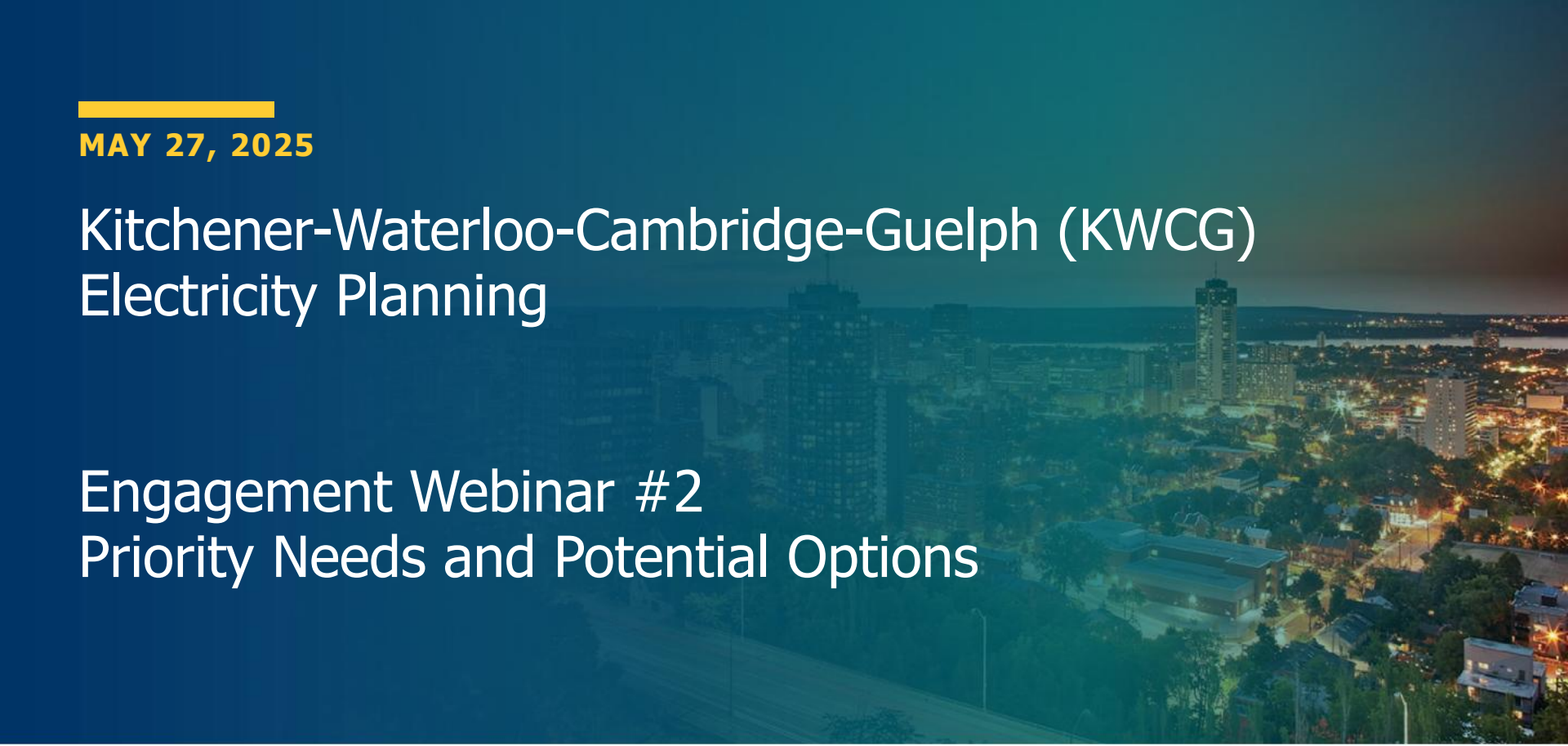
MAY 27, 2025

Kitchener-Waterloo-Cambridge-Guelph (KWCG) Electricity Planning

Engagement Webinar #2
Priority Needs and Potential Options



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Land Acknowledgement

The IESO acknowledges that the Kitchener-Waterloo-Cambridge-Guelph Region is the traditional territory of Anishinaabe, Attiwonderonk and Haudenosaunee people.

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. Land Acknowledgement
2. Ontario's Electricity Sector and IESO's Role
3. Recap: Regional Electricity Planning Process & the Demand Forecasts
4. Priority Electricity Needs & Screening Outcomes
5. Discussion & Next Steps

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We work with:

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

<<< **Communities** >>>

Seeking Input: Regional Planning

As you listen to the presentation today, we want to understand:

- What perspectives do you have on the high-level wire and non-wire options for priority needs?
- What additional information should be considered in the assessment of these options to address priority needs?
- What additional information should be provided in future engagements to help understand perspectives and insights?

IESO welcomes written feedback until June 17, 2025. Please submit feedback to engagement@ieso.ca.

Recap: Regional Electricity Planning Process & the Demand Forecasts

Electricity Planning in Ontario

Provincial/Bulk System Planning

Addresses provincial electricity system needs and policy directions.

Underway: South and Central Bulk Study

Regional Planning

Addresses local electricity system needs at the transmission system level.

Underway: KWCG IRRP

Distribution Planning

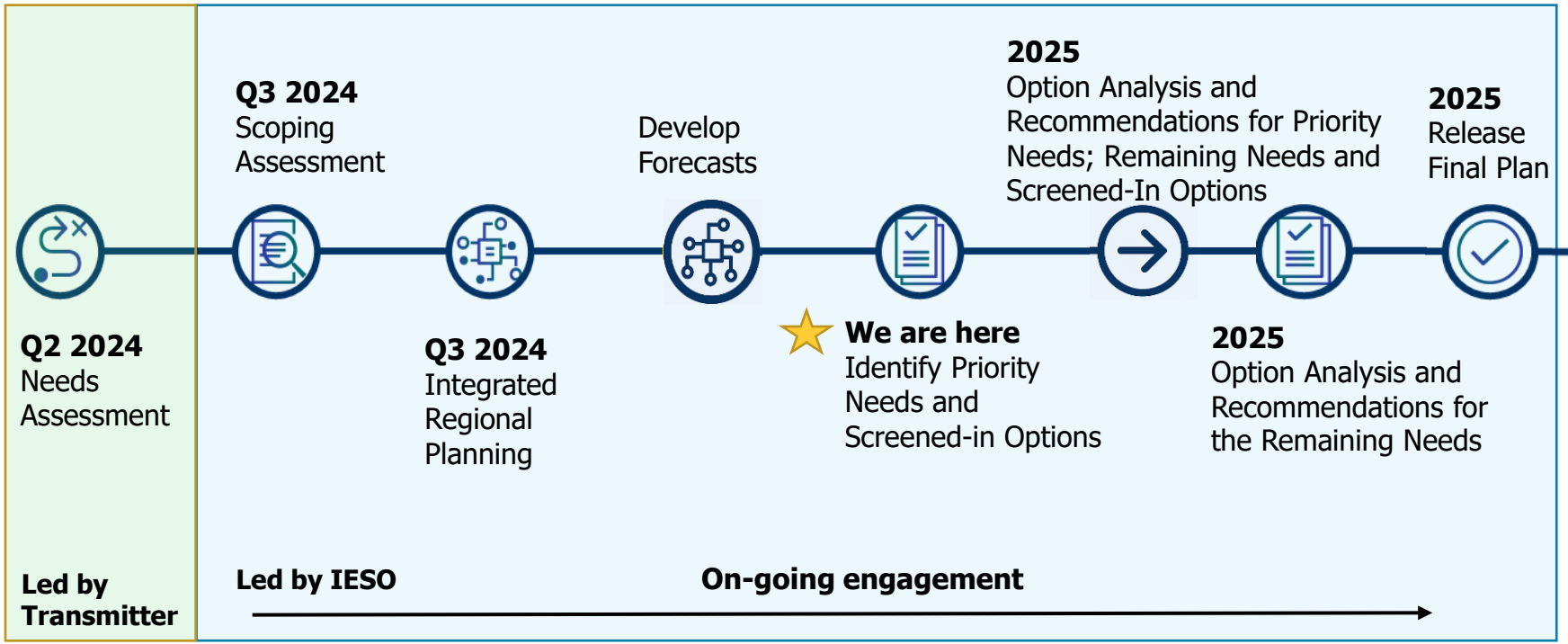
Addresses local electricity system needs and priorities at the distribution system level.

Led by local distribution companies.

Electricity Planning in KWCG

- Since 2013, the IESO has undertaken regional planning work to address electricity needs.
- Recommendations included energy efficiency, distributed generation, transmission refurbishments, and replacing end-of-life equipment to ensure a continued reliable supply of electricity.
- More electricity planning on the way:
  - The ongoing South and Central bulk study will determine transmission needs required to enable economic development, electrification, and growth between the Hamilton and Windsor areas.
  - The third regional electricity plan, or Integrated Regional Resource Plan (IRRP), for the KWCG electrical region is currently being developed to outline electricity needs and recommended solutions to ensure a reliable supply of electricity over the next 20 years.

Regional Planning Milestones for KWCG



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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?

Recap: Forecast Scenarios

Key Details:

Three scenarios are being developed for KWCG, accounting for existing demand side management programs, distributed generation, and extreme weather conditions in the electricity demand forecast:

- **Reference scenario (complete):** firm loads (current and planned), organic growth, etc.
- **High scenario (complete):** incorporate potential demand growth that is less certain, in terms of timelines, magnitude, and location.
- **Low scenario (underway):** omit potential demand growth that is less certain, in terms of timelines, magnitude, and location.

Insights have been incorporated from municipalities, customers, and other interested parties.

Forecast will drive recommended solutions: While plan recommendations will primarily be driven by the reference demand forecast, the high and low scenarios will be considered to test the robustness of the plan, identify signposts to monitor forecast changes, and contemplate additional actions required if lower or higher growth materializes.

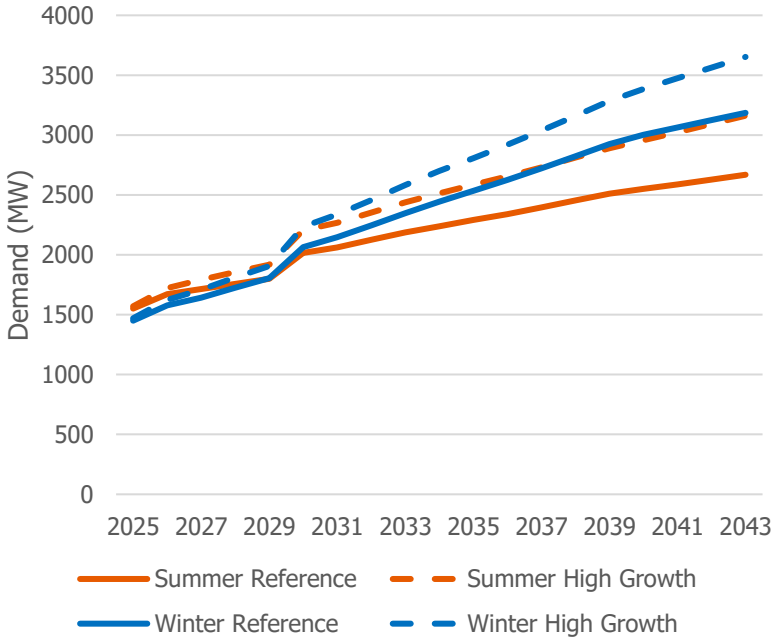
Feedback Received

Key Areas of Feedback	Incorporating Feedback
Confirm whether electrification of transportation and heating, and population and land use projections have been included in the forecasts.	✓ The IESO shared these factors with the local LDCs who confirmed that the information was accounted for in the forecasts.
Provide more information regarding the forecast development including inputs and assumptions that were considered.	✓ Forecast data is provided by each of the local distribution companies in the KWCG electrical area to the IESO. In response to feedback received, the IESO recently posted the detailed methodology and data tables to better understand the data. ✓ Data and information to be made available during IRRP development is outlined in the IESO Regional Planning Information and Data document.
Were non-wire solutions considered?	✓ Non-wire options play an important role in the regional planning process. Once the forecast scenarios and needs have been finalized, the IESO will screen and evaluate wire and non-wire options. As planning work advances, the IESO welcomes feedback from communities and stakeholders, which will be considered.

Final Demand Forecasts

Key takeaways:

- KWCG demand has an average annual growth rate of 3.7% in the summer and 5.5% in the winter in the near-term – compared to the provincial average annual demand growth rate of 2% by 2050.
  - Summer demand is driven by new large-scale customers and electrification.
  - Winter demand, although driven by the same growth drivers as the summer forecasts, has higher growth rates due to the increase in electric heating.
  - KWCG, currently a summer-peaking region, becomes dual peaking in 2029 before shifting to winter peaking.
- The current reference forecast has nearly 3x the annual growth rate relative to the previous cycle of regional planning, due to aforementioned factors.



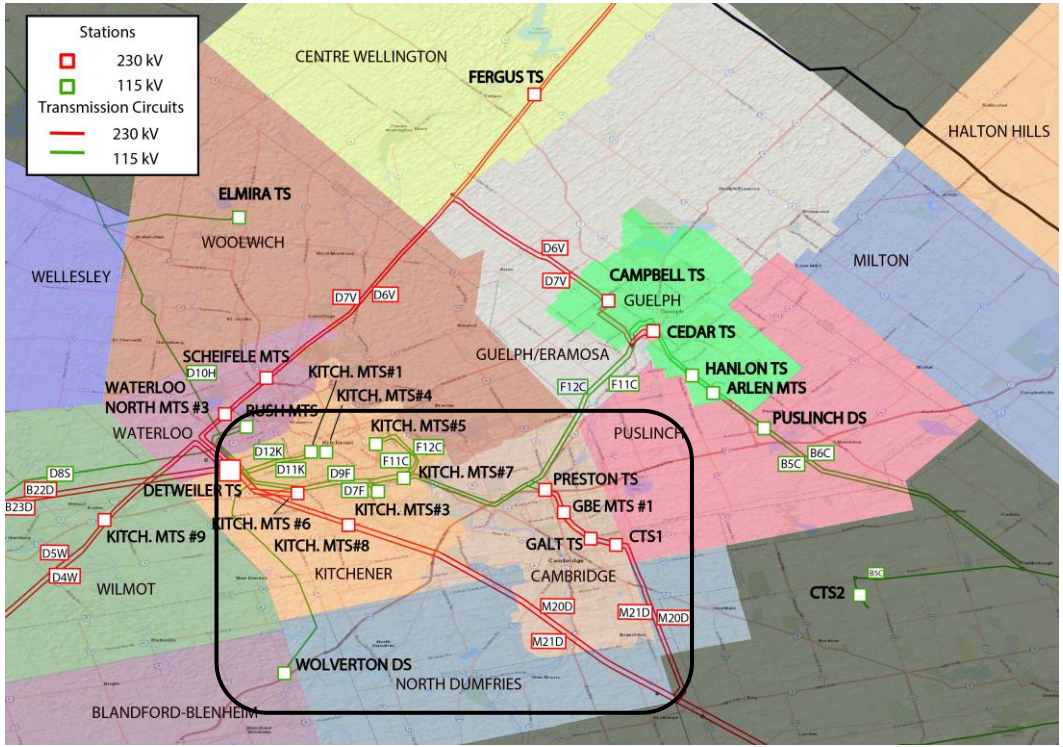
Priority Electricity Needs and Screening Outcomes

Identifying Priority Needs

Studies have been conducted to analyze KWCG's priority needs based on the electricity demand forecasts and technical studies (system capability, operating standards) of the infrastructure. Generally, needs studied in this process fall under the following categories:

- **Station capacity:** Ability of a station to deliver power from the grid down to the distribution systems.
- **Supply capacity:** Ability of the system to supply power through the transmission lines to a local area.
- **Asset replacement:** Station or transmission equipment that has reached end of life.
- **Load restoration:** Ability of the system to restore power after select contingencies.
- **Load supply security:** Maximum amount of power that can be lost during select contingencies.

Location of KWCG Infrastructure with Priority Needs (1)



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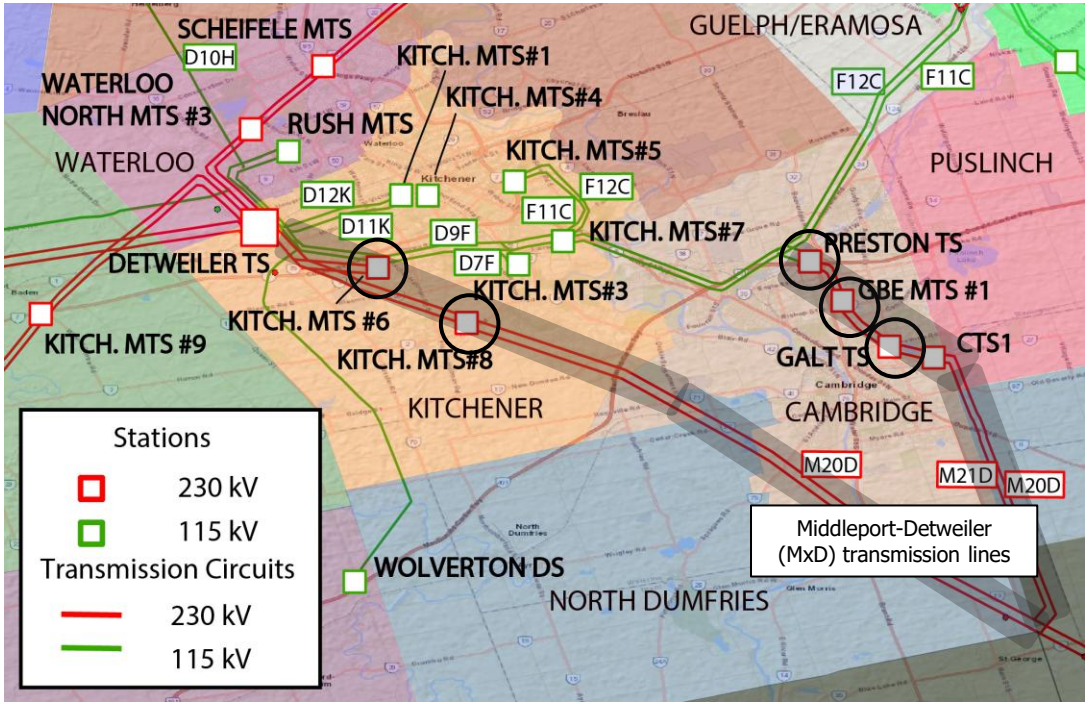
Location of KWCG Infrastructure with Priority Needs (2)



Given the forecast growth, the existing electricity system does not meet reliability standards. Reinforcements will need to be recommended to accommodate forecast growth. This plan will explore options to meet the electricity needs.

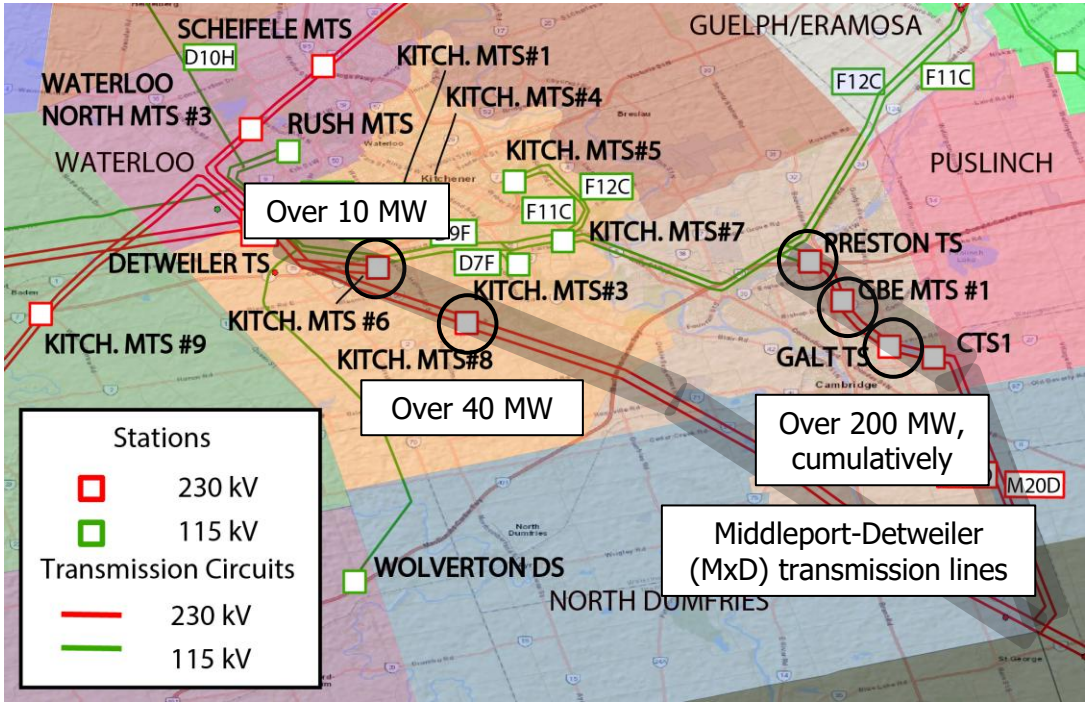
Legend

- Station capacity needs
- Supply capacity needs

Priority Needs - Timing

Need Type	Impacts	Need Timing – Reference	Need Timing – High Scenario
Station capacity	Kitchener Municipal Transformer Station (MTS) #8	Immediate	
	Preston TS	Immediate	
	GrandBridge Energy MTS #1	Immediate	
	Galt TS	Immediate	
	Kitchener MTS #6	Mid-2030s	Early 2030s
Supply capacity, load security and restoration	230 kV circuits between Middleport and Detweiler (MxD)	Immediate	

Priority Needs - Size



- Ongoing work to upsize Preston TS will partially help
- New (115 kV and 230 kV) stations are already being considered by GrandBridge Energy and Enova Power

Legend

Station capacity needs

Supply capacity needs

Determining Options

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

Screen various options to address the region's near, medium and long-term electricity needs for the Reference Forecast, including:

Traditional wires option to supply local area

Non-wires alternatives (NWAs), such as transmission-connected generation or energy storage, electricity demand side management (eDSM), distributed generation or demand response

Complete a detailed analysis of screened-in options to recommend solutions to meet needs.

Seek community feedback at key milestones to enhance development and evaluation of options before making a final recommendation.

Recommend options that address firm growth and consider potential growth to meet needs and ensure we can act quickly in the future when higher growth materializes.

Screening Steps

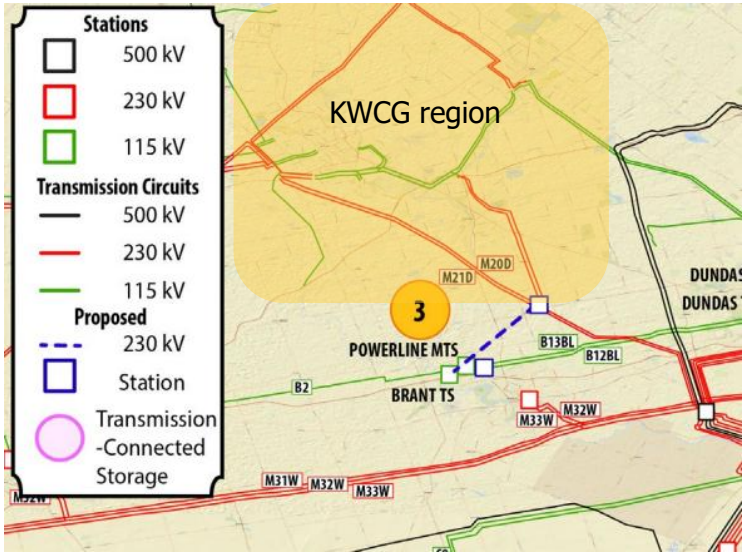
1. Type of Need	2. Need Traits	3. Additional Considerations
Evaluate the compatibility of the need with the various option types, based on technical requirements and permissibility under planning standards and criteria.	Further filter compatible options with high-level need traits (such as timing, size, and coincidence with system needs).	Consider local factors that may require further analysis of non-wire alternatives, even if earlier steps haven't identified non-wires alternatives as suitable.

Screening Results – Priority Needs (Reference Forecast)

eDSM can be considered for all needs as an option for long-term load management, and in the interim as other solutions are being built. Wires options can include new supply stations and connection lines.

Need	Impacts	Screened In	Screened Out
Station capacity	Kitchener MTS #8	• Wires options	• Demand response and distributed generation, due to the size and urgency of the needs • Transmission-connected resources, since they are upstream of the station
	Preston TS		
	GBE MTS #1		
	Galt TS		
	Kitchener MTS #6	• Wires options • Demand response • Distributed generation • eDSM	• Transmission-connected resources, since they are upstream of the station
Supply capacity, load security and restoration	MxD circuits	• Wires options • Transmission-connected resources	• Demand response and distributed generation, due to the type, size, and urgency of the needs

Coordinating with the Burlington to Nanticoke IRRP



- New 230 kV connection line and station in the Burlington to Nanticoke region were recommended
- These reinforcements help supply growth near the existing Brant and Powerline stations
- They will connect to the MxD circuits, but the exact connection point and timing will depend on options to meet KWCG priority needs

Seeking Input

Local considerations and feedback are a critical component to the development of an Integrated Regional Resource Plan (IRRP). As the options phase of the IRRP continues to identify how to best meet the area's infrastructure needs, the IESO wants to hear your perspectives about:

- High-level wire and non-wire options screening for priority needs
- Additional information that should be considered in the assessment of these priority needs options
- Additional information that should be provided in future engagements to help understand perspectives and insights

IESO welcomes written feedback until June 17, 2025. Please submit feedback to engagement@ieso.ca using feedback form.

Next Steps

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 Kitchener Waterloo Cambridge Guelph

Follow the Kitchener Waterloo Cambridge Guelph regional planning activities online

We Want to Hear From You

Local considerations and feedback are a critical component to the development of an Integrated Regional Resource Plan (IRRP). As the options phase of the IRRP continues to identify how to best meet the area's infrastructure needs, the IESO wants to hear your perspectives about:

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Next Steps

The IESO will continue to engage and inform at these milestones:

June 17, 2025 – Deadline to submit written feedback to engagement@ieso.ca

Remaining IRRP Activities:

- Share option analysis and recommendations for priority needs and and seek feedback.
- Share screened-in options, option analysis, and recommendations for remaining needs and seek feedback.
- IRRP report and data tables will be completed and published on the webpage.

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

- For wires solutions, the 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 eDSM will be determined following plan publication.

Appendix

Regional Electricity Planning Process

The regional system planning process ensures an affordable and reliable supply of electricity across Ontario. The process looks at the unique needs of each region and considers a range of options and resources to keep the lights on.

The regional plan for the Kitchener-Waterloo-Cambridge-Guelph (KWCG) electrical area will be developed by a Technical Working Group, led by the IESO, and consisting of the local distribution companies and the transmitter.

Technical Working Group

The regional planning process is conducted by a Technical Working Group consisting of:

Team Lead, System Operator	• Independent Electricity System Operator
Lead Transmitter	• Hydro One Networks Inc. (Transmission)
Local Distribution Companies	• Alectra Inc. • Centre Wellington • Enova Power Corp. • Grandbridge Energy • Halton Hills Hydro Inc. • Hydro One Networks Inc. (Distribution) • Milton Hydro • Wellington North

Determining the Need for an IRRP