much power is needed over the planning timeframe?	What needs are emerging in the region that need to be addressed?	What kinds of solutions can meet the future needs for the region?	Based on an assessment of potential options, what recommended actions will ensure a reliable and adequate electricity supply for the region over the long-term?

Developing the Demand Forecast

To develop Ottawa's demand forecast, the City of Ottawa, the local distribution companies and the IESO participated in focused discussions to ensure the forecast captures the effects of economic development, electrification and decarbonization in the city. Through this collaborative effort, the Technical Working Group determined the need to develop two forecast scenarios:

- **Reference scenario*** includes firm loads (current and planned), organic growth, residential, electrification and energy plans (Energy Evolution, Official Plans & community Energy Plans, Green Energy Act, Zero Emissions Bus Program, 2030 Emissions Reduction Plan), and industrial growth. Assumes most likely electrification adoption rates based on current policies.
- **High scenario*** reference plus potential demand growth that is less certain. Assumes the highest electrification adoption rates.

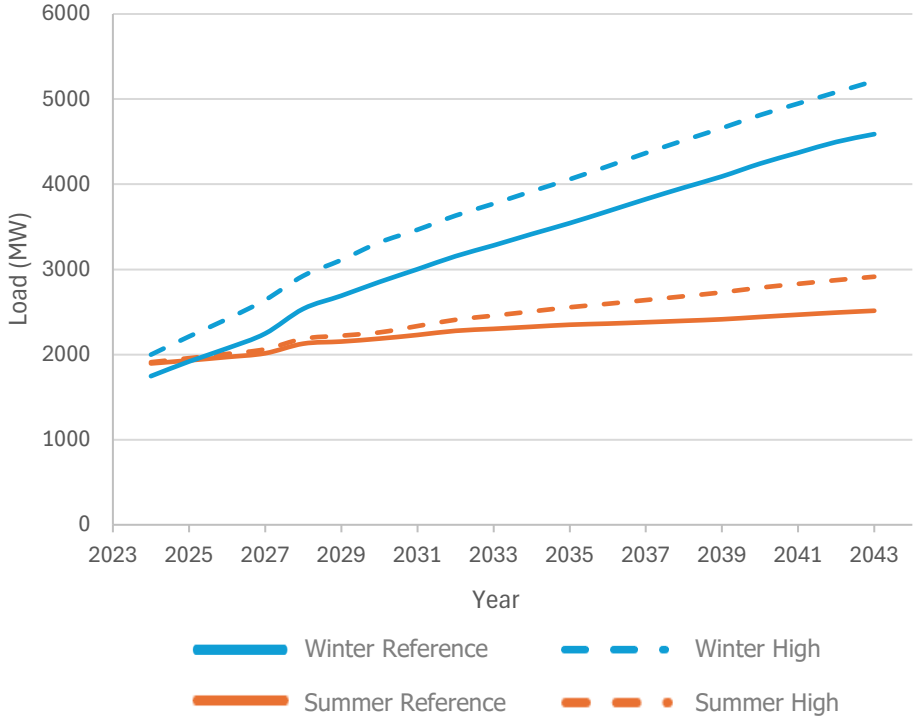
Insights have been incorporated from customers and other interested parties. More details can be found in the Public Webinar #1 recording on the engagement webpage.

Reference forecast will drive recommended solutions: To ensure the forecasted needs are addressed without over-building the system, the IRRP will prioritize addressing the near- and medium-term electricity needs to accommodate the reference forecast. The Technical Working Group will identify potential options for long-term electricity needs and high growth scenarios, refining these options in future planning cycles and activating them as growth occurs.

*In Hydro Ottawa's scenario formation, the reference scenario is "Moderate B" and the high scenario is the "Extreme Case." See Appendix for details.

Final Ottawa Area Demand Forecast

- In Ottawa, demand could grow by 33% in summer and 166% in winter by 2043 – for context and scale, Ontario's electricity demand could grow by 75% by 2050.
- 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 winter.
- The growing demand for electricity results in significant electricity infrastructure needs, which will require **flexible planning to ensure appropriate investment in infrastructure** and ensure the risk of underbuilding or overbuilding the electricity system is appropriately managed.
- To meet the needs, both wires and non-wires options will be evaluated.



Feedback Received

Key Areas of Feedback	Outcome
Ensure climate impacts are accounted for throughout the development of the IRRP.	In regional planning, the Technical Working Group develops an electricity demand forecast that reflects extreme weather conditions in various scenarios to ensure reliable supply of electricity for the province. This includes the system's ability to respond to disturbances which can be caused by extreme weather events. For details about extreme weather methodology in the demand forecast, please read more here.
Explore alternative solutions, such as non-wire options, to meeting the area's electricity needs.	To address the region's electricity needs, the IESO will explore wire and non-wire options. Additionally, the IESO has launched a local achievable potential study to identify potential for behind-the-meter distributed energy resources (DERs) and energy efficiency programs. As planning work advances, the IESO will share more information, answer questions and seek feedback at key milestones.

Please see the Ottawa-Area engagement webpage for the feedback and IESO response.

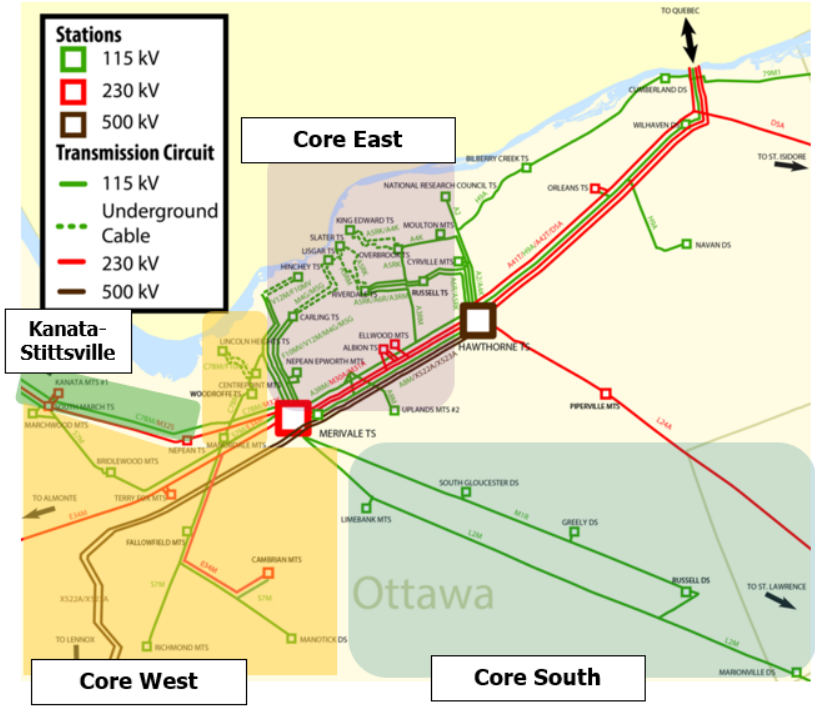
Electricity Needs

Needs Summary

Studies have been conducted to determine the infrastructure's needs based on the 20-year reference, high forecast and several technical studies (system capability, operating standards) of the infrastructure. The following electricity needs have been identified:

- **32 stations with station capacity needs:** Ability of a station to deliver power from the grid down to the distribution system.
- **Eight circuits with supply capacity needs:** Ability of the system to supply power through the transmission lines to a local area.
- **Three transmission assets requiring refurbishment:** Station or transmission equipment reaching end of life.
- **Four transmission assets with load restoration or security needs:** Maximum amount of power that can be lost during select contingencies.

The needs are being driven by economic growth and decarbonization policies that promote the intensification of electricity use, resulting in a substantial demand increase, particularly in winter. Additional details can be found in the appendix.



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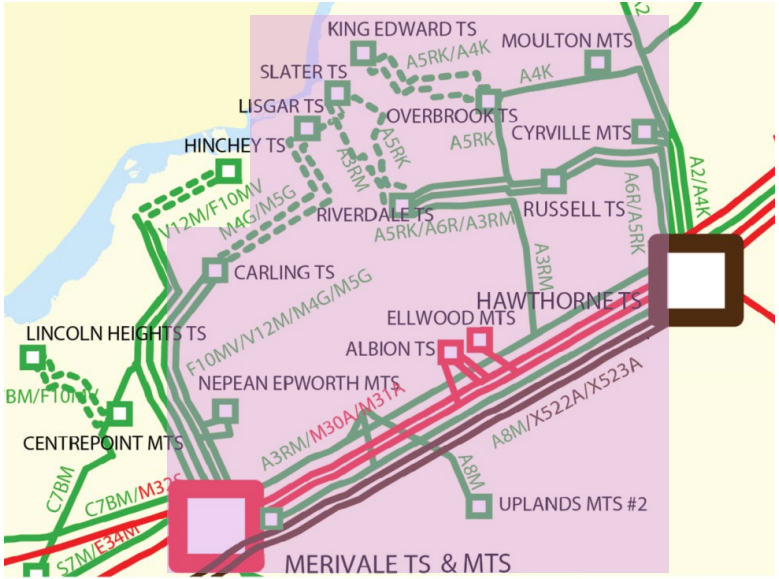
Core East (Downtown Ottawa) Background

- Core East is comprised of 16 transmission stations (TS) supplied by eight 115 kilovolt (kV) circuits, which primarily provide power to downtown Ottawa.
- The electricity consumed in the area is brought in through transmission infrastructure at Merivale TS and Hawthorne TS.
- The 2020 Ottawa IRRP recommended replacing one of two autotransformers at Merivale TS with a larger capacity transformer.
- In 2023, the Merivale Modernization Project added a third autotransformer to increase the capacity of the station and ensure the safe and reliable supply of power to over 20 stations connected to Merivale.



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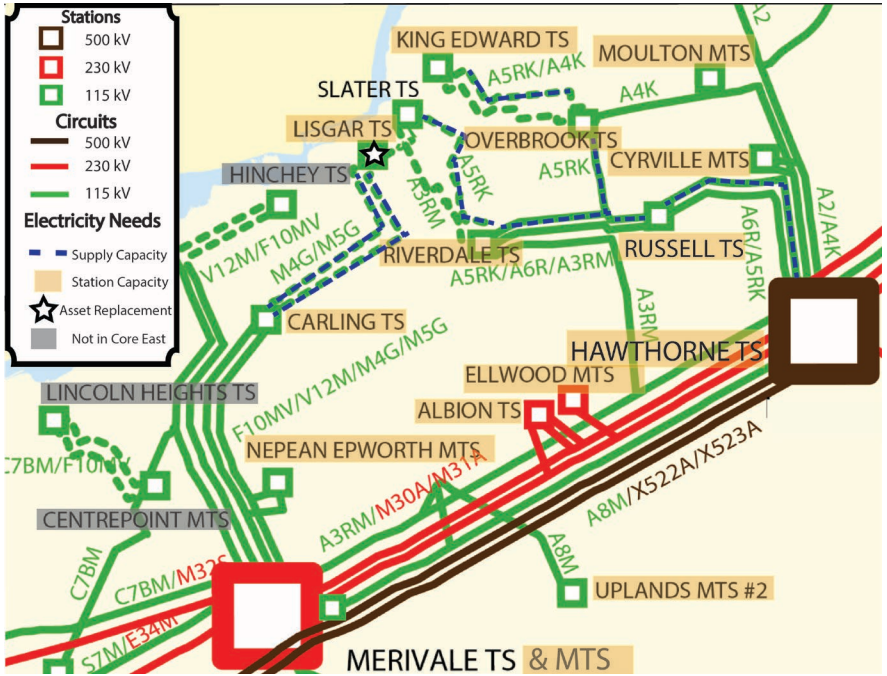
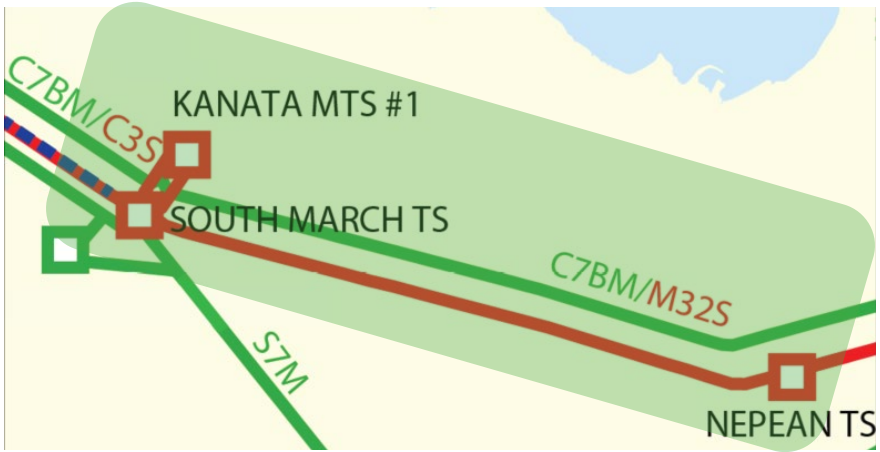
Core East Needs Summary

- Based on forecasted growth, the following needs have been identified for Core East in the long-term (2043):
  - 14 stations with **station capacity** needs.
  - **Supply capacity** needs for the 115kV system.
  - One station with an **asset replacement** need.
- This area comprises the largest part of the electricity system and has correspondingly large-scale needs.
- Limited space in this area poses significant challenges for adding new transmission infrastructure.



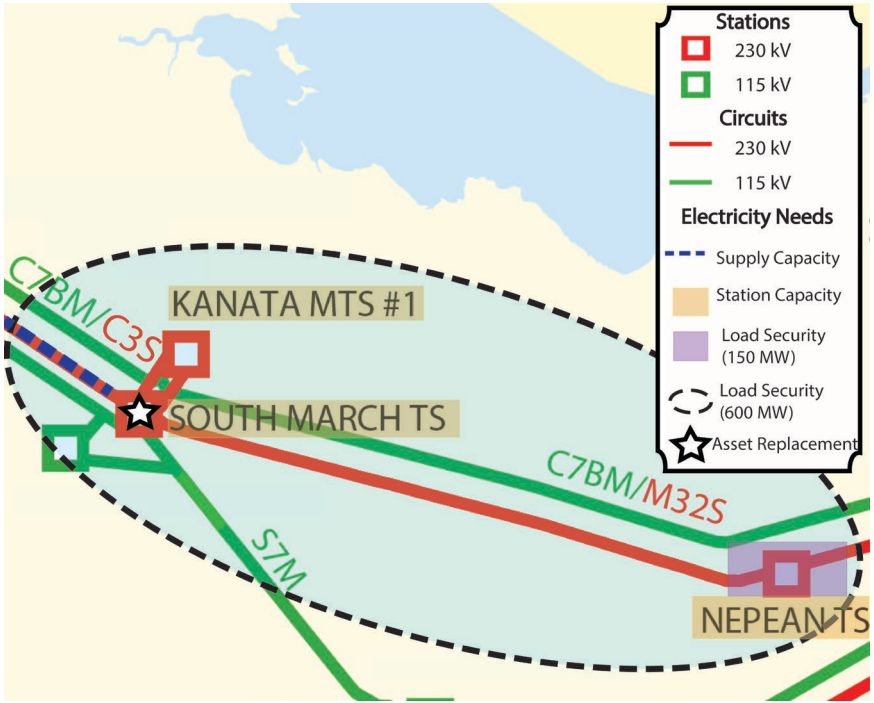
Kanata-Stittsville Background

- Kanata-Stittsville is comprised of three transmission stations (TS) supplied by two 230kV circuits, which provide power to Kanata and Stittsville areas.
- The electricity consumed in the area is brought in through transmission infrastructure at Merivale TS.
- The 2020 Ottawa IRRP recommended implementing targeted commercial and residential energy efficiency programs, resulting in the launch of the North Kanata Retrofit Top-Up Program and the North Kanata Smart Thermostat Program.



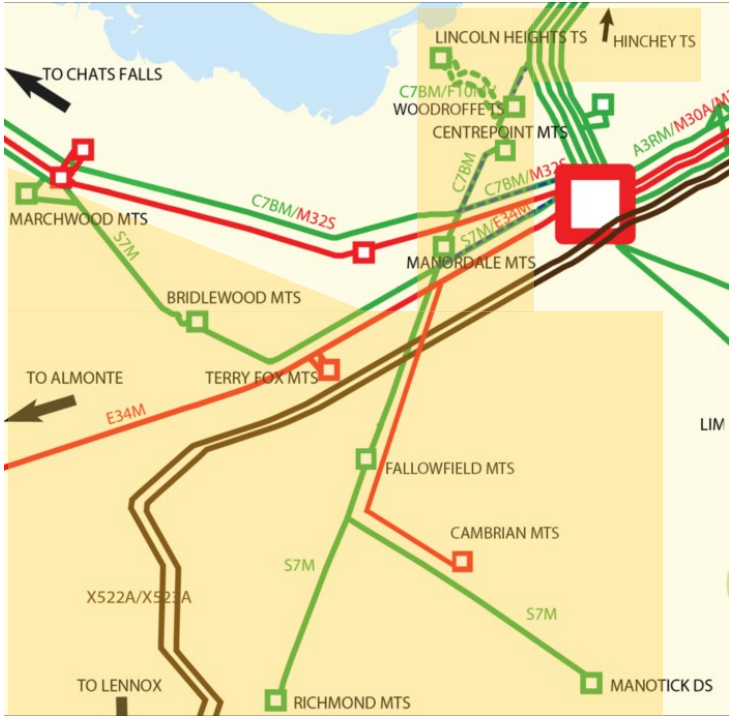
Kanata-Stittsville Needs Summary

- Based on forecasted growth, the following needs have been identified for Kanata-Stittsville in the long-term (2043):
  - Three stations with **station capacity** needs.
  - **Supply capacity** needs for the 230kV system.
  - One station with an **asset replacement** need.
  - One station and one circuit with **load security** needs.
- Several electricity needs in this area were identified as part of the previous plan and are gradually growing.
- This area is a strong candidate for a combination of options that can delay or reduce the needs while long-term solutions are being built.



Core West Background

- Core West is comprised of 12 transmission stations (TS) supplied by five 115kV circuits and one 230kV circuit, which provide power to Twin Elm, Richmond, Manotick, Bridlewood and part of Ottawa downtown core.
- The electricity consumed in the area is brought in through transmission infrastructure at Merivale TS.
- To meet growing needs, previous recommendations included:
  - A new 230kV connected station in the southwest area (Cambrian MTS) which was put in service in 2022.
  - The 115kV circuit S7M was refurbished (2017) and currently acts as a back-up supply to Cambrian MTS.
  - The Lisgar TS transformers is currently being refurbished.



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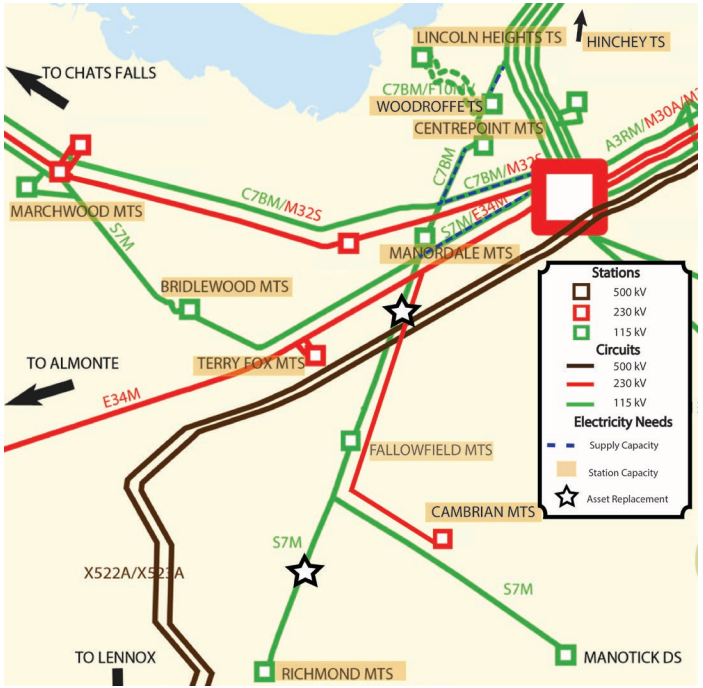
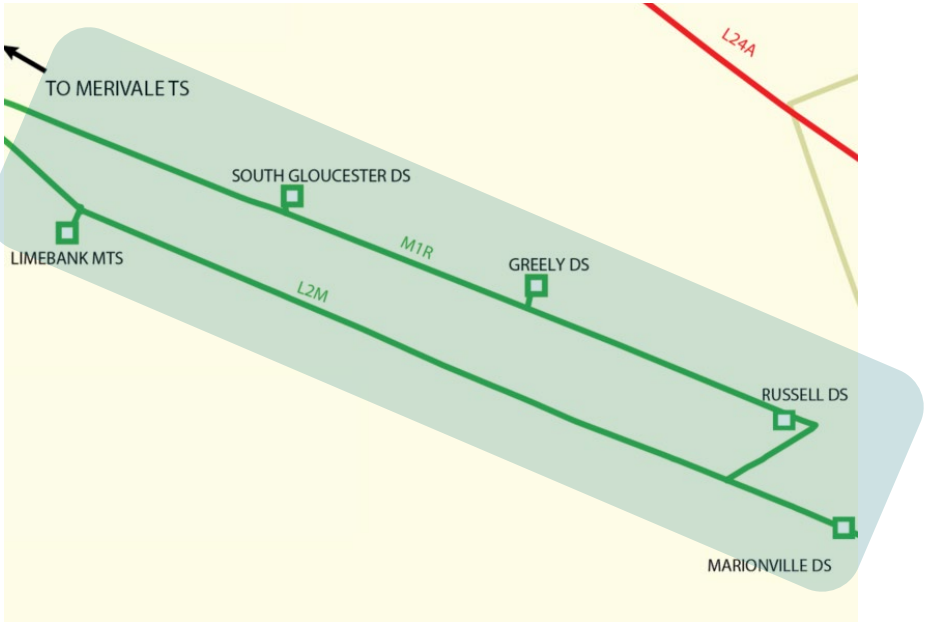
Core West Needs Summary

- Based on forecasted growth, the following needs have been identified for Core West in the long-term (2043):
  - 11 stations with **station capacity** needs.
  - **Supply capacity** needs for the 115kV system.
  - Sections of circuit S7M with **asset replacement** needs.
- Needs are focused on ensuring equipment does not overheat during peak demand, therefore options will be limited to those that do not risk adding extra load.
- The needs in these areas are emerging closer to the medium- term.
- This area is a strong candidate for future planning and incremental solutions focusing on near-, medium-, and long-term visions of the area.



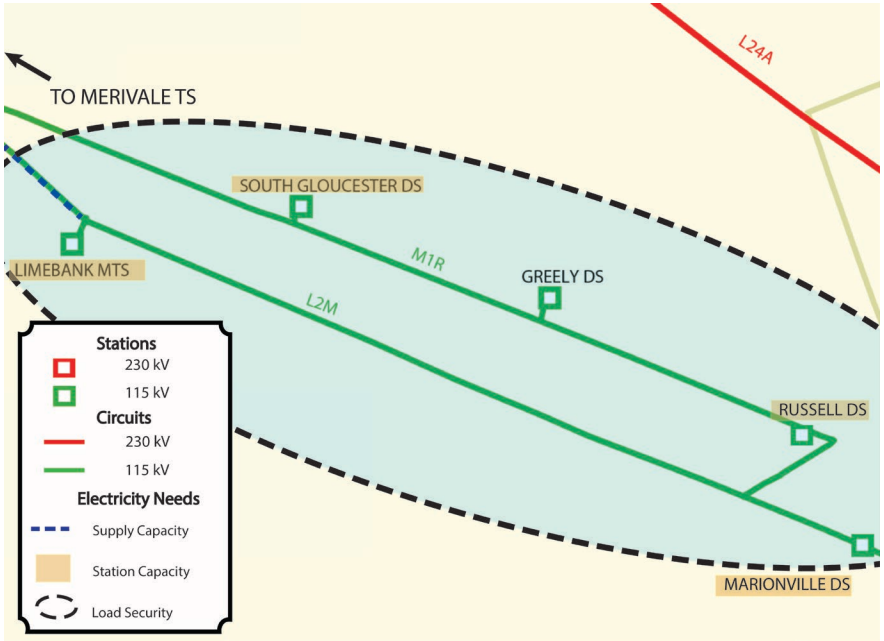
Core South Background

- Core South is comprised of five transmission stations (TS) supplied by two 115kV circuits, which provide power to Riverdale South, Greely and part of the south region of Ottawa.
- The electricity consumed in the area is brought in through transmission infrastructure at Merivale TS.
- The 2020 Ottawa IRRP recommended a new 230kV connected station (Piperville MTS) to meet the growing needs in the southeast end of the City of Ottawa as well as provide redundancy in the system in the event of future extreme weather events.
- Work at Piperville MTS is underway with plans to be energized in 2026 and is connected to L24A.



Core South Needs Summary

- Based on forecasted growth, the following needs have been identified for Core South in the long-term (2043):
  - Four stations with **station capacity** needs.
  - Supply capacity needs on L2M (medium- and long-term).
  - The entire sub-system with **load security** need.
- Needs in this area have resulted in the stations being unable to exceed 150MW in the current system, therefore options will be limited to those that do not risk adding extra load.
- The needs in these areas are emerging closer to the medium-term.
- This area is a strong candidate for future planning and incremental solutions focusing on near-, medium-, and long-term visions of the area.



Potential Wire Options

Background: Determining Options

A combination of wire and non-wire options will be needed to address the needs, and over the course of the planning process, the Technical Working Group will:

- **Evaluate wire and non-wire options** to address the region's near- and medium-term electricity needs for the reference forecast, including:
  - Traditional wires option to supply local area
  - Non-wires alternatives (NWAs), such as transmission and/or distribution-connected generation and/or energy storage, conservation and demand management or demand response
- **Complete the detailed options analysis to identify where non-wire options can be integrated.**

The IESO will share the outcomes of the steps and seek community feedback at key milestones to enhance development and evaluation of options before making a final recommendation. The Technical Working Group will recommend options that will address firm growth while considering how the options can meet potential growth.

Options Overview

The following wire and non-wire options have been considered to meet the electricity needs in Ottawa:

- **Distribution-level load transfers:** Moving load from one station to another station that has available capacity – these are typically low cost and can be quickly implemented.
- **Conservation and demand management (CDM):** Implementing additional CDM programs and initiatives to reduce electricity needs.
- **Transmission and/or distribution-connected storage and/or generation:** Building a battery storage facility with voltage support to increase capacity along the existing transmission lines and potentially pairing it with wind and/or solar generation.
- **Wire options:** Building new or upgrading existing transmission stations and lines.

A combination of these options will be required to meet Ottawa's electricity needs. Additionally, a **Local Achievable Potential Study** is underway to evaluate additional energy efficiency and behind-the-meter distributed energy resources (DERs) that can reduce the electricity needs.

Option Analysis Approach and Considerations

The Technical Working Group has considered options that can best meet the unique electricity needs in each subsystem:

Subsystem	Considerations
Core East	• Given the challenges of building new transmission infrastructure, options focus on maximizing the utilization of existing infrastructure and non-wires options within a limited footprint.
Kanata-Stittsville	• Needs begin in the near-term and are gradually growing. Strong candidate for options that can reduce or delay needs.
Core West	• Needs are focused on ensuring equipment does not overheat during peak demand. Storage/generation is not an option for these needs as it risks adding extra load.
Core South	• Needs have resulted in stations being unable to exceed 150 MW. Storage/generation is not an option for these needs as it risks adding extra load.

To ensure the forecasted needs are addressed without over-building the system, the Technical Working Group prioritized options aimed at addressing the near- and medium-term electricity needs to accommodate the reference forecast. The Technical Working Group will identify potential options for long-term electricity needs and high growth scenarios, refining these options in future planning cycles and activating them as growth occurs.

Addressing Near-Term Needs

The Technical Working Group has identified several electricity needs emerging in the near-term and has developed potential wires options to meet them effectively while ensuring all potential options are thoroughly evaluated:

- The preliminary options analysis process identified **distribution-level load transfers** as a low-cost, quickly implementable solution to meet several near-term needs.
- **Station upgrades and/or new stations** have been identified as a near- to medium-term solution that can significantly increase station capacity within two to six years, enabling future growth.
- A detailed options analysis is currently underway to evaluate all **wires and non-wires options**, ensuring that the proposed path forward is the most effective and efficient approach.
- This comprehensive analysis will assess the ability of all options to address near-, medium-, and long-term needs, with results to be shared in **Q1 2025**.

The Technical Working Group will complete a detailed options analysis to identify where non-wire options can be integrated.

Potential Wires Options to Address Emerging Needs

The Technical Working Group has developed potential wires options to meet emerging near-term electricity needs effectively while ensuring all feasible wire and non-wire options are thoroughly evaluated.

Core East:
- Convert a municipal station to 115 kV and increase station capacity

Kanata-Stittsville:
- Build a new 230 kV station to address the station capacity needs
- Build a new 230 kV transmission line (~18 km) from Merivale TS to connect the new station

Core West:
- Build a new 230 kV station to support distribution system needs (28 kV) and increase station capacity
- Build a new 230 kV transmission line (~5 km) from Merivale TS to connect the new station

Core South:
- Initiate station work at Merivale TS to address load security need

Local Achievable Potential Study

Local Achievable Potential Study (APS)

In parallel, and to further enhance and supplement the regional planning work underway for Ottawa, the IESO is conducting a local achievable potential study to identify potential for behind-the-meter distributed energy resources (DERs) and energy efficiency programs. The results from the APS will be used to inform the Ottawa IRRP recommendations on using energy efficiency and DER programs to address planning needs.

Key details:

The study will identify and quantify electricity energy savings potential, electricity demand savings potential and associated costs attainable through energy efficiency and behind-the-meter DERs over a 20-year period of 2025 to 2045.

As part of the regional planning public engagement, the IESO will present on the study's scope, objectives, methodology and timeline and solicit stakeholder feedback. Preliminary results will be presented at the next regional planning public engagement.

Study results are expected to published in late Q1/early Q2 2025.

The IESO will work in collaboration with Hydro Ottawa to help leverage the local insights and relationships.

Local Achievable Potential Study – Potential Scenarios

The APS will use two local load forecasts that are aligned with the Ottawa IRRP's reference and high forecast scenarios. For each scenario, the study will determine the energy savings potential from a technical, economic and achievable perspective:

- **Technical Potential** is the energy savings resulting from the implementation of all technically feasible measures.
- **Economic Potential** is the energy savings resulting from the implementation of all technically feasible measures that pass the cost-effectiveness test.
- **Achievable Potential** is the final energy savings remaining after adoption rates over the period of the study are applied. Adoption rates are calculated considering market barriers, customer payback acceptance, perception of non-energy impacts and customer awareness of measures.

Local Achievable Potential Study – Scope

The APS includes the quantification of electricity energy savings and demand savings potential, and the associated costs of energy efficiency and behind the meter distributed energy resources (DERs) in Ottawa from years 2025-2045. Measures in scope include:

Behind the Meter DER's including battery storage and solar.

Energy efficiency measures including heat pumps, HVAC, lighting, appliances, weatherization, and hot water.

Demand Response including EV charging, HVAC equipment, and water heaters.

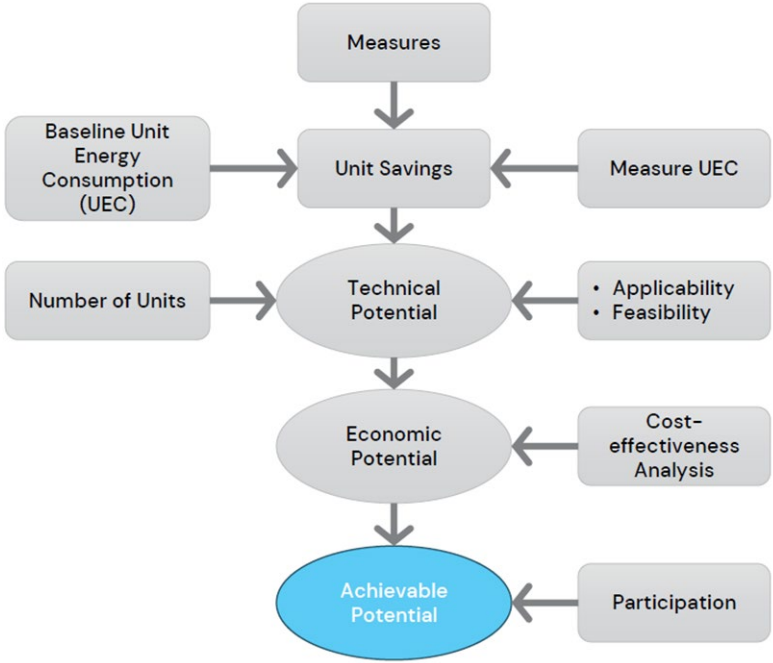
The final APS will include a presentation of the technical, economic and achievable savings, and the associated costs over the 20-year period for both the reference and high electrification forecasts. A detailed description of the methods, data sources, input assumptions, and data tables will be published.

Local Achievable Potential Study – Methodology

Methodology:

As shown on the graph, the study will use a bottom-up approach to estimate the total electricity savings at the station level.

1. A "digital twin" of Ottawa building stock is created and calibrated using utility and building characteristic data.
2. Conservation demand management (CDM) and distributed energy resources (DER) measures are applied to the digital twins.
3. The resulting savings are simulated at the building level and aggregated to the transformer station/municipal transformer station levels for each scenario.



Local Achievable Potential Study – Data Inputs/Sources

Key inputs and sources identified for the APS include:

Technical Potential	Economic Potential	Achievable Potential

• Forecasted energy demand
• Historical energy consumption data
• IESO 2024 MAL
• Building data (MPAC, Dunn & Bradstreet)
• City of Ottawa Official Plan
• Aggregated customer data
• Energy Efficient Measure Database
  ○ ResStock
  ○ ComStock
	• Avoided Generation, Capacity and Transmission costs
	• Forecasted Retail Rates
		• Historical DSM program results
		• Adoption Curves
		• End-Use Surveys
		• Network distributed energy resources (DERs) hosting capacity

Next Steps & Discussion

Ongoing Engagement

Your input plays an important role in developing the electricity plan.

Participate in upcoming public webinars

Subscribe to receive updates on the IESO website –> select Ottawa Region

Follow the Ottawa regional planning activities online

Next Steps

The IESO will continue to engage and inform throughout the IRRP's development. Participants can expect to hear from the IESO at these milestones:

December 12, 2024: Needs and potential wire options presented in a public engagement webinar.

January 2, 2025: Deadline for feedback to the IESO.

Q1 2025: Complete the detailed options analysis to identify where non-wire options can be integrated and share draft recommendations in a public engagement webinar with an opportunity to provide feedback. IRRP report will be completed and published on the webpage.

Q1/Q2 2025: Study results for the Local Achievable Potential Study published.

After IRRP: Depending on the recommendations of the IRRP, the following next steps can be expected:

- For wires solutions, the local transmitter will lead the development of a Regional Infrastructure Plan, which assesses and develops a detailed plan on how wire options can be implemented.
- For non-wire solutions, implementation mechanisms for new resources and energy efficiency programs will be determined following plan publication.

Ottawa Regional Planning Key Takeaways

- In Ottawa, electricity demand could grow by 33% in summer and 166% in winter by 2043. To meet Ottawa's electricity needs, without overbuilding the system, options that can delay or meet the near- and medium-term needs will be prioritized, and signposts will be identified to monitor forecast changes and contemplate additional actions required if higher demand growth materializes.
- The growing demand for electricity is also introducing large-scale needs, which will require large-scale solutions.
- The Technical Working Group has developed potential wires options to address emerging near-term needs. In Q1 2025, a detailed options analysis will be shared, including non-wire options.
- In parallel, the IESO is undertaking a local achievable potential study and an Eastern Ontario Bulk Study. Updates will be shared in future engagements.
- Your input will help ensure that any additional information or considerations are included as part of this needs assessment and future engagements.

Seeking Input

Regional planning:

- What perspectives do you have on the potential wire options?
- What additional information should be considered in the evaluation of non-wire options?
- Are there any additional information that should be provided in future engagements to help understand municipal perspectives and insights?

Local Achievable Potential Study (APS):

- Feedback on scope, methodology, and potential uses for the APS that the IESO should consider.
- Additional data sources or regional policies/trends that should be considered.

The IESO welcomes written feedback until **Thursday, January 2, 2025.** Please submit feedback to engagement@ieso.ca.

Thank You

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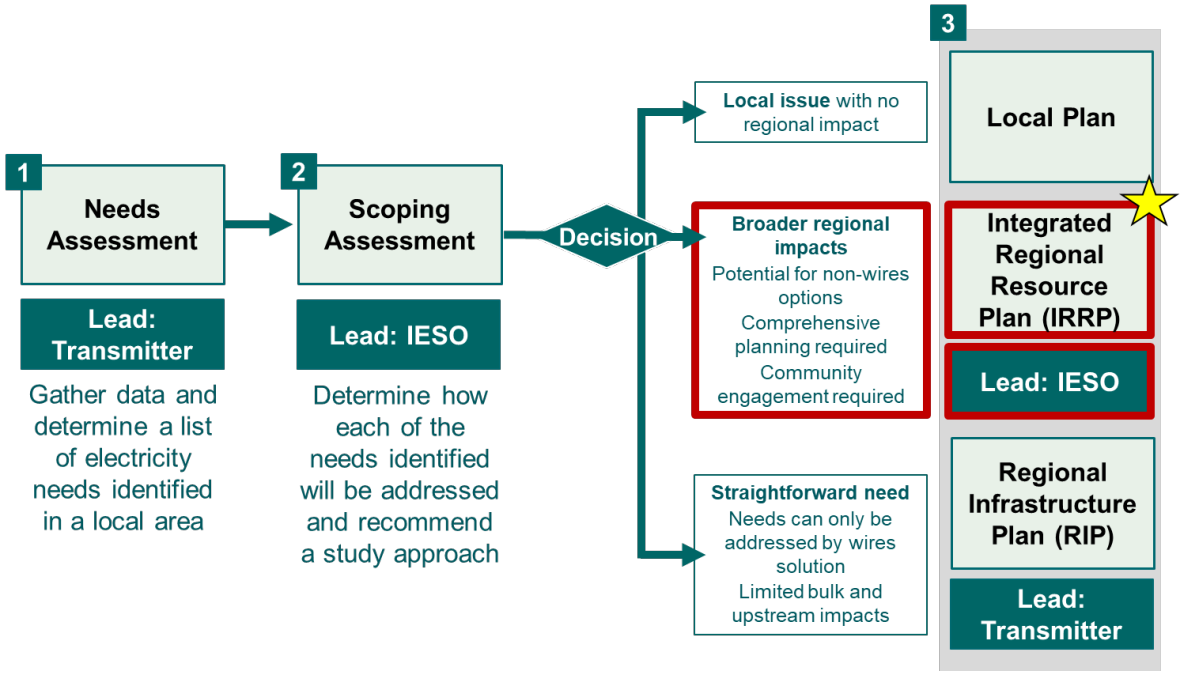
Appendix

Determining the Need for an IRRP



Technical Working Group

Team Lead, System Operator	• Independent Electricity System Operator
Lead Transmitter	• Hydro One Networks Inc. (Transmission)
Local Distribution Companies	• Hydro Ottawa Holding Inc., • Hydro One Networks Inc. (Distribution)

Gathering Data for the Demand Forecast

Developing the 20-year electricity demand forecasts included:

- Receiving information from Hydro One and Hydro Ottawa, including:
    - Demand forecasts for each station in their service territory.
    - Municipal and community plans incorporated into the forecast, including Energy Evolution, Official Plans & community Energy Plans, Green Energy Act, Zero Emissions Bus Program, 2030 Emissions Reduction Plan – Canada's Next Steps for Clean Air and a Strong Economy, Net Zero 2050 and Canada's Action Plan for Clean On-Road Transportation.
    - Forecasting assumptions based on customer growth plans.
- Engaging with municipalities, customers, and other interested parties to understand and incorporate potential growth and decarbonization plans.
- Accounting for the impacts of demand-side management, distributed energy resources, and extreme weather conditions in the electricity demand forecast.

Scenario Formation

Base Case: Policy-driven Decarbonization

Developed & defined based on total compliance to existing policy, goals & technological alternatives. If several goals and policies were identified the more conservative policy was leveraged.

Extreme Case

Each Scenario Achieves Canada's Goal of Net Zero by 2050

High

Societal Decarbonization Scenario

Developed & defined assuming compliance to more aggressive decarbonization & electrification assumptions, with improvements in building electrification efficiencies

Moderate

Measured Decarbonization Scenario

Developed & defined by adjusting the base case to reflect a decarbonization scenario most representative of today's trends, while meeting long-term net zero targets

Sensitivity Analysis for customers with heat pumps:

- **Moderate A**
- **Moderate B**

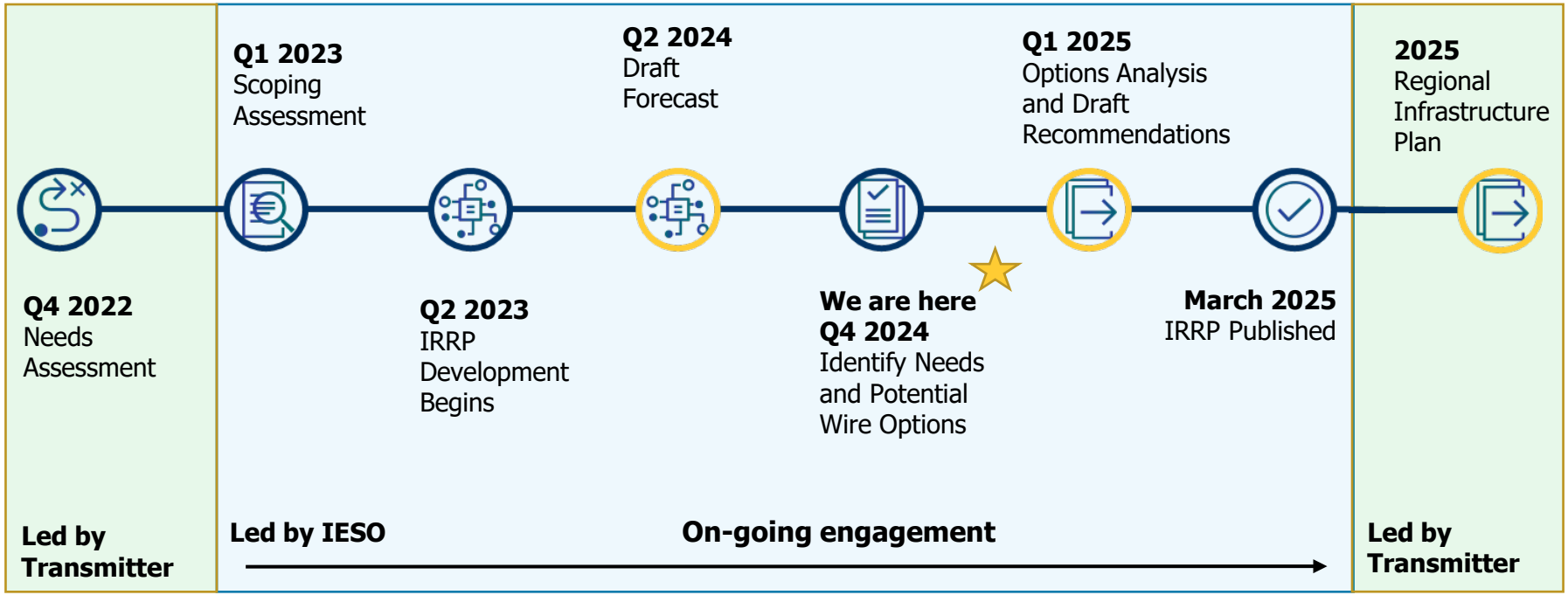
Reference

Low

Near Zero Scenario

Developed & defined by more conservative decarbonization with expectation of a greater reliance on clean fuel adoption as opposed to total electrification

Regional Planning Timeline



Detailed Needs by Subsystem

Near- to Medium-Term Needs Summary

Sub-system	Station Capacity			Supply Capacity			Asset Replacement	Load Supply Security
	# of Overloaded Stations	Magnitude (MW)		Limiting Phenomenon	Magnitude (MW)			
		Summer	Winter		Summer	Winter		
Core East	10	81	381	115 kV system thermal violations	42	386	South March TS transformers	N/A
Kanata-Stittsville	3	58	142	230 kV system voltage violations	12	172	N/A	Nepean TS (48 MW)
Core West	6	24	66	115 kV system thermal overload	0	118	Sections of circuit S7M (~6.6km)	N/A
Core South	3	8	31	N/A	N/A	N/A	N/A	L2M + M1R sub-system (17 MW)

Core East Needs (1)

Need Type	Magnitude of Need (MW)					
Station Capacity: Ability of a station to deliver power from the grid to the distribution system	Near-Term		Medium-Term		Long-Term	
	Summer	Winter	Summer	Winter	Summer	Winter
Albion TS	0	0	0	0	0	40
Carling TS	6	2	40	70	40	130
Cyrville MTS	0	>1	0	10	0	40
Ellwood MTS	>1	10	2	30	5	60
Hawthorne TS	0	0	0	30	0	60
King Edward TS	0	30	0	70	10	160
Lisgar TS	20	30	30	70	30	120
Merivale MTS	0	0	0	0	0	7
Moulton MTS	3	6	3	10	3	30
Nepean Epworth MTS	0	1	>1	6	1	10
Overbrook TS	0	0	0	20	0	90
Riverdale TS	0	10	0	50	8	110
Russell TS	2	10	4	40	20	90
Uplands MTS	0	0	0	0	0	5

Core East Needs (2)

Need Type	Magnitude of Need (MW)					
	Near-Term		Medium-Term		Long-Term	
	Summer	Winter	Summer	Winter	Summer	Winter
Supply Capacity: Ability of the system to supply power through the transmission lines to a local area. 115-kV system Core East (Thermal Overload)	0	93	40	390	44	840
Asset Replacement: Transmission equipment has reached end of life. Lisgar TS			Reaches end-of-life			

Kanata-Stittsville Needs

Need Type	Magnitude of Need (MW)					
Station Capacity: Ability of a station to deliver power from the grid to the distribution system.	**Near-Term**		**Medium-Term**		**Long-Term**	
	Summer	**Winter**	**Summer**	**Winter**	**Summer**	**Winter**
Kanata MTS Nepean TS South March TS	10 0 2	10 0 20	10 0 8	20 30 50	20 0 20	40 110 100
Supply Capacity: Ability of system to supply power through the transmission lines to a local area. 230-kV system Kanata-Stittsville	0	50	0	130	7	280
Load supply security: Maximum amount of power that can be lost during select contingencies. Nepean TS exceeds (N-1) 150 MW limit	0	9	0	48	0	130
Asset Replacement: Equipment has reached end of life. South March TS			Reaches end-of-life			

Core West Needs (1)

Need Type	Magnitude of Need (MW)					
Station Capacity: Ability of a station to deliver power from the grid to the distribution system.	Near-Term		Medium-Term		Long-Term	
	Summer	Winter	Summer	Winter	Summer	Winter
Bridlewood MTS	0	>1	>1	7	1	20
Cambrian MTS	0	0	0	0	0	20
Centrepoint MTS	0	4	1	10	2	20
Fallowfield MTS	10	0	10	10	8	40
Hinchey TS	0	0	0	6	0	60
Lincoln Heights TS	0	0	0	0	0	10
Manordale MTS	1	4	2	8	3	20
Marchwood MTS	6	10	8	20	8	40
Richmond South MTS	0	0	0	0	0	10
Terry Fox MTS	0	0	0	0	0	30
Woodroffe TS	0	0	0	0	0	10

Core West Needs (2)

Need Type	Magnitude of Need (MW)					
	Near-Term		Medium-Term		Long-Term	
	Summer	Winter	Summer	Winter	Summer	Winter
Supply Capacity: Ability of the system to supply power through the transmission lines to a local area. 115-kV system Core West (Thermal Overload)	0	0	0	120	0	360
Asset Replacement: Transmission equipment has reached end of life. Circuit S7M	Reaches end-of-life					

Core South Needs

Need Type	Magnitude of Need (MW)					
Station Capacity: Ability of a station to deliver power from the grid to the distribution system.	**Near-Term**		**Medium-Term**		**Long-Term**	
	Summer	**Winter**	**Summer**	**Winter**	**Summer**	**Winter**
Limebank MTS Marionville DS Russell DS South Gloucester	0 0 0 0	0 >1 0 0	0 0 0 0	10 2 0 0	0 1 0 0	50 5 >1 1
Supply Capacity: Ability of system to supply power through the transmission lines to a local area. L2M (Thermal Overload)	0	0	0	0	0	40
Load supply security: Maximum amount of power that can be lost during select contingencies. L2M+M1R exceed 150 MW limit (one event)	0	0	0	20	0	60

Eastern Ontario Bulk Study

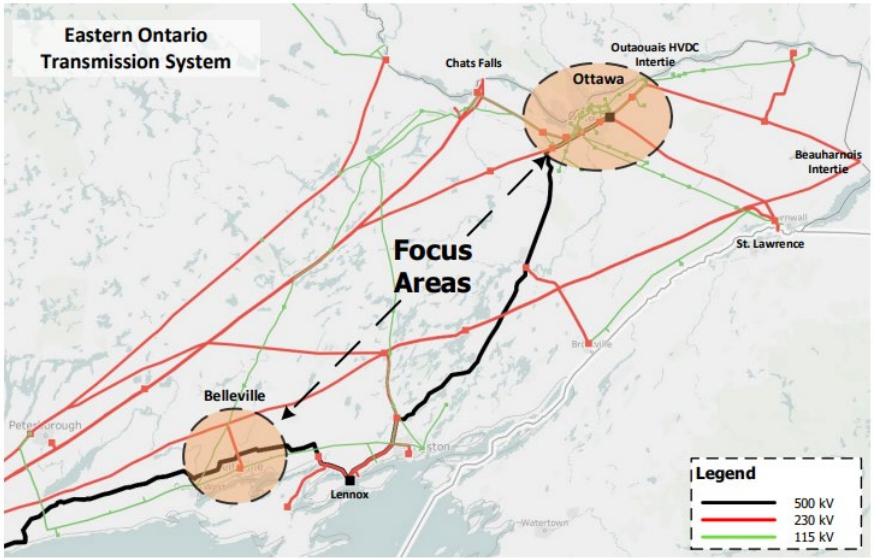
Eastern Ontario Bulk Study

The Eastern Ontario bulk transmission system is composed of 500kV and 230kV circuits which help facilitate power flows from several large generation facilities to main load centres in Ottawa, Kingston, Belleville, Peterborough and back to Toronto.

In 2024, the IESO initiated the Eastern Ontario Bulk Study to:

- Evaluate the adequacy of electricity supply to key focus areas (including Ottawa and Belleville) over the next 20 years.
- Assess opportunities for expanding interties with neighbouring Quebec and New York.
- Explore opportunities to improve transmission capability to deliver new resources located in Eastern Ontario.

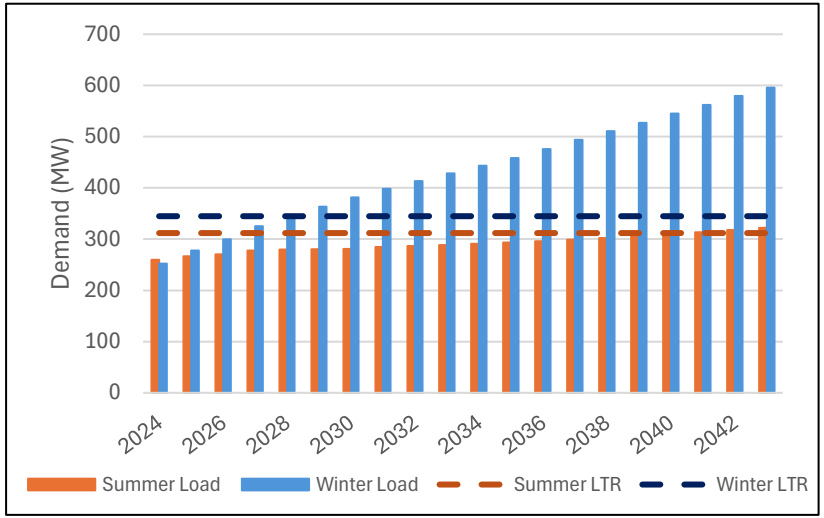
The Eastern Ontario bulk study will examine the broader bulk transmission system across Eastern Ontario regions and will be closely coordinated with the Ottawa IRRP, to ensure alignment with respect to long-term options. The final plan will be released in 2026.

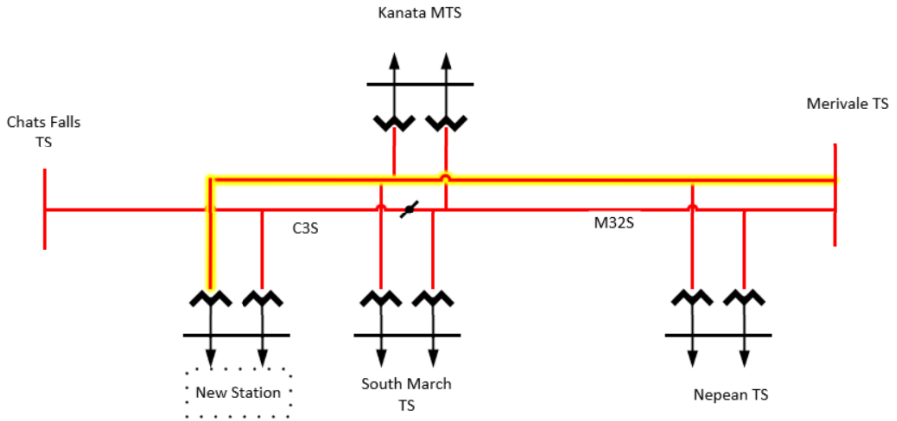


Potential Wires Options by Subsystem

Kanata-Stittsville Potential Wires Options

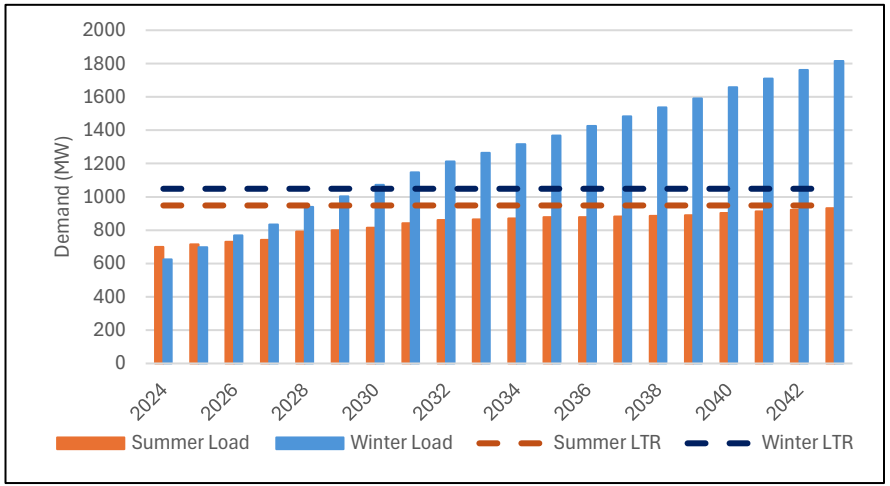
- A new 230 kV station to address the station capacity needs
- A new 230 kV transmission line from Merivale TS to connect the new station
- This line will also address the load security need at Nepean TS by providing a second supply

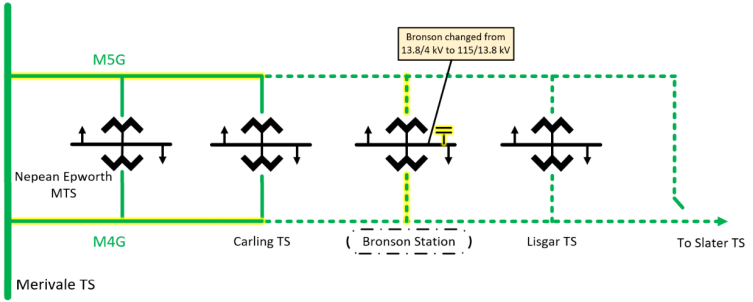


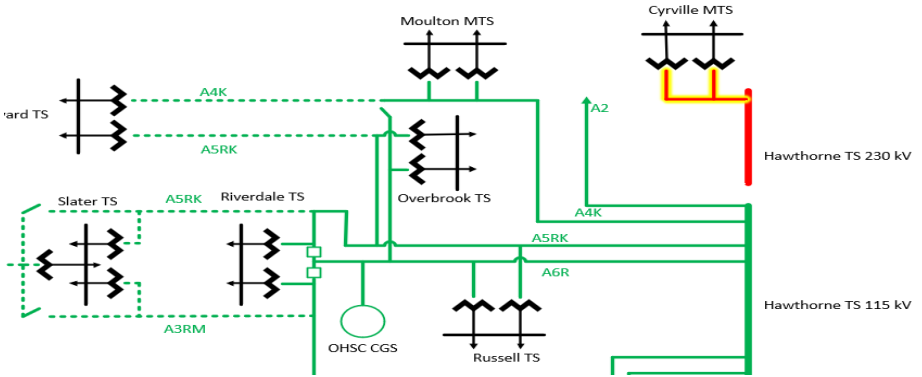


Core East Preliminary Potential Wires Options

- **Near-Term**:
  - Convert municipal Bronson station to 115 kV
- **Medium-Term:**
  - Upgrade 115 kV circuit M4G/M5G
  - Convert Cyrville MTS to 230 kV system







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Core West Preliminary Potential Wires Options

- **Near-Term:**
  - A new 230 kV station to provide station capacity and support 28 kV distribution system
  - A new 230 kV transmission line from Merivale TS to connect the new station
- **Medium-Term:**
  - Upgrade sections of 115 kV circuit F10MV and C7BM