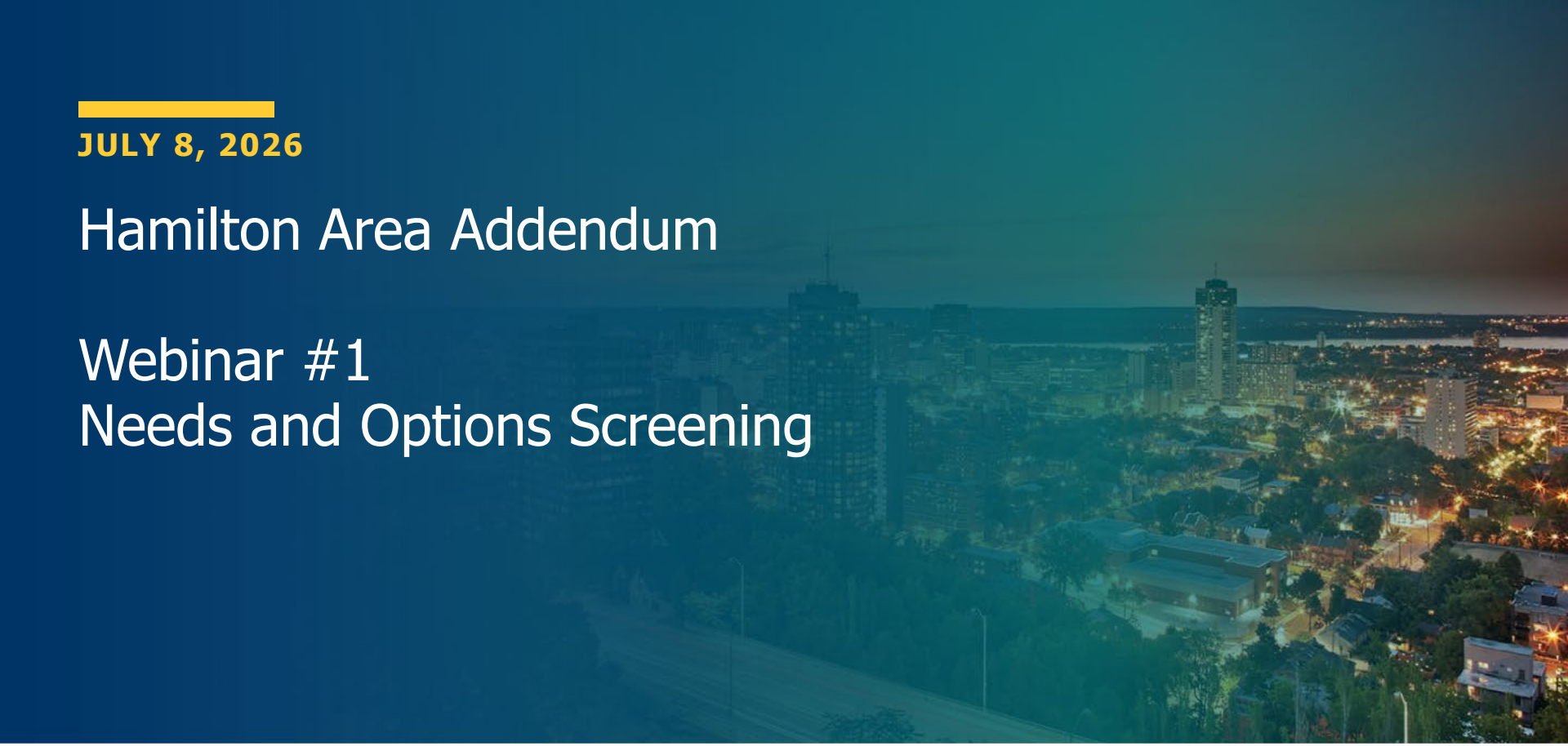
JULY 8, 2026

Hamilton Area Addendum

Webinar #1
Needs and Options Screening



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Land Acknowledgement

The City of Hamilton is situated upon the traditional territories of the Erie, Neutral, Huron-Wendat, Haudenosaunee and Mississaugas. This land is covered by the Dish With One Spoon Wampum Belt Covenant, which was an agreement between the Haudenosaunee and Anishinaabek to share and care for the resources around the Great Lakes.

The IESO further acknowledge that this land is covered by the Between the Lakes Purchase, 1792, between the Crown and the Mississaugas of the Credit First Nation.

Our Commitment to Respectful Participation

- One speaker at a time; please raise your hand to enter the speaking queue.
- Keep remarks concise (approximately 60-90 seconds) and focused on the agenda topic.
- Avoid repeating points already covered; detailed feedback may be submitted in writing for follow-up.
- Maintain a respectful tone at all times.
- The IESO may redirect discussion to keep the agenda on track.
- Participants that are unable to participate respectfully by adhering to these principles may have their microphone disabled.

Agenda

1. Regional Electricity Planning Process
2. Demand Forecast and Scenarios
3. Electricity Needs
4. Screening Potential Options
5. Niagara Bulk Plan
6. Next Steps & Discussion

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

<<< **Communities** >>>

Meeting Purpose

The purpose of today's webinar is to share the draft demand forecast for the Hamilton Area and discuss the electricity needs and the screening of potential wire and non-wire options for feedback.

- Regional electricity planning has advanced in the Hamilton Area.
- In November 2024, the IESO released the Burlington-to-Nanticoke Integrated Regional Resource Plan (IRRP) that included recommendations to address needs identified in the Hamilton area:
  - A new 230 kV station at Dundas transformer station (TS) to transfer load from the 115 kV system on to the 230 kV system (Middleport-Burlington circuits), in part to help relieve capacity constraints in the Hamilton area.
  - Further study to assess and address the remaining needs in Hamilton ("Hamilton Area Addendum Study").
- Today, we will present the needs and options screening for the Hamilton Area and Introduce the soon to launch Niagara Bulk Plan which ensures the bulk transmission system can continue to supply firm and potential economic development in the Niagara region, which will have interdependencies with the Hamilton Addendum.

Seeking Input

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

- Perspectives on the high-level wire and non-wire options screening
- Additional information that should be considered in the assessment of these options
- Additional information that should be provided in future engagements to help understand perspectives and insights

IESO welcomes written feedback until **July 22, 2026**. Please submit feedback to engagement@ieso.ca.

Regional Electricity Planning Process

Electricity Planning in Ontario

Provincial/Bulk System Planning

Addresses provincial electricity system needs and policy directions.

Complete: Central-West Bulk Plan
Underway: South and Central Bulk Plan & Niagara Bulk Plan

Regional Planning

Addresses local electricity system needs at the transmission system level.

Complete: Burlington-to-Nanticoke IRRP
Underway: Hamilton Area Addendum

Distribution Planning

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

Led by local distribution companies.

Technical Working Group – Active Participants

Team Lead, System Operator	• Independent Electricity System Operator
Lead Transmitter	• Hydro One Networks Inc. (Transmission)
Local Distribution Companies	• Alectra Utilities • Grand Bridge Energy • Hydro One Networks Inc. (Distribution)

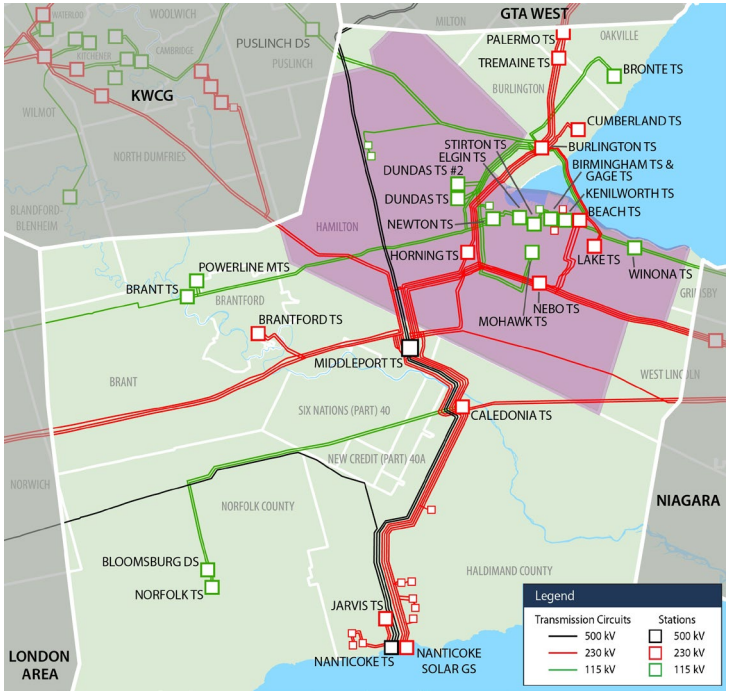
Electricity Planning in the Hamilton Area

The 2024 Burlington-to-Nanticoke IRRP was the third regional planning cycle and included subregions: Brant, Bronte, Caledonia-Norfolk, and Hamilton.

The electricity demand forecast showed strong growth driven by industrial expansion, housing development, and decarbonization initiatives.

Recommendations impacting Hamilton include a new substation near Dundas TS & Dundas #2 TS (highlighted), to address station capacity needs and partially relieve supply capacity needs to downtown Hamilton.

Given rapid growth, the Technical Working Group (TWG) continues to recommend a Hamilton Addendum study to fully assess and address the subregion's needs.



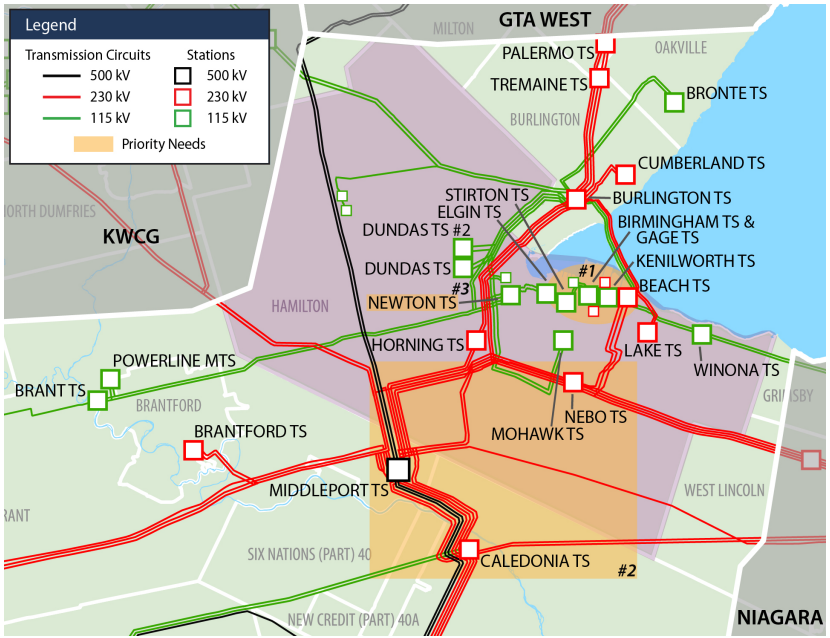
Hamilton Area Addendum Study Scope

Over a 12-month period, the Hamilton Area Addendum Study will develop and recommend an integrated plan to meet the needs of the Hamilton sub-region. The Addendum will:

- Update the 20-year electricity demand forecast, and include a low-growth and a high-growth scenario
- Assess the adequacy of electricity supply
- Evaluate opportunities for cost-effective non-wires alternatives (NWAs) and wires options to address the needs identified

Priority needs in the Hamilton sub-region are identified in:

- **Bayfront Industrial Area:** seeing a surge in electricity demand driven by new large industrial customers, potential data centres, and expansion of existing industries.
- **South of Hamilton Area:** significant growth is expected near the airport, driving the need for additional station capacity at Nebo TS and coordinated solutions to support the broader system.
- **Newton:** Strong growth across residential, commercial, and industrial sectors is creating capacity needs at Newton TS with limited upgrade or relief options.



Hamilton Area Addendum Milestones

We are here

Q1 2026
Develop Updated Forecasts

Q2/Q3 2026
Identify Needs and Potential Options

Q4 2026
Complete Options Analysis and Draft Recommendations

Q1 2027
Release Final Plan

On-going engagement – Led by the IESO

Components of a Regional 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 wires and non-wires 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?

Demand Forecasts

Developing the Demand Forecast

Local distribution companies (LDCs) are the main conduit for the demand forecast, and they:

- Provided summer and winter demand forecasts for each station they are supplied from,
- Incorporated municipal and community plans into their forecast, and
- Established forecasting assumptions based on customer growth plans.

In addition to LDC forecasts, the IESO:

- Develops the conservation and demand management (CDM) forecasts based on provincial and federal policies,
- Works with LDCs to forecast impact of contracted distributed generation, and
- Works directly with customers and industry stakeholders to create demand forecasts for large electricity consumers that may seek connection on the transmission system.

Forecast Scenarios

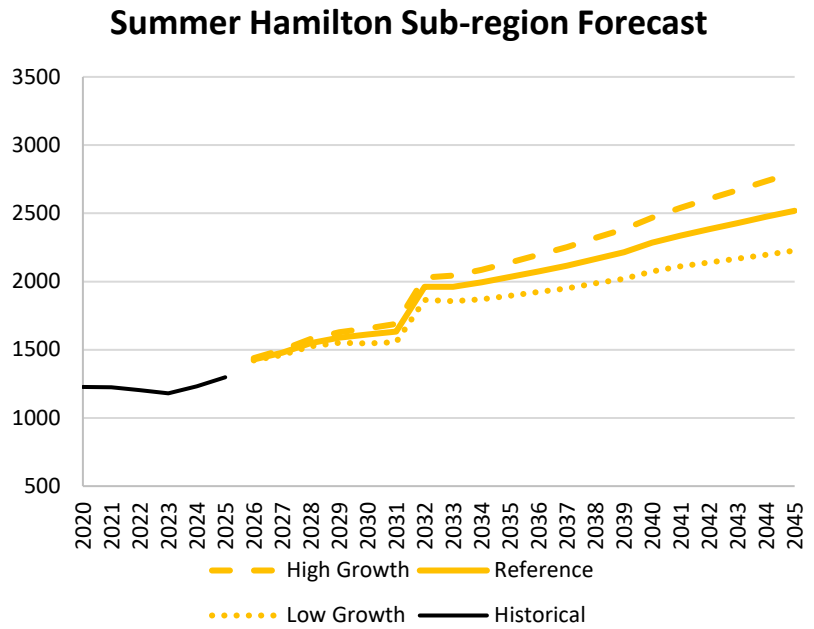
The TWG has prepared a reference demand forecast and two additional scenarios for consideration in this IRRP.

- **Low:** A low electricity demand scenario that incorporates the risk of potential economic downturn, delayed and/or reduced growth.
- **Reference:** a demand forecast that reflects current trends and policies in electrification of transportation, space heating, industry, and other areas that impact electricity, while considering business-as-usual factors such as firm loads (current and planned), growth trends, and existing plans.
- **High:** A high electricity demand scenario that reflects a reasonable incremental increase in the foregoing trends, while incorporating potential demand growth that is less certain.

Draft Summer Hamilton Area Forecast and Scenarios

Key takeaways:

- Demand increase from 2026 to 2045: +70 to +110%
- Large increase in 2032 due to the Steelport project
- Strong growth throughout forecast due to City developments and increased requests for customer connections
- Short term demands have high certainty; long-term demands are driven by long-term plans and trends with less certainty
- The system peaks in the summer over the short to medium term (2026-2035)



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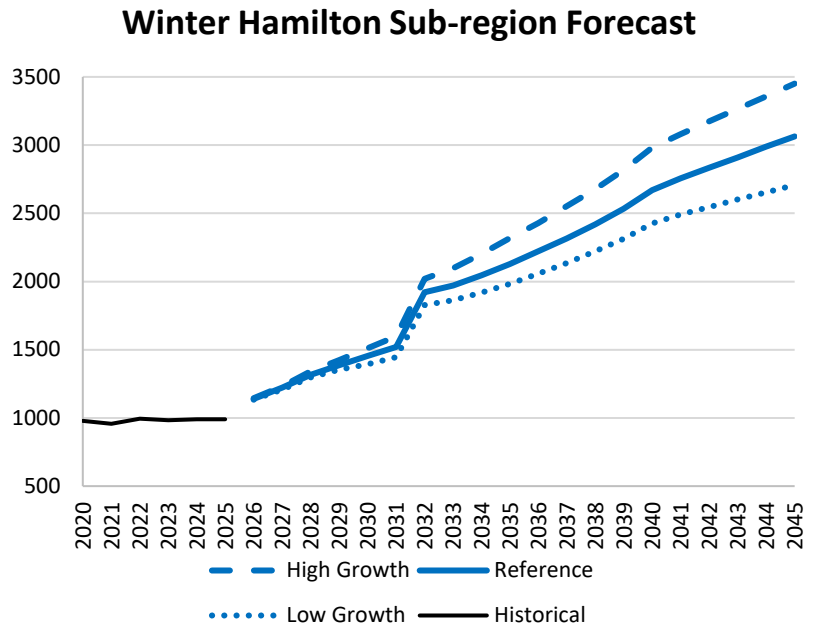
Draft Winter Hamilton Area Forecast and Scenarios

- **Key takeaways:**
- Demand increase from 2026 to 2045: +170 to +250%
- The Hamilton system demand switches to peaking in the winter from 2033
- Forecast anticipates significant electrification demand
- Strong growth throughout forecast due to City developments and increased requests for customer connections
- Short term demands have high certainty; long term demands are driven by long-term plans and trends with less certainty



Regional Electricity Needs

A Note on Planning Concepts

Capacity vs. Energy vs. Voltage	• Capacity represents the maximum amount of electricity that the system can supply in a point of time (measured in MW), energy (measured in MWh) represents the amount electricity provided over a period of time. Electricity is transmitted via different voltage levels (ranging from 13.8 to 500 kV) depending on the amount of electricity needed.
Peak demand	• Represents the highest levels of electricity consumption during specific periods of the year (i.e., summer, winter). This plays a very important role as there needs to be enough capacity to meet the highest level of demand.
Timing	• Near-term (2025 to 2030), medium-term (2031 to 2035) and long-term (2035+).
10 MW vs 100 MW	• 10 MW could power a university campus including dorms, classrooms and buildings, while 100 MW could power a substantial part of a city's infrastructure, including neighborhoods, commercial and public services. • 10 MW is significant but manageable, while 100 MW requires a number of solutions to meet the need.

Electricity Need Types

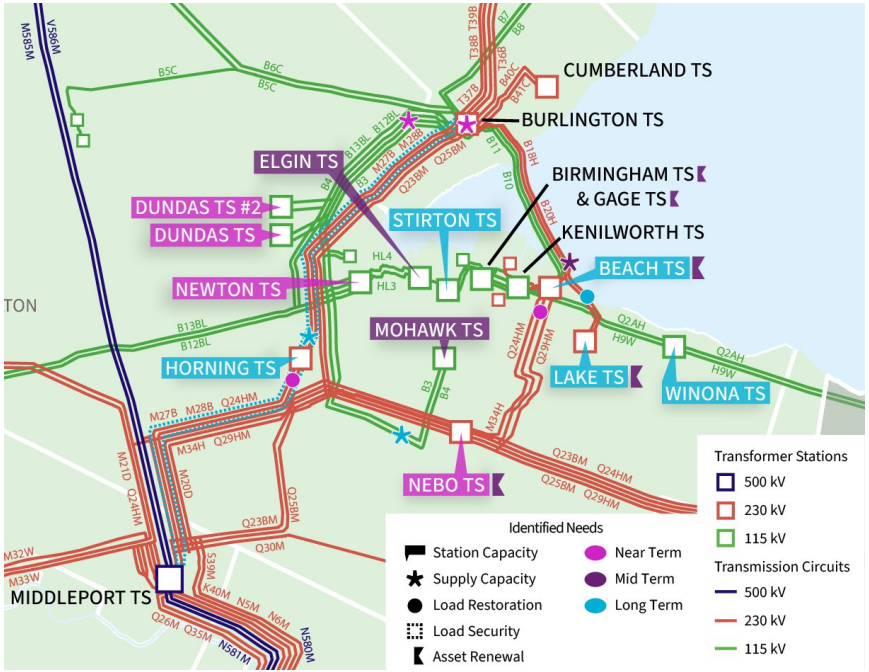
Generally, needs identified in this process fall under the following categories:

- **Station capacity:** Ability of a station to deliver power from the high-voltage grid down to the distribution system.
- **Supply capacity:** Ability of the transmission system to supply power through the transmission lines to a local area.
- **Load restoration:** Ability of the system to restore power after an interruption or loss of load.
- **Load security:** Maximum amount of power that can be interrupted following specific planning contingencies.
- **Asset renewal:** Station or transmission equipment replacement as determined by age and the assessed condition of the asset.

Electricity Needs in the Hamilton Area

Based on forecasted growth, the following needs have been identified for the reference forecast:

Timing	Need / Impacted Equipment*
Near-term	5 station capacity needs 2 supply capacity need 2 load restoration needs
Medium-term	2 station capacity needs 1 supply capacity need 5 asset renewal needs
Long-term	5 station capacity needs 2 supply capacity needs 1 load restoration need 1 load security need



*Note some stations include two DESNs. As a result, a count of needs on the map may appear less than what is shown in this table.

Needs Requiring Regional Coordination (1)

	Location of Need	Need Type	Forecast*			
			Low Need Year	Reference Need Year	High Need Year	Reference 2045 Size (MW)
1	Beach TS (T5/T6)	Station Capacity	2044	2040	2038	19
2	Dundas TS (T1/T2)	Station Capacity	2026	2026	2026	28*
3	Dundas 2 TS (T5/T6)	Station Capacity	2026	2026	2026	28*
4	Elgin TS (T5/T6)	Station Capacity	2034	2033	2032	129
5	Horning TS (T3/T4)	Station Capacity	2042	2040	2038	30
6	Lake TS (T1/T2)	Station Capacity	N/A	2042	2039	7

*Green MW refers to summer forecast, Blue MW refers to winter forecast

*Represents the MW need before offloading to the new station identified in the 2024 Burlington–Nanticoke IRRP, which reduces the need to zero post-2032.

Needs Requiring Regional Coordination (2)

	Location of Need	Need Type	Forecast*			
			Low Need Year	Reference Need Year	High Need Year	Reference 2045 Size (MW)
7	Mohawk TS (T1/T2)	Station Capacity	2038	2035	2032	46
8	Nebo TS (T1/T2)	Station Capacity	2026	2026	2026	125
9	Nebo TS (T3/T4)	Station Capacity	2026	2026	2026	34
10	New Dundas TS (230 kV)**	Station Capacity	N/A	N/A	N/A	381**
11	New Middleport TS**	Station Capacity	N/A	N/A	N/A	319**
12	New Steelport TS**	Station Capacity	N/A	N/A	N/A	351**

*Green MW refers to summer forecast, Blue MW refers to winter forecast

**For new stations, Need is N/A. Size refers to forecasted demand.

Needs Requiring Regional Coordination (3)

	Location of Need	Need Type	Forecast*			
			Low Need Year	Reference Need Year	High Need Year	Reference 2045 Size (MW)
13	Newton TS (T1/T2)	Station Capacity	2030	2030	2029	81
14	Stirton TS (T3/T4)	Station Capacity	2039	2038	2036	53
15	Winona TS (T1/T2)	Station Capacity	2039	2038	2036	38
16	B18H+B20H	Supply Capacity	2032	2032	2032	351
17	M27B+M28B	Supply Capacity	N/A	2040	2037	46
18	Brant Extended Area (B12BL,B13BL,B3,B4)	Supply Capacity	2026	2026	2026	145

*Green MW refers to summer forecast, Blue MW refers to winter forecast.
Supply Capacity needs were calculated using the summer forecast only.

Needs Requiring Regional Coordination (4)

	Location of Need	Need Type	Forecast*			
			Low Need Year	Reference Need Year	High Need Year	Reference 2045 Size (MW)
19	B3+B4 (Horning MT JCT to Mohawk TS)	Supply Capacity	N/A	2042	2038	7
20	Burlington TS Autotransformers	Supply Capacity	2026	2026	2026	149
21	B18H+B20H	Load Restoration (4 hr/0.5 hr)	2044	2041	2036	26/0
22	M27B+M28B	Load Restoration (4 hr/0.5 hr)	2030	2030	2030	601/501
23	Q24HM+Q29HM	Load Restoration (4 hr/0.5 hr)	2026	2026	2026	205/105
24	M27B+M28B	Load Security	2042	2040	2038	151

*Green MW refers to summer forecast, Blue MW refers to winter forecast.
Supply Capacity needs were calculated using the summer forecast only.

Needs Requiring Regional Coordination (5)

	Location of Need	Need Type	Timing	Description
25	Nebo TS (T3/T4)	End of Life	2030-2035	Transformer (T3/T4) refurbishment
26	Lake TS (T3/T4)	End of Life	2030-2035	DESN (T3/T4) refurbishment
27	Beach TS (T5/T6)	End of Life	2030-2035	DESN (T5/T6) refurbishment
28	Birmingham TS (T1)	End of Life	2030-2035	Transformer (T1) and MV metal clad switchgear refurbishment
29	Gage TS (T8/T9)	End of Life	2030-2035	DESN (T8/T9) refurbishment

Electricity Needs in the Hamilton Area

Significant and growing electricity needs across the region: 29 needs identified, including 17 related to station and supply capacity

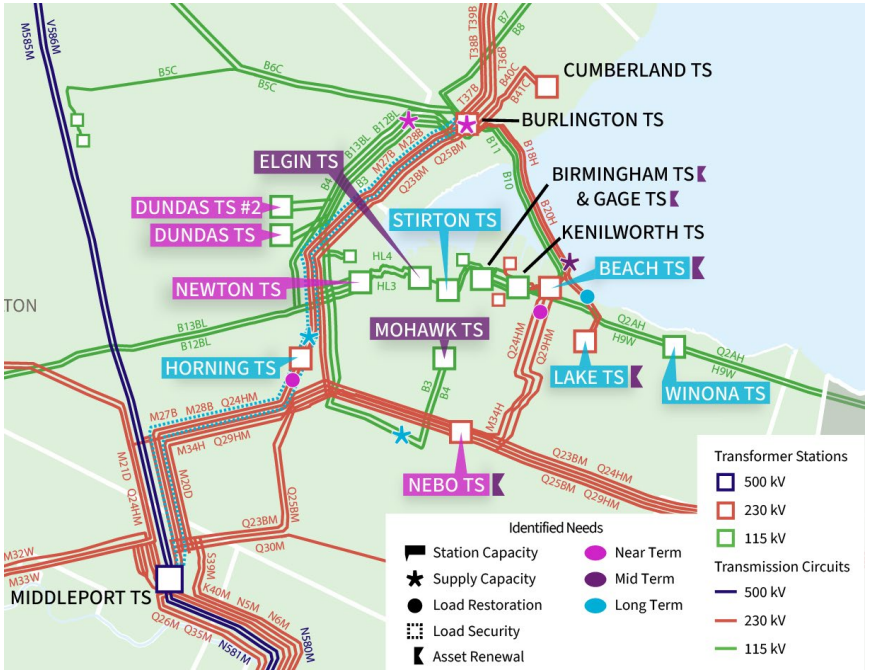
Urgent actions may be needed: over one-third of capacity needs are expected in the near term (2026–2030)

Large-scale infrastructure requirements: many of these needs are large in magnitude and will ultimately require wires-based solutions

Non-wires screened in for 2 needs: can defer needs up until the long term (~2035-2045)

Bayfront Industrial Area has largest and most complex needs concentrated here and multiple solutions are under active investigation in this area:

- Reinforcing transmission supply to Beach TS
- Expanding Beach TS
- Developing a new station in the area
- Investigating 2 additional stations nearby: Hamilton Airport close to Nebo TS and West Urban Hamilton close to Newton TS



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Options Screening

Background: 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 Technical Working Group will:

- **Screen various options** to address the region's near, medium and long-term electricity needs for the reference forecast, including:
  -  Traditional wires options to supply the local area
  -  Non-wires alternatives (NWAs), such as transmission-connected generation or energy storage, conservation and demand management, distributed generation or demand response
- **Complete a detailed analysis** of screened-in options to recommend solutions to meet needs.

The IESO will share the outcomes 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 address needs from the reference forecast and also consider options to address potential growth as part of the high electrification forecast to act quickly if/when higher growth materializes.

Key Considerations for Determining Options

Consideration	Key Details
Technical Feasibility	The Technical Working Group will screen all options, including wires and non-wires alternatives, with respect to established criteria and guidelines (e.g., ORTAC, Guide to Assessing Non-Wires Alternatives, etc.). Only options that can meet technical criteria will be considered further.
Economics	All technically feasible options are assessed for their cost-effectiveness. Typically, the options with the lowest net present value of annual net consumer costs are usually selected as the preferred recommendations in IRRPs. Preferred options that have similar economic performance would be subject to other considerations before arriving at a recommendation.
Timing	The IRRP recommendations will depend on timing of need and lead time of most appropriate solution. E.g., energy efficiency programs can be implemented quickly, while transmission reinforcement projects require 7-10 years.
Community Considerations	Community preferences and feedback regarding potential options, for example resiliency.

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).	Take into account local factors that may require further analysis of non-wire alternatives, even if earlier steps haven't identified non-wires alternatives as suitable.

Renewable Generation vs Wire-options

Renewables are infeasible for majority of the needs due to the land requirements to support the magnitude of needs identified. Station short circuit capacity also limits the quantity of distributed energy resources (DERs) which can connect.

- e.g. one of the identified needs at Mohawk TS will need an **additional 46MW by 2045** to meet electricity demand. Two options were screened:
  - Non-wire, renewable generation: would require 140 hectares of land for solar or 1600 hectares of land for wind. Additional battery storage (not estimated) would need to be combined.
  - Wire options: New substation in area to supply local customers.
- Considering the urban characteristic in areas with identified needs in the City of Hamilton, renewable generation has been screened out due to the significant land requirements.

Screening Results (Reference Forecast) (1)

Need Summary	Impacts	Screened In	Screened Out
Station Capacity	Elgin TS, Newton TS	• Non-wire alternatives (additional eDSM, demand response, distributed generation) to defer medium-term needs to long-term • Wires options for medium-to-long-term needs	• Transmission-connected resources, since they are upstream of the station • Non-wire alternatives for long-term needs due to the size of the needs
	All remaining stations with near-to-medium term needs	• Wires options	• Transmission-connected resources, since they are upstream of the station • Demand response and distributed generation, due to the size and/or urgency of the needs

Screening Results (Reference Forecast) (2)

Need Summary	Impacts	Screened In	Screened Out
Station Capacity	Remaining stations with only long-term needs	• Monitor needs and identify signposts	• Wires options • Non-wire alternatives due to long-term timing
Supply Capacity	B18H+B20H, Brant Extended Area (B12BL,B13BL,B3,B4), Burlington TS Autotransformers	• Wires options	• Transmission-connected resources and non-wires alternatives, due to size and urgency of the needs
	Remaining with only long-term needs	• Monitor needs and identify signposts • Wires options	• Wires options • Non-wire alternatives due to long-term timing

Screening Results (Reference Forecast) (3)

Need Summary	Impacts	Screened In	Screened Out
Load Restoration	M27B+M28B, Q24HM+ Q29HM	• Wires options	• Transmission-connected resources and non-wire alternatives, due to size and urgency of the needs
	B18H+B20H	• Monitor needs and identify signposts • Wires options	• Non-wire alternatives due to the size and long-term timing
Load Security	M27B+M28B	• Monitor needs and identify signposts • Wires options	• Transmission-connected resources, due to size and urgency of the needs • Non-wire alternatives, due to the type of the need

Electricity Investment Costs

Cost allocation for transmission investment is set by the Ontario Energy Board (OEB), using two key principles:

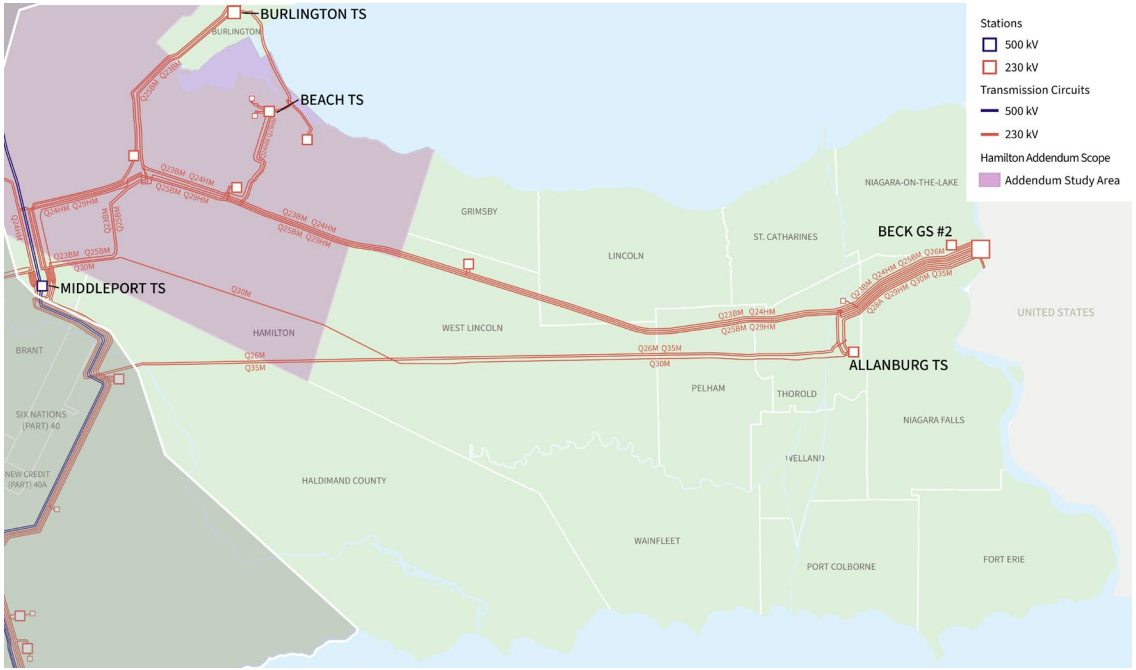
- Approved projects have to be "just and reasonable"
  - Reference forecasts are based on firm load forecasts to guide near- to medium-term investments, while additional growth scenarios are considered conditionally to avoid unnecessary costs for customers until demand materializes.
- Benefactor pays approach
  - Costs for dedicated connection facilities are paid by the connecting customer, while costs for shared network facilities are allocated across all ratepayers.

Through regional planning, the IESO forecasts future electricity demand, identifies regional needs, and compares potential solutions to recommend timely actions that deliver reliable, sustainable, and cost-effective electricity for the long term.

Niagara Bulk Plan

Niagara Bulk Plan

- Through bulk electricity planning studies, the IESO develops broader, provincial-scale system-level infrastructure plans to meet Ontario's future electricity needs.
- The IESO has launched a new bulk planning initiative for the Niagara Region and surrounding areas to address electricity demand growth and examine emerging needs.
- Outcomes of this plan will have a direct impact on the potential options that will be explored to address needs at the regional level for the Hamilton Area.
- The plan will be released in 2027.



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Co-ordinating with the Hamilton Area Addendum

- Given the interdependencies between the Hamilton Addendum and the Niagara Bulk Plan, the studies are being coordinated, with findings shared as planning progresses.
- This coordination will help ensure outcomes are aligned and options to address regional and broader system needs are coordinated.
- Registration details will be shared shortly for those interested in participating in the Niagara Bulk Plan Public Engagement Webinar.

Next Steps & Discussion

Next Steps

The IESO will continue to engage throughout the development of the Hamilton Addendum. Communities can expect to hear from the IESO at these milestones:

July 22, 2026: deadline for written feedback on the needs and options screening webinar.

Q3/Q4, 2026: Detailed options analysis and draft recommendations are presented in another targeted municipal meeting and public engagement webinar with an opportunity to provide feedback.

Q1 2027: Hamilton Area Addendum report and data tables will be completed and published on the engagement webpage.

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

- For wired 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, new resources will be procured through the IESO's Resource Adequacy Framework (e.g., competitive procurements), while new energy efficiency programs would be implemented through the IESO's Conservation and Demand Management Framework.

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
- Additional information that should be considered in the assessment of these options
- Additional information that should be provided in future engagements to help understand perspectives and insights

IESO welcomes written feedback until July 22, 2026.
Please submit feedback to engagement@ieso.ca using feedback form.

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 Burlington to Nanticoke

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Thank You

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