JUNE 9, 2025

Ottawa Area Sub-Region Regional Electricity Planning

Engagement Webinar #3
Options Analysis and Draft Recommendations

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Greater Ottawa Land Acknowledgement

The IESO acknowledges that the Ottawa region is the traditional territory of the Anishinabe Algonquin 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, Demand Forecast and Electricity Needs
4. Local Achievable Potential Study Update
5. Save on Energy Programs
6. Options Analysis and Draft Recommendations
7. Next Steps & Discussion

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We work with:

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

<<< **Communities** >>>

Seeking Input

Local considerations and feedback are a critical component to the development of an Integrated Regional Resource Plan (IRRP). The IESO wants to understand:

- What feedback is there on the draft recommendations?
- What information needs to be considered in the draft recommendations?
- How can the IESO continue to engage with communities and stakeholders as the recommendations are implemented or to help prepare for the next planning cycle?

Please submit your written comments by email to engagement@ieso.ca by June 30.

Summary

- Since 2022, regional planning has been underway to address transmission system needs within Ottawa and ensure the system can support expected demand growth driven by electrification policies and economic development.
- An Integrated Regional Resource Plan (IRRP) will be developed for the Ottawa Area and led by a Technical Working Group, consisting of the IESO, Hydro Ottawa and Hydro One Networks Inc.
- The recommendations made in this regional planning cycle meet near-term electricity needs and act as building blocks to meet future needs.
- In December 2024, the IESO hosted a public engagement webinar to share the electricity needs and potential wire options. The IESO requested feedback and a response from the IESO was posted on the engagement webpage.
- The Technical Working Group has progressed the study and will share the detailed analysis of all feasible wire and non-wire options and the draft recommendations. In parallel, the IESO is undertaking a Local Achievable Potential Study and an Eastern Ontario Bulk Study.
- **Your input will help ensure that any additional information or considerations are included as part of the decision-making process.**

Recap: Regional Electricity Planning, Demand Forecast and Electricity Needs

Update: Local Achievable Potential Study and Save on Energy Programs

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.

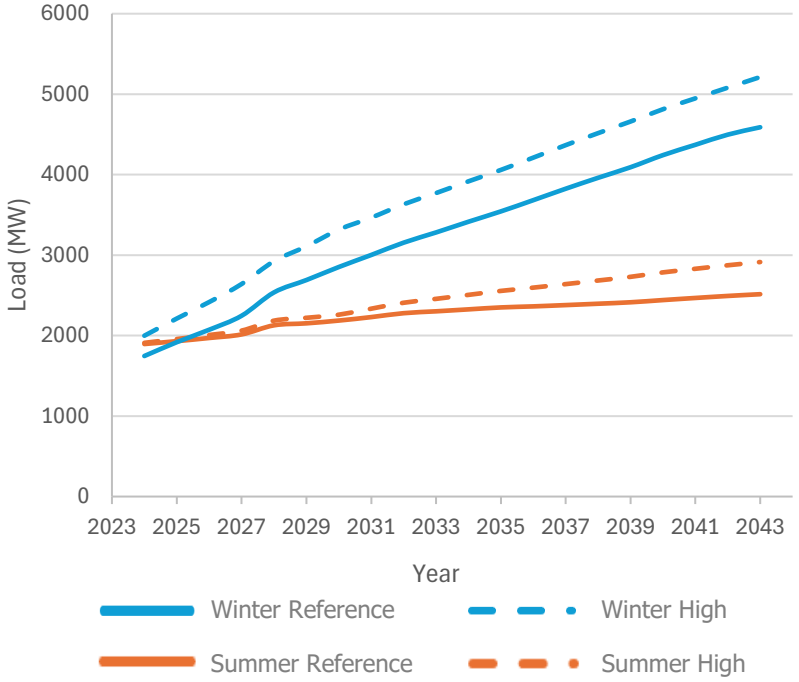
Components of an Integrated Regional Resource Plan

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?

Recap: Electricity Demand Forecast

Key Details:

- 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 development and decarbonization.
- The Technical Working Group uses the electricity demand forecasts to anticipate future system needs, which helps guide planning decisions and forms the foundation for recommendations on ensuring a reliable system.



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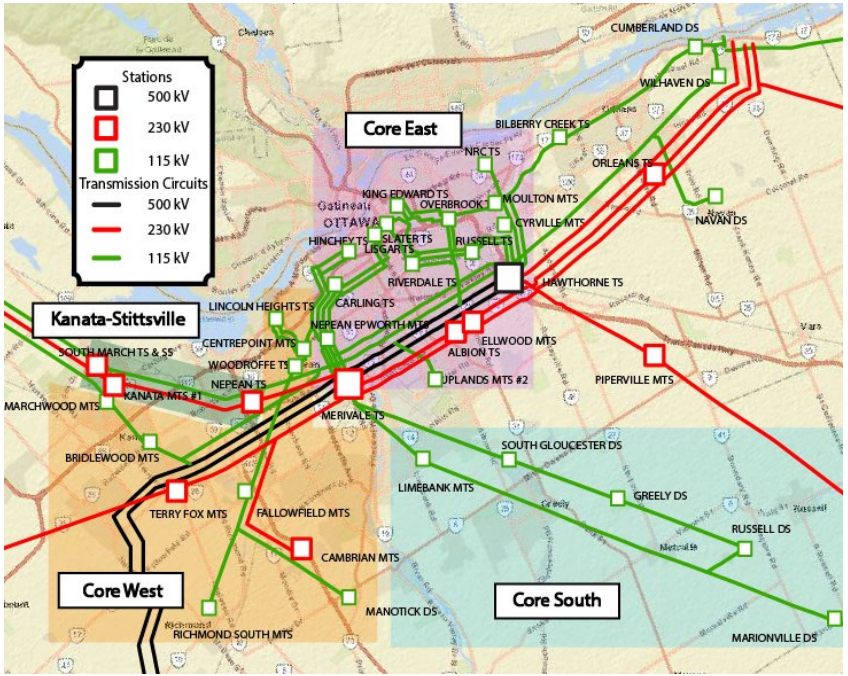
Recap: Near-Term Electricity Needs

In the near term, the following needs have been identified:

- **Eighteen transformer stations with station capacity needs:** Ability of a station to deliver power from the grid down to the distribution system.
- **Two 115 kilovolt (kV) circuits and one 230kV circuit with supply capacity needs:** Ability of the system to supply power through the transmission lines to a local area.
- **One transmission station and one 115kV system with load restoration or security needs:** Maximum amount of power that can be lost during select contingencies.

To support planning for Ottawa, the area was divided into four smaller sub-systems.



Recap: Near- to Medium-Term Station Needs

Stations are responsible for delivering power from the grid to the distribution system.

	Station Capacity Needs (2034)			Asset Replacement	Load Supply Security
Sub-system	**Stations with electricity demand greater than its capacity**	**Magnitude (MW)**			
		Summer	**Winter**		
Core East	Carling TS, Cyrville MTS, Ellwood MTS, King Edward TS, Lisgar TS, Moulton MTS, Nepean Epworth MTS, Riverdale TS, Russell TS, Overbrook TS, Hawthorne TS	80	410	Infrastructure at South March TS is approaching End-of-Life	N/A
Kanata-Stittsville	Kanata MTS #1, South March TS, Nepean TS	20	100	N/A	Nepean TS is at risk for violating reliability standards (48 MW)
Core West	Bridlewood MTS, Centrepoint MTS, Fallowfield MTS, Manordale MTS, Marchwood MTS, Hinchey TS	20	70		N/A
Core South	Limebank MTS, Marionville MTS	0	20	N/A	

Recap: Near- to Medium-Term Transmission Needs

Transmission lines are responsible for delivering power from generators to the stations for distribution.

Sub-system	Supply Capacity Needs (2034)			Asset Replacement	Load Supply Security
	Limiting Phenomenon	Magnitude (MW)			
		Summer	Winter		
Core East	115 kV system, circuit thermal overloading (M4G, M5G)	0	330	N/A	N/A
Kanata-Stittsville	230 kV system voltage issues where system is at risk for voltage instability (C3S, M32S)	0	130	N/A	N/A
Core West	115 kV system, circuit thermal overloading (S7M, C7BM, F10MV)	0	120	Sections of circuit S7M (~6.6km) are approaching End-of-Life	N/A
Core South	N/A	N/A	N/A	N/A	L2M + M1R sub-system is at risk for violating reliability standards (17 MW)

Wire and Non-Wire Options Screening Outcomes

Given the type, urgency and magnitude of infrastructure needs, some subsystems were evaluated for non-wire options. Additional context on the needs that could be met with non-wire options are identified below.

Near-Term Needs	Location	Screened-In Options
Station capacity needs	Across all four sub-systems	• Electricity demand-side management (eDSM)* • Battery storage (Core East) • Wind/Solar/Battery storage (Kanata-Stittsville) • Demand Response • New and/or upgraded stations and transmission lines
Supply capacity needs on several 115kV and 230kV transmission lines	Core East, Kanata-Stittsville and Core South	
Load security need for a subsystem	Core South	• New wire configuration (new breakers and separating the two circuits) to increase capacity
Transmission line nearing end-of-life	Core West	• New and/or upgraded stations and transmission lines

More information regarding screening non-wire alternatives (NWAs) can be found in the IESO's guide to assessing NWAs.

Local Achievable Potential Study (L-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 the potential for energy efficiency measures, demand response and behind-the-meter distributed energy resources (DERs). The results from the L-APS will be used to inform the Ottawa IRRP recommendations on using eDSM (electricity demand-side management) to address planning needs.

Key Updates:

- Since the last webinar, the consultant has completed the data collection, digital twins, measures development and load forecasting incorporating the feedback submitted by stakeholders in Q4 2024.
- Currently, they are working on the technical, economic and achievable potential results.
- IESO will publish the draft results of the study in July 2025 and seek stakeholder feedback
- The report and final results will be available on the Ottawa IRRP engagement webpage in August 2025.

Save on Energy

- The IESO, through the Save on Energy brand, delivers a suite of energy efficiency programs offering incentives to help them manage their electricity use and costs, and to directly contribute to a reliable, affordable and sustainable electricity system. Hydro Ottawa supports its customers to participate in Save on Energy programs.
- Since 2011, 19.5TWh of energy has been saved across the province by participation in Save on Energy programs. This is equivalent to powering a city the size of Ottawa for more than two years. Customers in Ottawa have received more than $140M in incentives from Save on Energy Programs.
- To help meet the province's rapidly growing demand for electricity, Save on Energy's energy efficiency programs budget has been expanded from $1 billion over the past four years, to $10.9 billion over the next 12 years. This new long-term commitment ensures programs will continue to be available to customers.

Energy Efficiency Opportunities for Residents

- Key programs of interest for Ottawa residents include:
  - Peak Perks – Residential electricity customers with an eligible smart thermostat can be rewarded for reducing their energy use when demand for electricity is high in the summer.
  - Home Renovation Savings – Homeowners can get rebates up to 30% for home energy efficiency renovations and improvements (including solar panels).
  - CoolSaver – Helps homeowners and tenants upgrade their home cooling systems to reduce their electricity consumption and energy costs.

- To stay informed on program developments, sign up for the quarterly newsletter.

Energy Efficiency Opportunities for Businesses

- Key programs of interest for Ottawa businesses include:
  - Retrofit – Businesses can get to 50% of eligible project costs covered for targeted energy efficiency retrofits.
  - Bizenergysaver – Industrial, commercial, institutional and multi-residential buildings can receive direct installation and instant discounts on energy-saving equipment upgrades. Learn how Algonquin College saved instantly on variable frequency drives (VFDs) for pumps – projecting electricity savings of $346,600 over five years using this program.
  - Peak Perks – Small business electricity customers with an eligible smart thermostat can be rewarded for reducing their energy use when demand for electricity is high in the summer.
  - Existing Building Commissioning Program – Offers financial incentives to owners, operators and managers of commercial and institutional buildings to hire a Commissioning Provider to undertake building recommissioning at their facilities, helping them realize energy savings from improved facility operations and maintenance.
  - Small Business Program – Small businesses can receive up to $3,000 for eligible lighting equipment and up to $2,500 for eligible non-lighting equipment.
- To stay informed on program developments, sign up for the quarterly newsletter.

Summary of Feedback Received (1)

Feedback	Consideration of Feedback into Draft Recommendations
Consider wires and non-wires together rather than separately.	The IESO acknowledges the importance of evaluating wire and non-wire options, including a combination of both, when evaluating options that can meet the region's electricity needs. A combination of wire and non-wire options, including additional electricity demand-side management (eDSM), transmission- or distribution-connected resources such as Battery Energy Storage Systems (BESS), solar or wind generation, have been evaluated to meet the region's identified near-term electricity needs and the results will be shared in this webinar.
Consider resiliency when evaluating options to meeting Ottawa's electricity needs.	The IESO acknowledges the importance of community preferences regarding resiliency during the options development and appreciates these insights. This feedback was considered in the detailed options analysis, and the results will be shared in this webinar.

To review the feedback and IESO response, please visit the Ottawa-Area engagement webpage.

Summary of Feedback Received (2)

Feedback	Consideration of Feedback into Local Achievable Potential Study
Ensure the study accounts for continued improvement of technologies and decreasing costs.	The Local Achievable Potential Study accounts for improvement in the efficiency of certain technologies, as well as decreasing costs over time.
Utilize the 2022 report by Dunsky Energy + Climate Advisors.	The methodology for the Local Achievable Potential Study is informed by experience with the 2022 provincial DER Potential Study produced by Dunsky Energy + Climate Advisors.

To review the feedback and IESO response, please visit the Ottawa-Area engagement webpage.

Options Analysis and Draft Recommendations

Options Analysis

Options are evaluated based on the following key considerations:

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

Core East Near-Term Needs & Options Summary

Based on the area's infrastructure need, the several options have been evaluated:

Near-Term Needs	Recommended Options	Screened Out Options
Station capacity needs for nine stations	• Distribution-level load transfers at three stations can meet a portion of needs • The Local Achievable Potential Study is evaluating electricity demand-side management (eDSM) and other energy efficiency programs across all Ottawa stations. Given the growing needs and limited space for options in Core East, eDSM was evaluated as an option and can further reduce some of the demand. • Station expansions and upgrades at five stations can meet needs • Convert existing Bronson municipal low-voltage station to 115kV TS and connect to circuits M4G and M5G can enable future growth • Convert existing Cyrville to 230kV MTS and connect to D5A and new circuit A25 (in-service 2029) can meet needs and enable future growth	• Expand the 115kV system by building 3-5 new stations and 2-4 new circuits is very cost prohibitive and difficult to site. • Limited demand response capacity historically offered in this area. • Battery facility will be difficult to site and can only meet needs until 2029.
Supply capacity need for the 115kV system	• Upgrades to circuits M4G and M5G can meet needs and enable future growth	

Core East Options Analysis (1)

Option	✓ Additional Electricity Demand Side Management (eDSM)	× Demand Response (DR)	× Battery Energy Storage System
Technical Feasibility	✓ Can be implemented with existing infrastructure	× Limited DR capacity historically offered in this area	× Space is limited to host infrastructure
Ability to Address Need	✓ Given the size of needs, this option would reduce the electricity demand by ~220 MW over 20 years, but not fully meet the needs	× Given the size and timing of needs, this option will have minimal impact	✓ Given the size of needs, this option can meet near-term needs (up to 2029) but not feasible for long-term needs.
Integration	✓ Local Achievable Potential Study will analyze additional eDSM and energy efficiency programs across the Ottawa Area	✓ Local Achievable Potential Study will further evaluate this option and costs.	× Difficult to site over 15 hectares downtown
Cost	✓ System cost effective	× Not assessed	✓ $0* (to meet need up to 2029)
Lead-Time	TBD	× Not assessed**	× Not assessed**

*NPV 2024-2101 in $2024 Real, net benefit/cost to ratepayer
** Not assessed due to unfeasible scope of work

Core East Options Analysis (2)

Option	✓ **Distribution level load transfers at Ellwood MTS, Nepean Epworth MTS and Riverdale TS**	✓ **Station expansion at Moulton MTS, King Edward TS, Lisgar TS, Carling TS and Russel TS and upgrades of secondary cables, transformers, switchgear etc.**
Technical Feasibility	✓ Transfers are feasible, Riverdale TS will require conversion of Bronson MTS	✓ Station upgrades are feasible
Ability to Address Need	✓ Ellwood MTS will need 15 MW near-term; 29 MW mid-term ✓ Nepean Epworth MTS will need 13 MW long-term ✓ Riverdale TS will need 2 MW near-term; 50 MW mid-term	✓ Adds 12 MW capacity to Moulton MTS; meet near-term needs ✓ Adds 30 MW capacity to King Edward TS; meet near-term needs ✓ Adds 40 MW capacity to Lisgar TS; meet near-term needs ✓ Adds 35 MW capacity to Carling TS; meet near-term needs ✓ Adds 32 MW capacity to Russel TS; meet near-term needs
Integration	✓ Adds capacity for future growth	✓ Adds capacity for future growth
Cost & Lead-Time	✓ $0-5M/transfer ✓ 0-2 years	✓ $30-$50M/station ✓ 3-5 years

Core East Options Analysis (3)

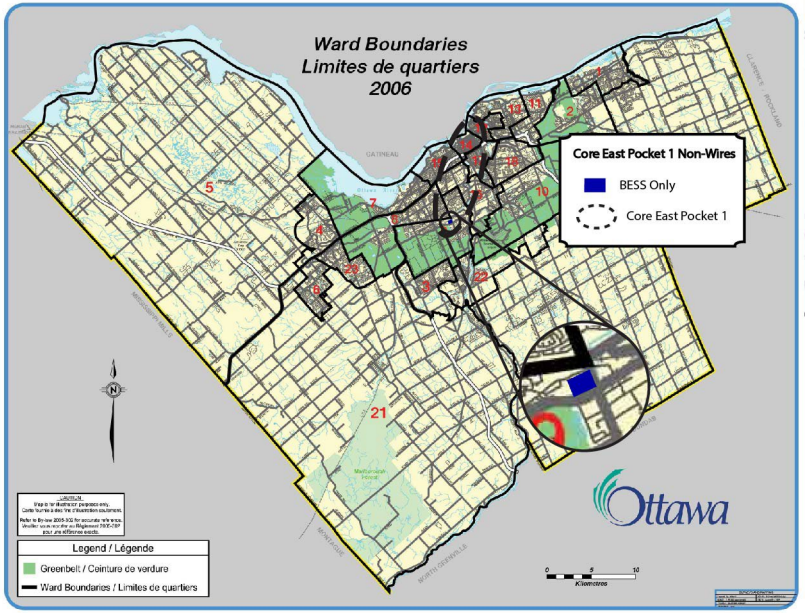
Option	✗ **Transfer Carling TS to nearby circuit in Core West**	✓ **Upgrade circuits M4G and M5G**	✓ **Convert Bronson municipal low-voltage station to 230kV and connect to circuits M4G and M5G**
Technical Feasibility	✗ Much more complicated due to vicinity to highway, portions of circuit underground	✗ Vicinity of highway could make this challenging	✓ Feasible
Ability to Address Need	✓ Able to meet medium-term supply capacity needs of M4G and M5G thermal overload	✓ Able to meet medium-term supply capacity needs of M4G and M5G thermal overload	✓ Able to meet medium-term station capacity needs for Carling TS, Lisgar TS, and Riverdale TS
Integration	✗ N/A	✓ Enables connection and utilization of new TS and associated transformation capacity	✓ Allows for future load transfers from Lisgar TS, Carling TS, and Riverdale TS if required
Cost & Lead-Time	✗ $30M	✓ $35M ✓ 3-5 years	✓ $65M ✓ 3-5 years

Core East Options Analysis (4)

Option	✓ **Voltage conversion at Cyrville TS and convert station from 115kV to 230kV**	× **Expand 115kV downtown core system by expanding Hawthorne TS, constructing 2-4 new circuits and 3-5 new stations**
Technical Feasibility	✓ Feasible for Cryville MTS and A2 (new circuit)	× Will require 1-3 new transmission lines and 1-4 new stations × Will require expansion of Hawthorne TS
Ability to Address Need	✓ Able to meet medium-term station capacity needs for Cyrville MTS and Moulton MTS ✓ Ability to meet near- to medium-term supply capacity needs by shifting load off the 115kV system	✓ Able to meet long-term supply and station capacity for downtown core demand growth ✓ System would be built to enable large scale growth for foreseeable future*
Integration	✓ Provides 230kV supply to downtown area ✓ Can facilitate future expansion of downtown system if required	✓ Enables connection of new transformer stations ✓ Will be designed to accommodate long-term
Cost & Lead-Time	✓ $75M ✓ 5-7 years	× $1B × 10-20 years

Generation and Storage Analysis

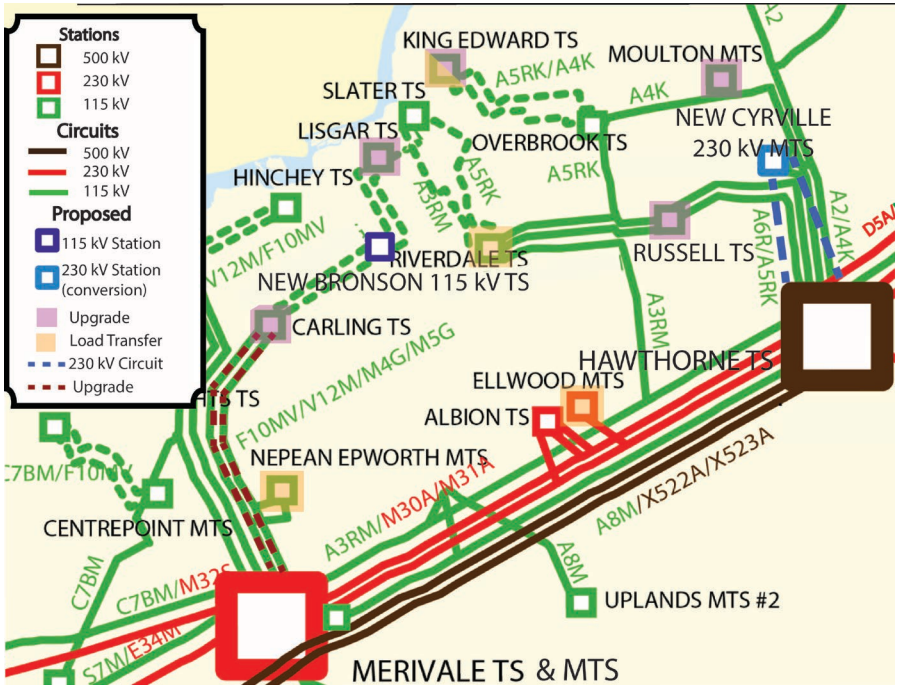
- A facility that can meet Core East needs until 2029 is about 18 hectares of land, which will not fit within the city's limits. If installed further away, new transmission would be required to connect the BESS facility.
- While this may not be the recommendation for transmission needs within Ottawa, BESS facilities remain important for meeting broader provincial goals and can support local distribution on a smaller scale.
- There is a Local Achievable Potential Study underway which will identify potential for behind-the-meter distributed energy resources (including battery and solar) and energy efficiency programs.



Core East Draft Recommendations

Core East has growing electricity needs and limited space to expand the 115kV system. To meet needs, the Technical Working Group recommends options with a smaller footprint:

- Implement distribution-level load transfers at three stations
- Additional electricity demand-side management (eDSM) to reduce the electricity demand
- Station expansions and upgrades of secondary cables, transformers, switchgear etc. at five stations
- Upgrade circuits M4G and M5G
- Convert existing Bronson municipal low-voltage station to new Bronson 115kV MTS and connect to circuits M4G and M5G
- Voltage conversion at Cyrville MTS, convert existing station from 115kV to new Cyrville 230kV TS and connect to D5A and new circuit A25 (in-service 2028)



Note: The names and locations used for proposed stations are for reference only and may change as planning advances.

Kanata-Stittsville Near-Term Needs & Options Summary

Based on the area's infrastructure need, the several options have been evaluated:

Near-Term Needs	Recommended Options	Screened Out Options
Station capacity needs for two stations	• Distribution-level load transfers at two stations can meet a portion of the electricity needs • Station expansions and upgrades at South March TS can meet needs • New 230kV transformer station north of Kanata station can meet needs and enable future growth • Electricity demand-side management can reduce electricity needs.	• Demand response • Wind and/or solar generation will need a battery to meet significant winter needs. Various combinations of renewable generation and battery was evaluated and will be difficult to site.
Supply capacity need for the 230kV system	• New ~18km 230kV transmission line from Merivale TS to supply new 230kV TS (north of Kanata MTS) will meet needs and enable future growth. Rebuild existing tower along corridor to carry new transmission line and existing line.	• New 230kV transmission line from Chats Falls TS to supply new 230kV TS (north of Kanata MTS) requires large-scale upgrades
Load security need for one station		

Kanata-Stittsville Options Analysis (1)

Option	✓ Additional Electricity Demand Side Management (eDSM)	× Demand Response (DR)	× BESS + Solar + Wind
Technical Feasibility	✓ Can be implemented with existing infrastructure	× Limited DR capacity historically offered in this area	× Space is limited to host infrastructure
Ability to Address Need	✓ Given the size of needs, this option would reduce the electricity demand by ~40 MW over 20 years, but not meet the needs	× Given the size and timing of needs, this option will have minimal impact	× Unable to generate enough energy during winter peak
Integration	✓ Local Achievable Potential Study will analyze additional eDSM and energy efficiency programs across the Ottawa Area	✓ Local Achievable Potential Study will further evaluate this option and costs.	× Difficult to site almost 17,000 hectares close to needs
Cost	✓ System cost effective	× Not assessed	✓ $-1.4B to $0*
Lead-Time	TBD	× Not assessed**	× Not assessed**

*NPV 2024-2101 in $2024 Real, net benefit/cost to ratepayer
** Not assessed due to unfeasible scope of work

Kanata-Stittsville Options Analysis (2)

Option	× **BESS + Wind**	× **BESS + Solar**	✓ **Distribution level load transfers of Kanata MTS and South March TS**
Technical Feasibility	× Space is limited to host infrastructure	× Space is limited to host infrastructure	✓ Transfers are feasible; Kanata MTS and South March TS distribution level transfer will be feasible when new 230kV TS north of Kanata MTS is built
Ability to Address Need	× Unable to generate enough energy during winter peak	× Unable to generate enough energy during winter peak	✓ Kanata MTS will need 14 MW near-term, 25 MW mid-term ✓ South March TS will need 13 MW medium-term following station expansion
Integration	× Difficult to site almost 49,000 hectares close to needs	× Difficult to site almost 11,000 hectares close to needs	✓ Adds capacity for future growth
Cost	✓ $-2.3B to $0*	✓ $-2.4B to $0*	✓ $0-5M/transfer
Lead-Time	× Not assessed**	× Not assessed**	✓ 0-2 years

*NPV 2024-2101 in $2024 Real, net benefit/cost to ratepayer
** Not assessed due to unfeasible scope of work

Kanata-Stittsville Options Analysis (3)

Option	✓ **Station expansion at Kanata MTS and South March TS and upgrades of secondary cables, transformers, switchgear etc.**	✓ **Build new 230kV TS north of Kanata MTS**	✓ **New switching station to interconnect Kanata MTS, South March TS, and new 230kV TS (north of Kanata MTS)**
Technical Feasibility	✓ Station upgrades are feasible	✓ Feasible to connect to C3S × Requires extension of circuit M32S for connection	✓ Feasible
Ability to Address Need	✓ Able to meet medium-term station capacity needs	✓ Able to meet supply capacity need of the 230kV circuit and meet load security need at Nepean TS	✓ Aligns with an adaptive planning approach and ensures the new system is resilient to a combination of contingencies
Integration	✓ Adds capacity for future growth	✓ Adds capacity for future growth by providing a second supply to Nepean TS	✓ Provides additional resiliency to system by reducing load lost due to combinations of contingencies
Cost & Lead-Time	✓ $30-$50M/station ✓ 3-5 years	✓ $45M ✓ 3-5 years	✓ $65M ✓ 3-5 years

Kanata-Stittsville Options Analysis (4)

Option	✓ **New 230kV transmission line from Merivale TS to supply new 230kV TS north of Kanata MTS and Nepean TS**	× **New 230kV circuit from Chats Falls TS to supply new 230kV TS north of Kanata MTS**
Technical Feasibility	✓ Feasible, will require rebuild of one of the existing transmission towers to accommodate the new transmission line (either M32S or C7BM)	× Extensive work required at Chats Falls TS before this option is feasible (expansion + new breaker positions)
Ability to Address Need	✓ Able to meet medium-term station capacity needs for Kanta MTS and South March MTS ✓ Able to meet medium-term load security need for Nepean TS	✓ Able to meet medium-term station capacity needs for Kanta MTS and South March MTS × Unable to meet medium-term load security need for Nepean TS
Integration	✓ Enables connection of new 230kV TS north of Kanata MTS ✓ Enables further connection of NWS	✓ Enables connection of new 230kV TS north of Kanata MTS ✓ Enables further connection of NWS
Cost & Lead-Time	✓ $185M ✓ 5-7 years	× Not assessed

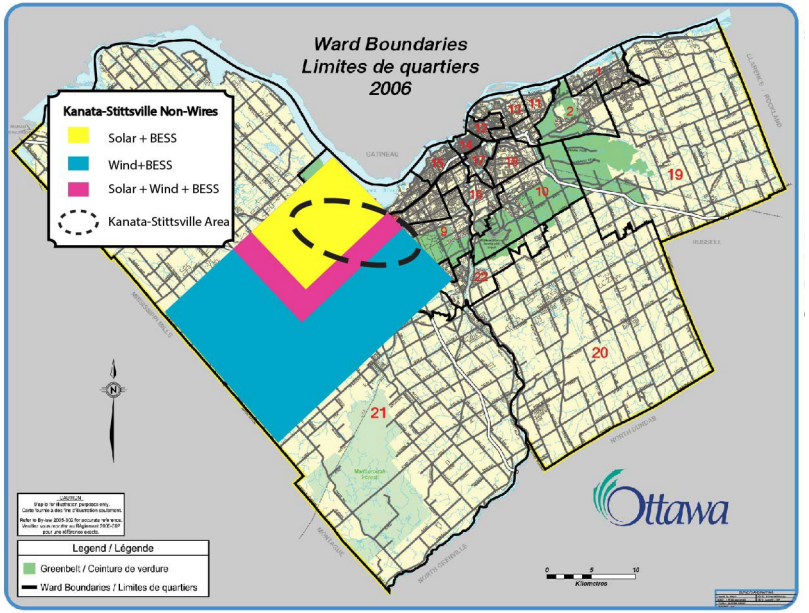
Generation and Storage Analysis

Given the significant winter-peaking needs, wind and/or solar generation would only be feasible to meet Ottawa's electricity needs when paired with a BESS facility. A facility that can meet the needs would not fit within the city's limits:

- Solar + BESS (Yellow: 11,000 hectares)
- Wind + BESS (Blue: 49,000 hectares)
- Solar + Wind + BESS (Pink: 17,000 hectares)

If installed further away, new transmission would be required to connect the generation and BESS facilities to the needs.

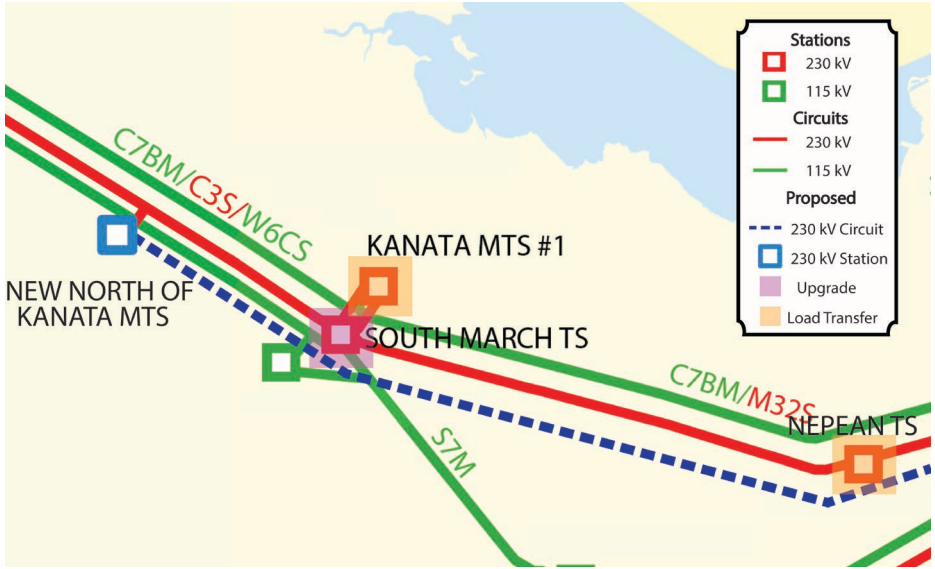
While this may not be the recommendation for transmission needs within Ottawa, these kinds of facilities remain important for meeting broader provincial goals and can support local distribution on a smaller scale.



Kanata-Stittsville Draft Wire Recommendations

The Kanata-Stittsville subsystem is currently operating at capacity and requires an expansion to support future growth. To meet needs, the following options have been recommended:

- Implement distribution-level load transfers at two stations
- Additional electricity demand-side management (eDSM) to reduce the electricity demand
- Build a new 230kV TS (north of Kanata MTS)
- South March TS expansion and upgrade
- New ~18km 230kV transmission line from Merivale TS to supply new 230kV TS (north of Kanata MTS) and provide 2nd supply to Nepean TS
- New switching station to interconnect Kanata MTS, South March TS, and new 230kV TS (north of Kanata MTS). A switching station improves transmission reliability by rerouting power during outages or maintenance, minimizing disruptions and enhancing grid flexibility.



Note: The names and locations used for proposed stations and transmission lines are for reference only and may change as planning advances.

Core West Near-Term Needs & Options Summary

Based on the area's infrastructure need, the several options have been evaluated:

Near-Term Needs	Recommended Options	Screened Out Options
Station capacity needs for five stations	• Distribution-level load transfers at five transformer stations can meet a portion of the needs	• Demand response • Non-wire options including eDSM, DERs and more are being evaluated through the Local Achievable Potential Study.
End-of-life for S7M circuit in future	• Upgrading sections of circuit S7M can enable future growth • Upgrading circuits C7BM and F10MV can enable future growth • New 230kV transformer station (west of Merivale MTS) can meet needs and enable future growth • New ~5km 230kV transmission line from Merivale TS to connect new 230kV TS (west of Merivale TS) can enable future growth. New line will require upgrade of existing transmission towers.	• Fully convert S7M from 115kV to 230kV at this stage • Generation and/or storage would not address the underlying asset condition and remain vulnerable to the same capacity limitations

Core West Options Analysis (1)

Option	× Additional Electricity Demand-Side Management (eDSM)	× Demand Response (DR)
Technical Feasibility	✓ Can be implemented with existing infrastructure	× Limited DR capacity historically offered in this area
Ability to Address Need	× Given the magnitude of needs and timing of these needs, it would be best to explore eDSM through the Local Achievable Potential Study currently underway	× Given the size and timing of needs, this option will have minimal impact
Integration	✓ Local Achievable Potential Study will further evaluate this option and costs.	✓ Local Achievable Potential Study will further evaluate this option and costs.
Cost	× Not assessed	× Not assessed
Lead-Time	× Not assessed	× Not assessed

Core West Options Analysis (2)

Option	✓ **Distribution Level Load Transfers of Bridlewood MTS, Manordale MTS, Fallowfield MTS, Centrepoint MTS and Marchwood MTS**	✓ **Build new 230kV TS (west of Merivale MTS)**	✓ **Upgrade circuits C7BM and F10MV**
Technical Feasibility	✓ Feasible if new 230kV TS (west of Merivale MTS) is recommended/built × Varying voltages may be more challenging	✓ Feasible to connect to E34M ✓ Requires new 230kV transmission line to be built from Merivale TS	✓ Feasible ✓ Could be bundled with Kanata-Stittsville transmission line
Ability to Address Need	✓ Bridlewood MTS will need 2 MW near-term, 7 MW mid-term ✓ Manordale MTS will need 5 MW near-term, 8 MW mid-term ✓ Fallowfield MTS will need 11 MW near-term, 13 MW mid-term ✓ Centrepoint MTS will need 5 MW near-term, 10 MW mid-term ✓ Marchwood MTS will need 17 MW near-term, 25 MW mid-term	✓ Able to meet medium-term station capacity needs for Manordale MTS, Centrepoint MTS, Fallowfield MTS ✓ Provides higher voltage for large customer connections	✓ Able to meet medium-term station capacity needs
Integration	✓ Adds capacity for future growth	✓ Adds capacity for future growth	✓ Adds capacity for future growth
Cost & Lead-Time	✓ $0-5M/transfer ✓ 0-2 years	✓ $40M ✓ 4-7 years	✓ $50M ✓ 4-7 years

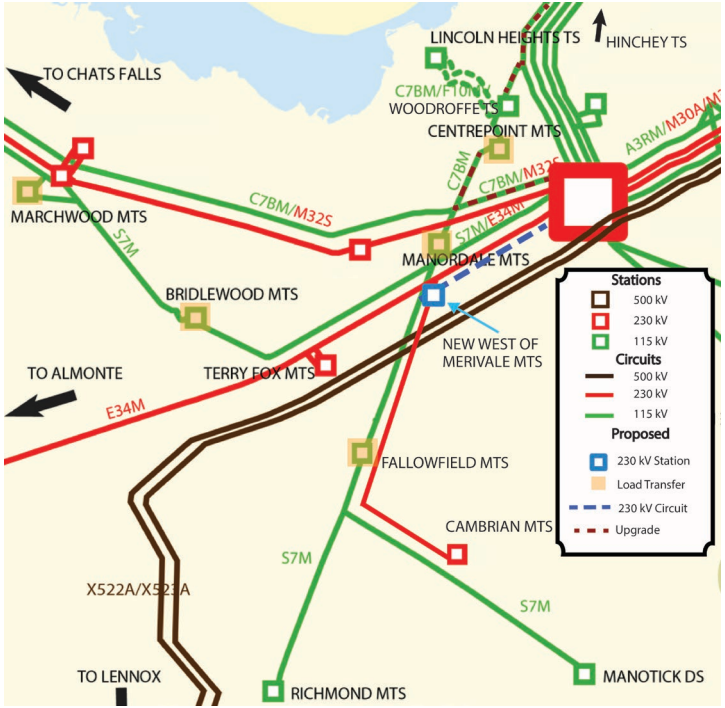
Core West Options Analysis (3)

Option	✓ New 230kV transmission line from Merivale TS to connect new 230kV TS (west of Merivale TS)	× Fully convert circuit S7M from 115kV to 230kV	✓ Uprate sections of circuit S7M
Technical Feasibility	✓ Feasible	× Losing connection to W6CS creates long line prone to low voltages × Losing link to C7BM loses operational flexibility	✓ Feasible ✓ Many stations will require extensive work for conversion
Ability to Address Need	✓ Able to meet medium-term station capacity needs for Manordale MTS, Centrepoint MTS, Fallowfield MTS ✓ Ability to meet 28kV demand	✓ Able to resolve thermal overload ✓ Increases capacity of the system ✓ Offloads 115kV system, preserving growth for other parts of the city	✓ Able to meet medium-term station capacity needs for Cambrian MTS
Integration	✓ Enables connection of new 230kV TS (west of Merivale MTS) ✓ Enables conversion of S7M ✓ Enables second supply for Terry Fox MTS and Cambrian MTS	✓ Enables connection of new 230kV TS (west of Merivale MTS) ✓ Enables second supply for Terry Fox MTS and Cambrian MTS	✓ Enables system to function at status quo
Cost & Lead-Time	✓ $50M ✓ 4-7 years	× Not assessed	✓ $15M ✓ 4-6 years

Core West Draft Wire Recommendations

The 115kV transmission line "S7M" supplies several stations across West Ottawa. Portions of this important line are expected to reach end-of-life over the long-term. To meet near-term needs while preparing for future needs, the Technical Working Group recommends options that lays the groundwork to upgrade circuit S7M into 230kV:

- Implement distribution-level load transfers at five stations
- Build a new 230kV TS (west of Merivale TS)
- Upgrade circuits F10MV and C7BM
- Plan for conversion of S7M to 230kV and upgrade circuit accordingly
- Build new ~5km 230kV transmission line to supply new 230kV TS (west of Merivale MTS), enables future conversion of S7M, second supply to Terry Fox MTS and Cambrian MTS



Note: The names and locations used for proposed stations and transmission lines are for reference only and may change as planning advances.

Core South Near-Term Needs & Options Summary

Based on the area's infrastructure need, the several options have been evaluated:

Near-Term Needs	Recommended Options	Screened Out Options
Station capacity needs for two stations	• Distribution-level load transfers from Limebank MTS to Piperville MTS can meet some needs • Station expansions and upgrades at Greely DS, Marionville DS and Cumberland DS can meet needs	• Converting Limebank MTS into 230kV station will result in another load security need • Demand Response • Non-wire options including eDSM, DERs and more are being evaluated through the Local Achievable Potential Study.
Supply capacity need for the 115kV system L2M	• Upgrading sections of circuit L2M from Merivale TS to Limebank MTS can enable future growth	• Generation and/or storage would not address the underlying asset condition and remain vulnerable to the same capacity limitations
Load security need on the entire subsystem	• Install new breaker at Merivale TS and separate circuits L2M and M1R will alleviate constraints in the subsystem	• Generation and/or storage be impacted by the same contingency and limitations

Core South Options Analysis (1)

Option	× Additional Electricity Demand-Side Management (eDSM)	× Demand Response (DR)	✓ Distribution-Level Load Transfer from Limebank MTS
Technical Feasibility	✓ Can be implemented with existing infrastructure	× Limited DR capacity historically offered in this area	✓ Feasible
Ability to Address Need	× Given the magnitude of needs and timing of these needs, it would be best to explore eDSM through the Local Achievable Potential Study currently underway	× Given the size and timing of needs, this option will have minimal impact	✓ Limebank MTS will need 1 MW near-term, 15 MW mid-term
Integration	✓ Local Achievable Potential Study will further evaluate this option and costs.	✓ Local Achievable Potential Study will further evaluate this option and costs.	✓ Adds capacity for future growth
Cost & Lead-Time	× Not assessed	× Not assessed	✓ $5M

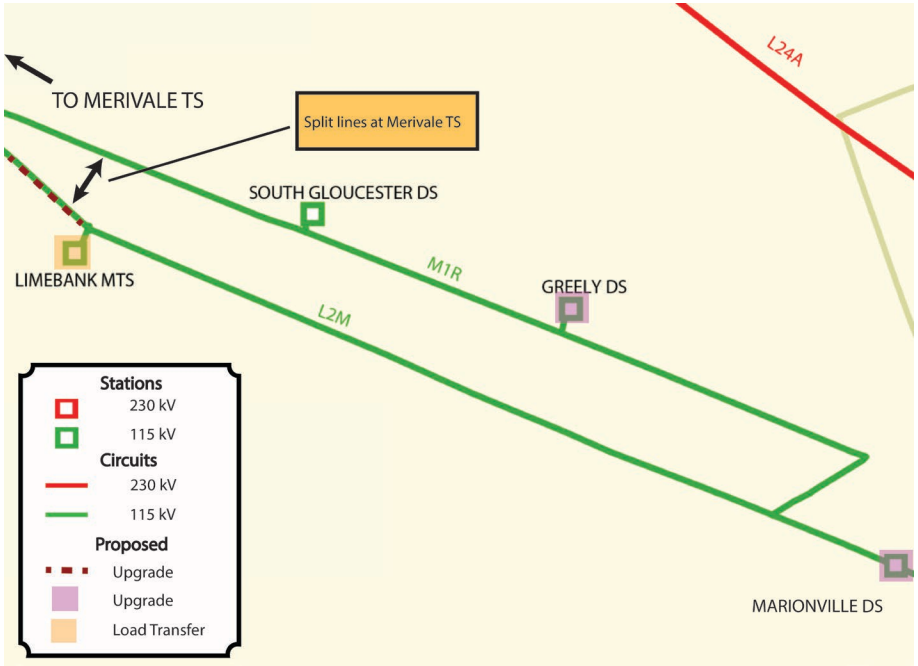
Core South Options Analysis (2)

Option	✓ **Station expansions and upgrades of secondary cables, transformers, switchgear etc. at Greely DS, Marionville DS**	✓ **Uprate section of L2M from Merivale TS to Limebank MTS**	✓ **Install new breaker at Merivale TS and separate circuits L2M and M1R**	× **Convert Limebank MTS into 230kV station**
Technical Feasibility	✓ Feasible	✓ Feasible	✓ Feasible	✓ Feasible
Ability to Address Need	✓ Able to meet medium-term station capacity needs	✓ Investment will meet supply capacity need in medium-term	✓ Investment will meet the load security need and enable system to operate beyond the current 150MW limitation	× Station currently only has one supply and as the load grows will run into load security need – will need to build additional line before it can meet needs
Integration	✓ Adds capacity for future growth	✓ Adds capacity for future growth	✓ Investment will enhance reliability and capacity on each line for future growth	✓ Adds capacity for future growth
Cost & Lead-Time	✓ $15M ✓ 3-5 years	✓ $25M ✓ 4-6 years	✓ $30M	× Not assessed

Core South Draft Wire Recommendations

Growth in Core South is currently limited because the circuits supplying the subsystem shares a common breaker position, creating constraints. The Technical Working Group recommends relieving this subsystem's constraints through actions identified in the IRRP, with further consideration for subsystem expansion in future plans, including the Eastern Ontario Bulk Study.

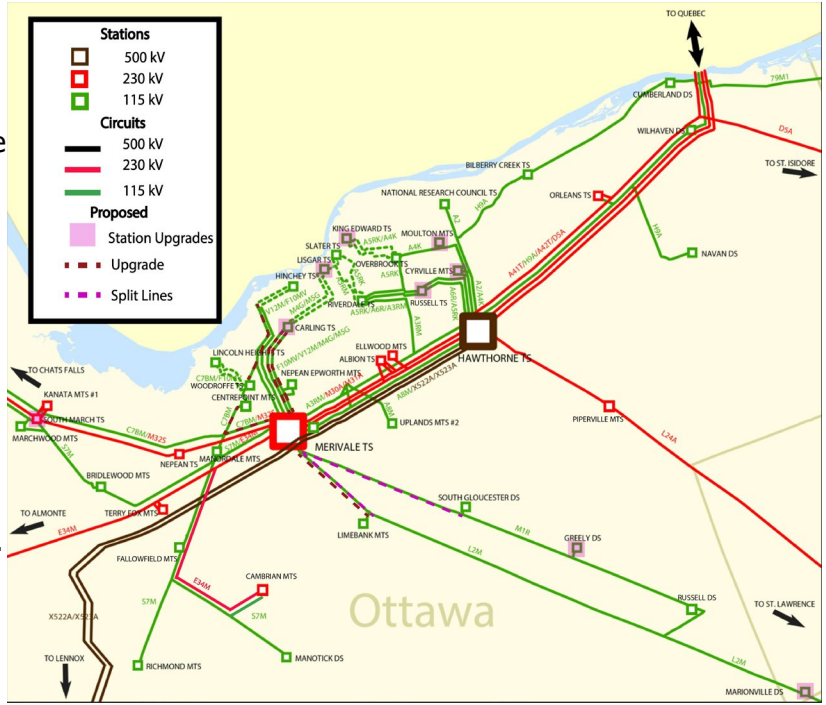
- Implement distribution-level load transfers at one station
- Install new breaker at Merivale TS and separate circuits L2M and M1R
- Station expansions and upgrades of secondary cables, transformers, switchgear etc. at two stations
- Upgrade section of L2M from Merivale TS to Limebank MTS



Summary of Ottawa's Draft Recommendations (1)

After a detailed analysis of all feasible wire and non-wire options, the Technical Working Group recommends the following options to meet Ottawa's near-term needs:

1. Additional electricity demand-side management (eDSM) to reduce the electricity demand by 200-250 MW over 20 years.
2. Distribution-level load transfers at 11 stations*.
3. Install new breaker at Merivale TS and separate circuits L2M and M1R.
4. Station expansions and upgrades at eight 115kV stations (King Edward TS, Moulton MTS, Cyrville MTS, Russell TS, Lisgar TS, Carling TS, Greely TS, Marionville TS) and one 230kV station (South March TS).
5. Upgrade sections of circuits M4G, M5G, L2M, S7M, C7BM and F10MV.
6. Develop an adaptive pathways long-term plan for each subsystem to ensure near-term recommendations address immediate needs while serving as building blocks for future improvements.

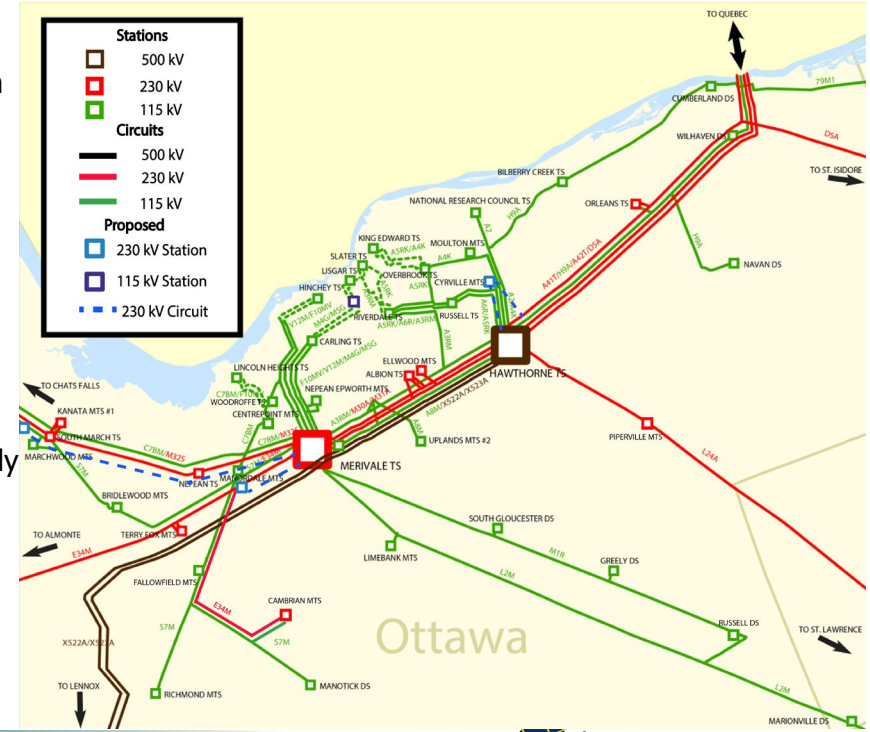


*not shown on the map

Summary of Ottawa's Draft Recommendations (2)

Draft recommendations in Ottawa include:

7. Convert Bronson municipal low-voltage station to new Bronson 115kV MTS and connect to circuits M4G and M5G.
8. Convert existing Cyrville station from 115kV to new Cyrville 230kV TS and connect to D5A and new circuit A25.
9. New 230kV TS (north of Kanata MTS) to transfer load from Kanata MTS, South March TS and Marchwood TS.
10. New 230kV TS (west of Merivale TS) to transfer load to from Centrepoint MTS, Fallowfield MTS and Manordale MTS.
11. New ~18km 230kV transmission line from Merivale TS to supply new 230kV TS (north of Kanata MTS) and provide 2nd supply to Nepean TS.
12. New ~5km 230kV transmission line from Merivale TS to Greenbank MTS, providing second supply to new 230kV TS (west of Merivale TS)



Note: exact routing and siting are subject to transmitter-led development work after the regional plan.

Next Steps & Discussion

Upcoming Milestones

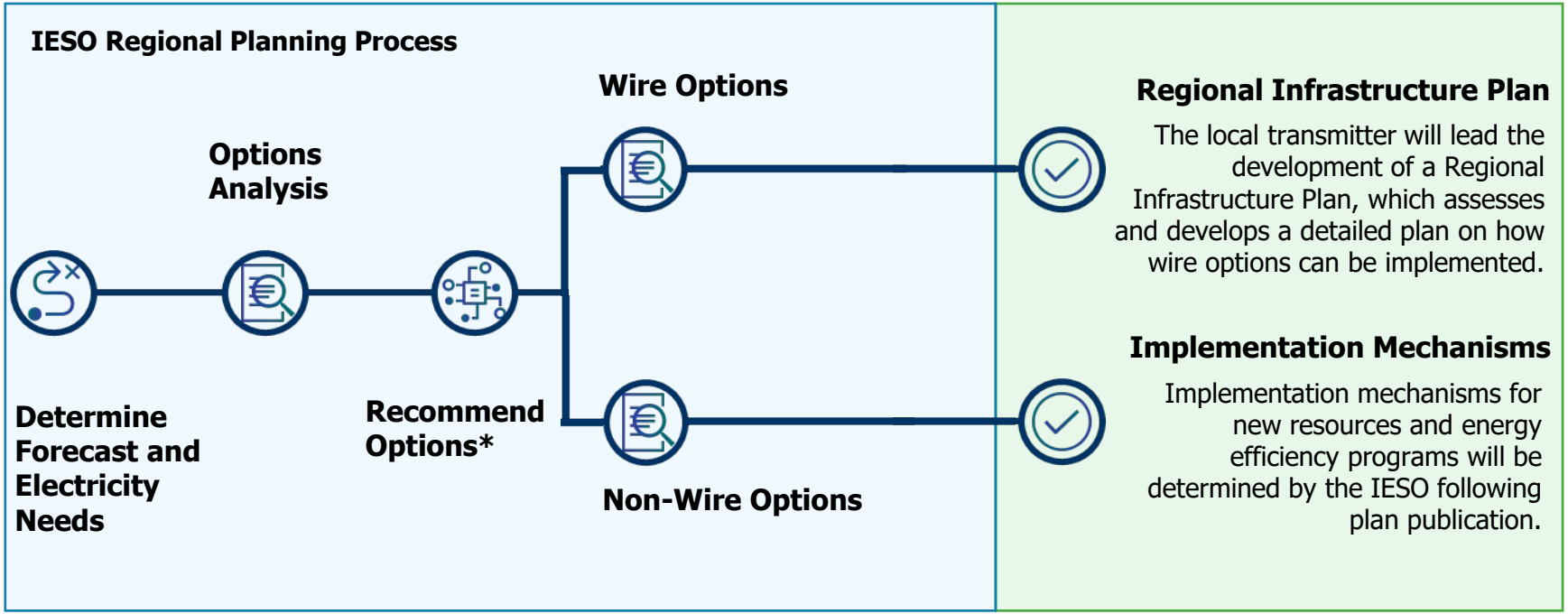
Upcoming milestones for the Ottawa Area IRRP:

June 30, 2025: Deadline for feedback to the IESO on options analysis and draft recommendations.

July 2025: IRRP report, IESO's response to feedback and draft study results for the Local Achievable Potential Study will be shared on the engagement webpage.

Q3 2025: Webinar on the Local Achievable Potential Study results will take place.

Implementation of IRRP Recommendations



*Recommended solutions can take the form of wire and/or non-wire options.

Seeking Input

Local considerations and feedback are a critical component to the development of an Integrated Regional Resource Plan (IRRP). The IESO wants to understand:

- What feedback is there on the draft recommendations?
- What information needs to be considered in the draft recommendations?
- How can the IESO continue to engage with communities and stakeholders as the recommendations are implemented or to help prepare for the next planning cycle?

Please submit your written comments by email to engagement@ieso.ca by June 30.

Summary of Draft Recommendations

- Through previous regional planning cycles, the Technical Working Group has made recommendations that met electricity needs and helped defer the need for major new infrastructure. There is a need for new infrastructure now as the city continues to grow.
- Ottawa has significant electricity needs that will require a build out of the electricity system.
- Key recommendations from this IRRP includes two new transmission lines, two new stations and two upgraded stations to meet Ottawa's near-term needs. These recommendations will support Ottawa's decarbonization goals, ensure new customers can connect and enable future growth.
- To reduce electricity demand as critical infrastructure gets built, the Technical Working Group recommends additional electricity demand-side management.
- A Local Achievable Potential Study is underway which will identify potential for behind-the-meter distributed energy resources (including battery and solar) and energy efficiency programs.
- The Technical Working Group will continue to collaborate with the City of Ottawa on the implementation of these recommendations and stay connected on the timing of Ottawa's electrification and decarbonization goals.

Thank You

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Appendix

Background: 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.

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

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, electricity demand-side 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.

Other Planning Activities in Ottawa

Prior to the IRRP, the Ottawa Area has been the focus of other planning initiatives with recommendations currently underway including:

- **2020 Ottawa IRRP:** In the last cycle of regional planning, a new 230kV connection station, Piperville MTS, was recommended to relieve station capacity issues in Core South and will be energized in 2026.
- **2022 Gatineau Corridor Study:** The IESO studied circuits on the Gatineau Corridor identified as nearing end-of-life and made several recommendations to ensure a reliable supply of electricity along the bulk system between Peterborough to Oshawa, which also included recommendations for Ottawa that are underway such as implementing 230MW of additional energy efficiency and optimizing the use of remedial action schemes (RAS) to improve capacity.
- **2023 Orleans Area Study:** Builds on the recommendations from the 2020 Ottawa IRRP. Recommendations include upgrades to the existing stations in the Orleans Area (Core East) to increase capacity.

In addition to the IRRP, there are ongoing studies with new recommendations to come online in the next few years including:

- **2025 Local Achievable Potential Study:** Study will evaluate additional energy efficiency, demand response, and behind-the-meter distributed energy resources (DERs) that can reduce Ottawa's electricity needs.
- **2026 Eastern Ontario Bulk Study:** Study will examine the broader bulk transmission system across Eastern Ontario. It'll identify options and recommendations to improve the supply into Ottawa.

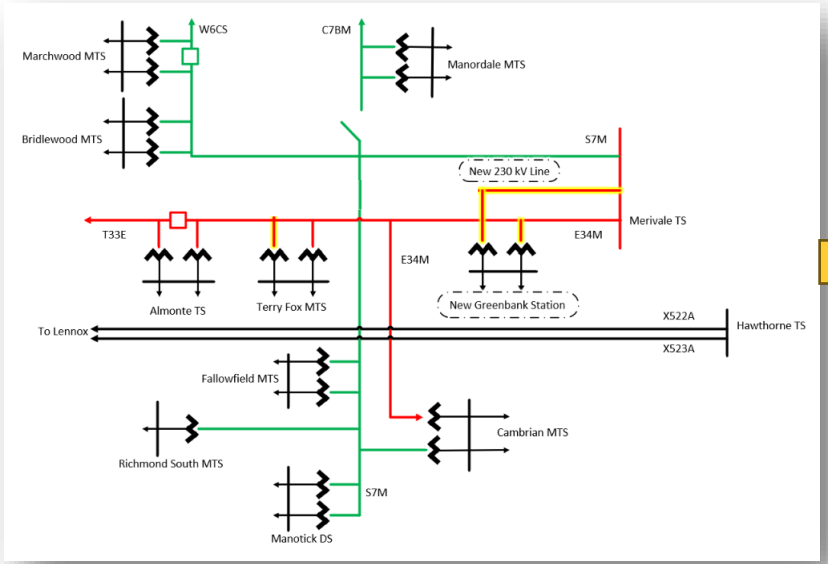
Non-Wire Options Analysis Approach

Ottawa has four electricity subsystems, each with unique needs identified in the chart below. Given the type of infrastructure needs, some were stronger candidates for non-wire options. Additionally, the IESO is conducting a Local Achievable Potential Study to explore additional non-wire solutions throughout the Ottawa Area.

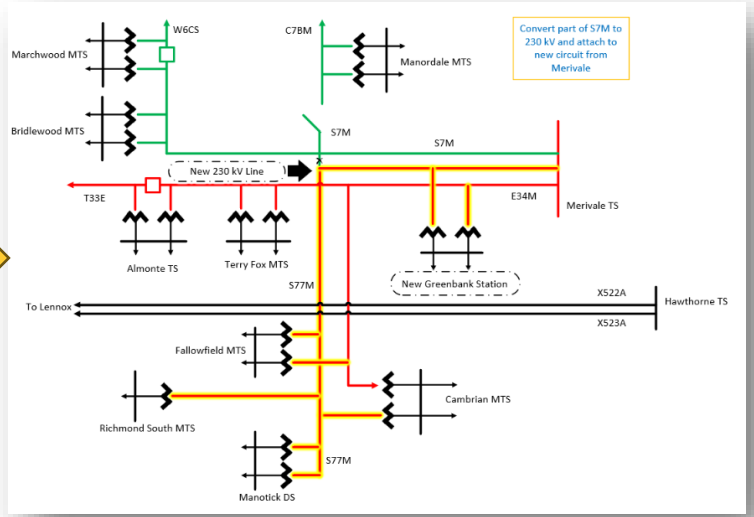
Near-Term Needs	Location	Screening Outcome
Station capacity needs	Across all four sub-systems	• Additional electricity demand-side management (eDSM) • Battery storage (Core East) • Wind/Solar/Battery storage (Kanata-Stittsville) • Demand Response
Supply capacity needs on several 115kV and 230kV transmission lines	Core East, Kanata-Stittsville and Core South	
Load security need for one station	Kanata-Stittsville	• Limitations prevent this infrastructure from maintaining load levels above a certain MW when a single element is out of service. Additional non-wire options would be impacted by the same contingency.
Load security need for a subsystem	Core South	
Transmission line nearing end-of-life	Core West	• Non-wire options do not address the underlying asset condition and would be impacted by the same structural and capacity limitations.

Core West: Voltage Conversion of S7M (1)

Stage 1 – Near-term

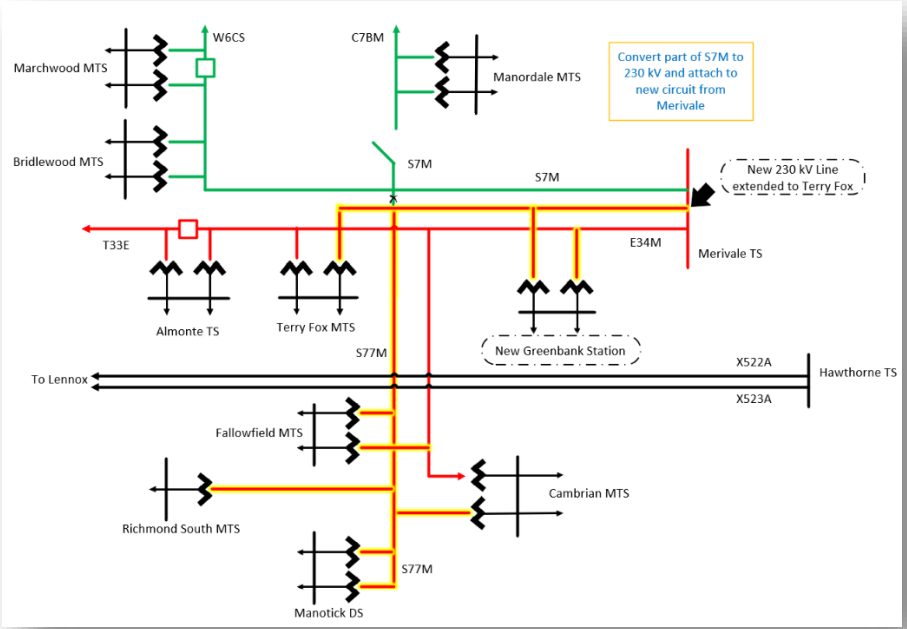


Stage 2 – Mid-term



Core West: Voltage Conversion of S7M (2)

Stage 3 – Long-term



Recap of Wire Recommendations

The Technical Working Group drafted the below wire recommendations to meet Ottawa's near-term needs:

Subsystem	Recommendations
Core East	• Implement distribution-level load transfers at four stations • Station expansions and upgrades of secondary cables, transformers, switchgear etc. at five stations • Upgrade circuits M4G and M5G • Convert Bronson municipal low-voltage station to new Bronson 115kV MTS and connect to circuits M4G and M5G • Convert existing Cyrville station from 115kV to new Cyrville 230kV TS and connect to D5A and new circuit A25
Kanata-Stittsville	• Implement distribution-level load transfers at two stations • Build a new 230kV TS (north of Kanata MTS) • South March TS expansion and upgrade of secondary cables, transformers, switchgear etc. • New switching station to interconnect Kanata MTS, South March MTS, and new 230kV TS (north of Kanata MTS) • New ~18km 230kV circuit from Merivale TS to supply new 230kV TS (north of Kanata MTS)
Core West	• Implement distribution-level load transfers at five stations • Build a new 230kV TS (west of Merivale TS) • Upgrade circuits F10MV and C7BM; plan for conversion of S7M to 230kV and upgrade circuit accordingly • Build new ~5km 230kV circuit to supply new 230kV TS (west of Merivale MTS)
Core South	• Implement distribution-level load transfers at one station • Install new breaker at Merivale TS and separate circuits L2M and M1R • Station expansions and upgrades of secondary cables, transformers, switchgear etc. at two stations • Upgrade section of L2M from Merivale TS to Limebank MTS

Eastern Ontario Bulk Study

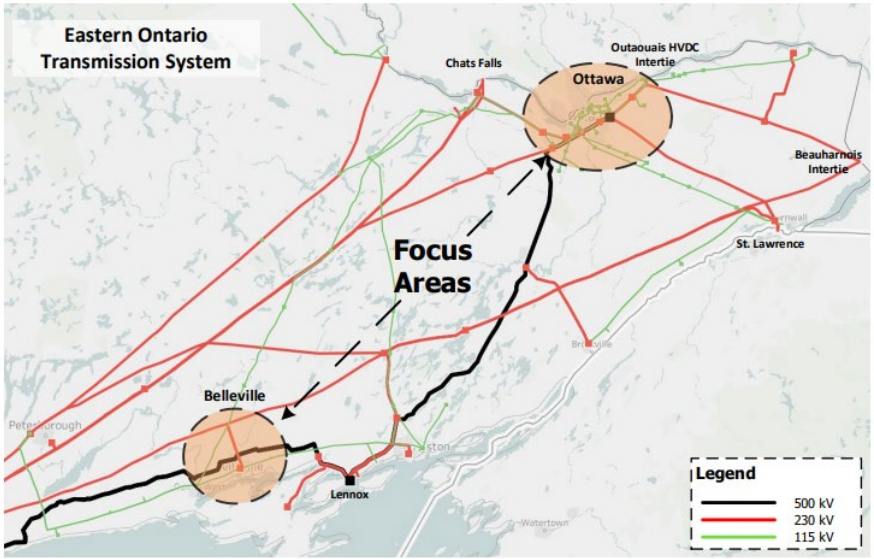
Eastern Ontario Bulk Study

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.



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