



AUGUST 8, 2024

Windsor-Essex Regional Electricity Planning

Engagement Webinar #2 Needs and Potential Options

Agenda

1. Ontario's Electricity Sector and IESO's Role
2. Recap: Regional Electricity Planning Process & the Demand Forecasts
3. Electricity Needs
4. Screening Potential Options
5. Discussion & Next Steps



We work with:



Seeking Input: Regional Planning

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

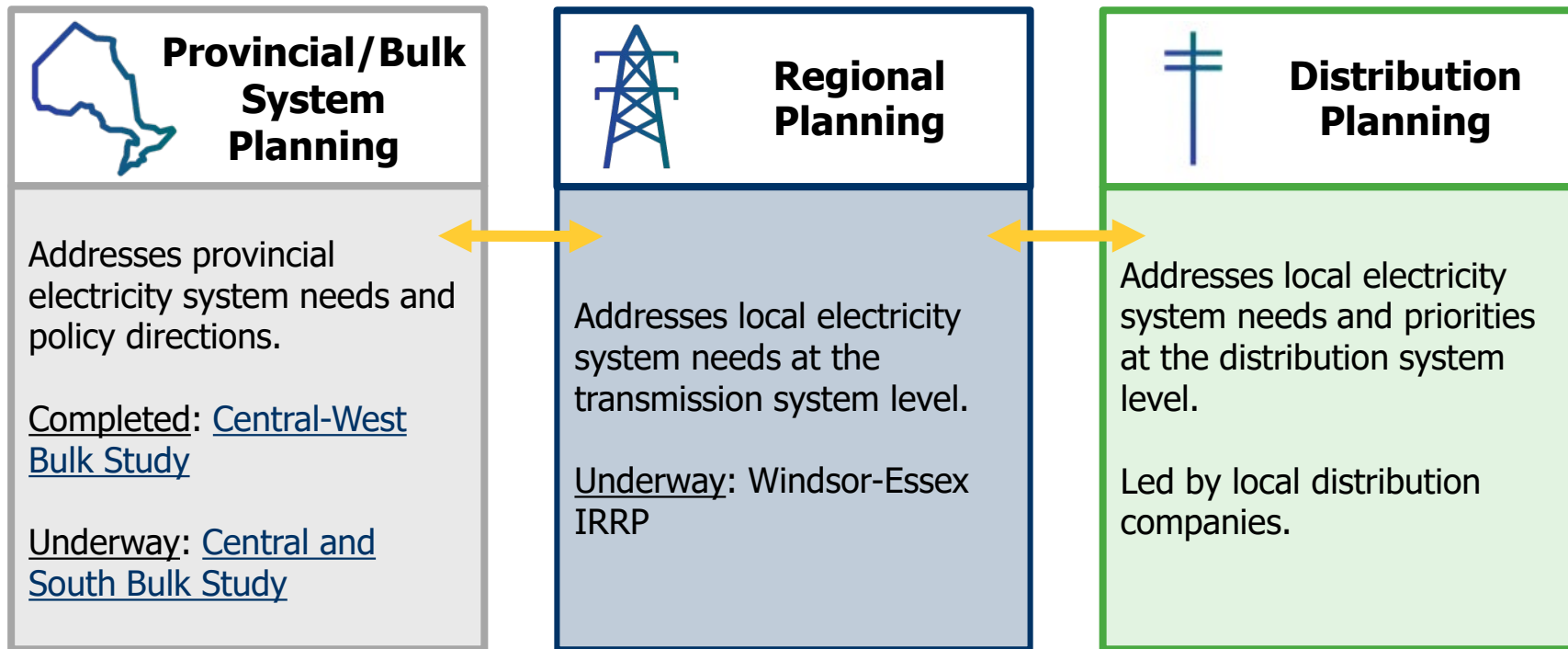
- Perspectives regarding the high-level wire and non-wire options screening
- Additional information that should be considered in the assessment of these options
- Additional information that should be provided in future engagements to help understand perspectives and insights

IESO welcomes written feedback until August 29. Please submit feedback to engagement@ieso.ca.



Recap: Regional Electricity Planning Process & the Demand Forecasts

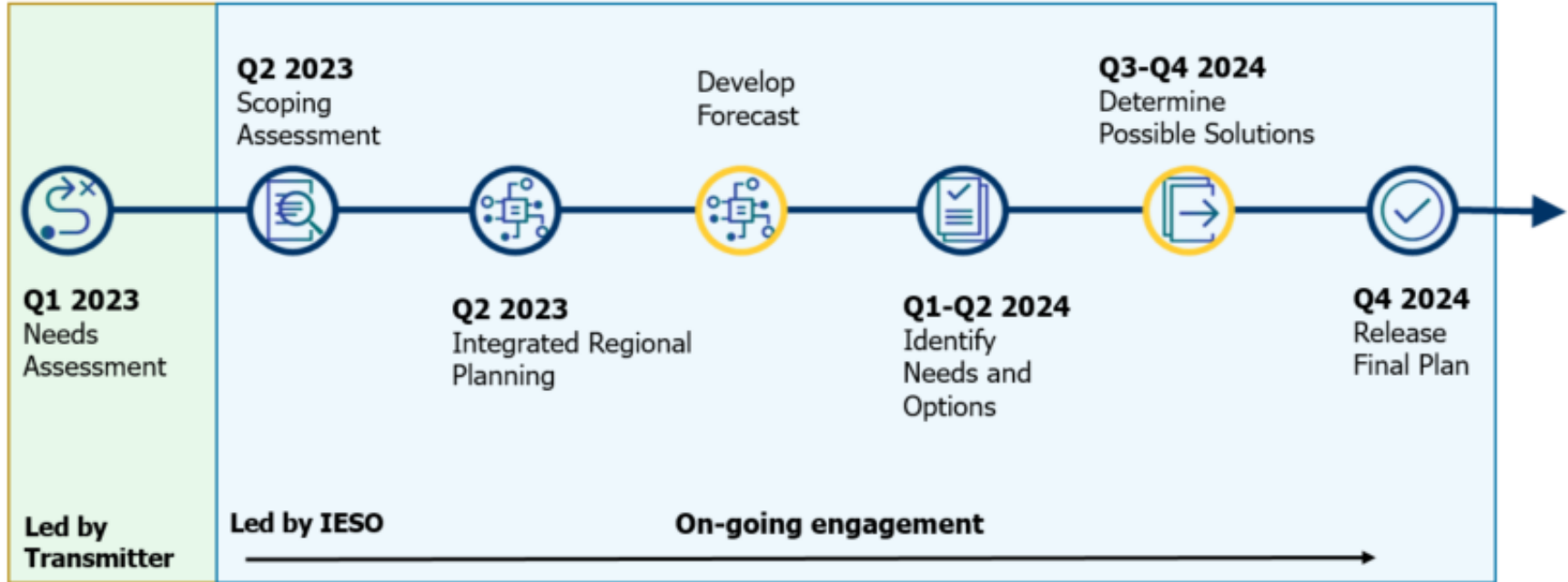
Electricity Planning in Ontario



Electricity Planning in Windsor-Essex

- Since 2018, the IESO has undertaken significant planning work to address capacity needs to the Windsor-Essex electrical area.
- Recommendations included bulk transmission to increase bulk transfer capacity by 1,800 MW (in-service between 2022-2030), multiple new supply stations, 550 MW of local generation (successfully procured 800 MW) and targeted funding for energy efficiency and innovation projects.*
- The IESO is expecting electricity demand in the Windsor-Essex region to more than double over the next 20 years, being driven largely by agricultural and industrial growth.
- A new South and Central bulk study will determine transmission needs required to enable economic development between the Hamilton and Windsor areas.
- The third regional electricity plan, or Integrated Regional Resource Plan (IRRP), for the Windsor-Essex area 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 Windsor-Essex



Components of a Regional Plan



Demand Forecast

How much power is needed over the planning timeframe?



Needs

What needs are emerging in the region that need to be addressed?



Potential Solutions

What kinds of solutions can meet the future needs for the region?

Recommendations

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:

Two scenarios have been developed for Windsor-Essex, accounting for impacts of existing demand side management programs, planned distributed generation, and extreme weather conditions in the electricity demand forecast:

- **Reference scenario** includes firm loads (current and planned), organic growth, residential, electrification and energy plans, greenhouse and industrial growth etc.
- **High scenario** incorporates potential demand growth that is less certain, in terms of timelines, magnitude and location, plus reference scenario

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

Forecast will drive recommended solutions: Reference forecast will drive firm near- and mid-term recommendations. High forecast will be used to outline a plan based on load thresholds rather than need years, direct early development work, and identify sign-posts to trigger further investments.

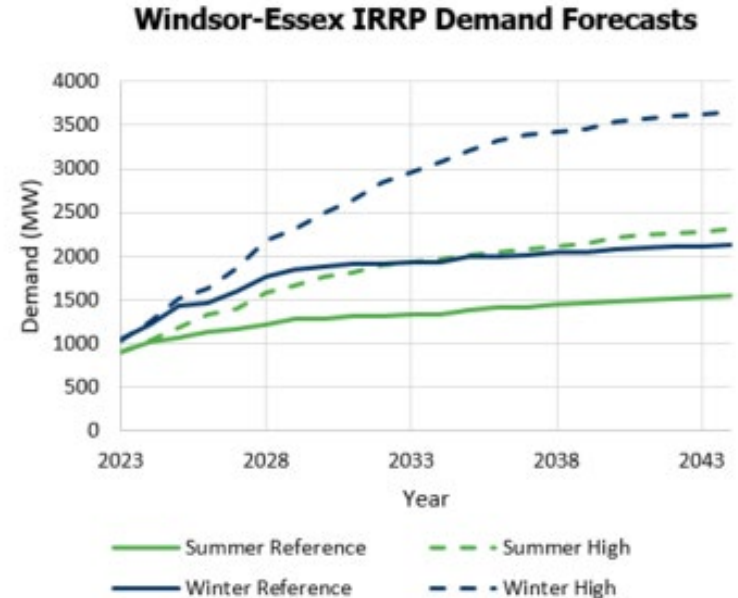
Feedback Received

| Key Areas of Feedback | Incorporating Feedback |
|--|---|
| Considering future growth and identifying milestones for investments is very important | <ul style="list-style-type: none">✓ Recommend options that consider firm growth to meet needs and set up the system to be able to more quickly respond when higher growth materializes.✓ Identify signposts that may trigger additional investments in response to high growth, and potential solutions to address them. |
| Ensuring energy transition and electrification is considered | <ul style="list-style-type: none">✓ Electrification and energy plans have been incorporated by each local distribution company, and specific inputs shared by municipalities have been considered by the Technical Working Group. |
| Distribution reliability is a concern | <ul style="list-style-type: none">✓ The local distribution companies will work with municipalities to address concerns.✓ The Technical Working Group will consider how these concerns impact the regional system during the needs identification stage of the regional plan. |
| Share additional information | <ul style="list-style-type: none">✓ Data, assumptions and the methodology used to develop forecast models and conduct analyses will be included in the final electricity plan – Integrated Regional Resource Plan (IRRP) report, and shared at appropriate planning milestones. |

Final Demand Forecasts

Key takeaways:

- Windsor-Essex demand could double by 2043, with an average annual growth rate of 9% in the near-term – Ontario electricity demand growth rate is 2% by 2050.
 - Summer demand is driven by industrial growth.
 - Winter demand is compounded by greenhouse growth, cementing this region as winter-peaking.
- Reference forecast is tempered relative to previous cycle of regional planning, as connection costs are putting downward pressure on customer commitment.
- High forecast is still aligned with previous cycle of regional planning, driven by potential growth in the greenhouse sector and surge in potential industrial growth.





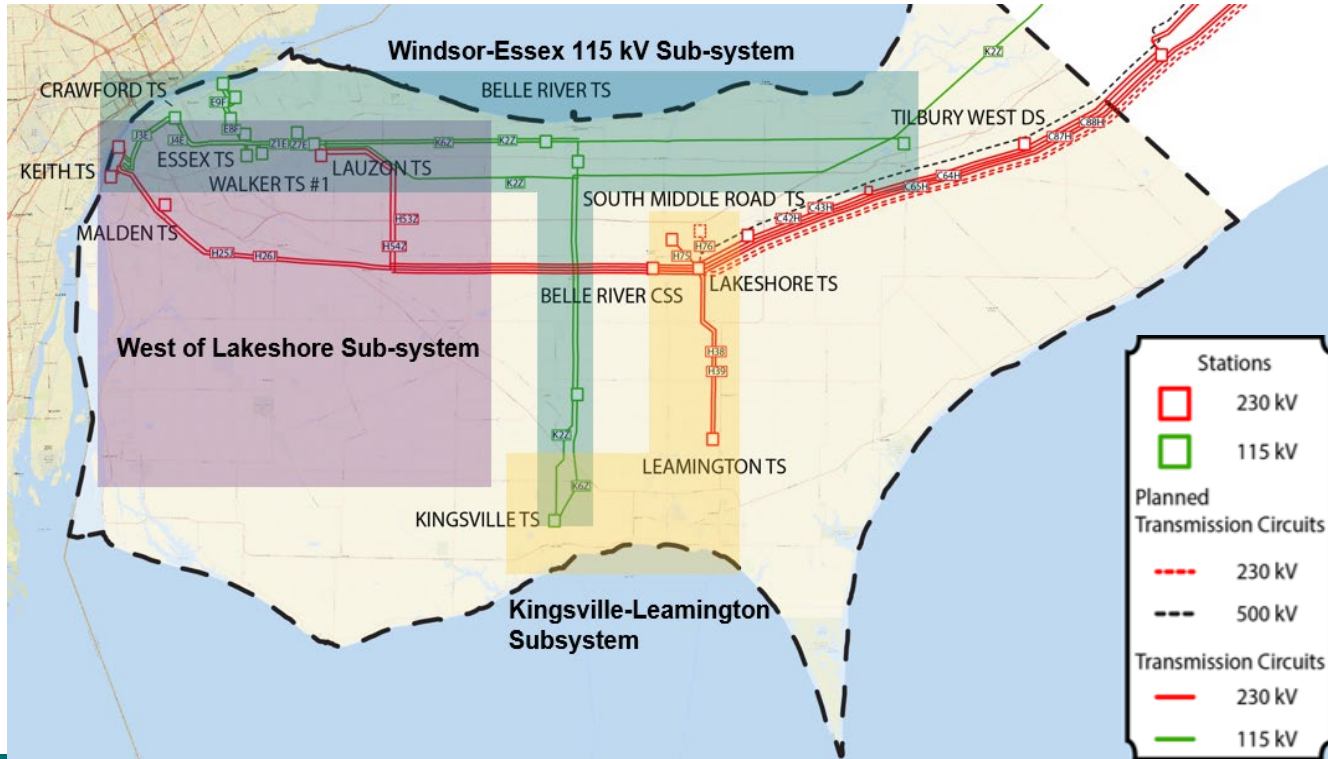
Electricity Needs

Identifying Needs

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

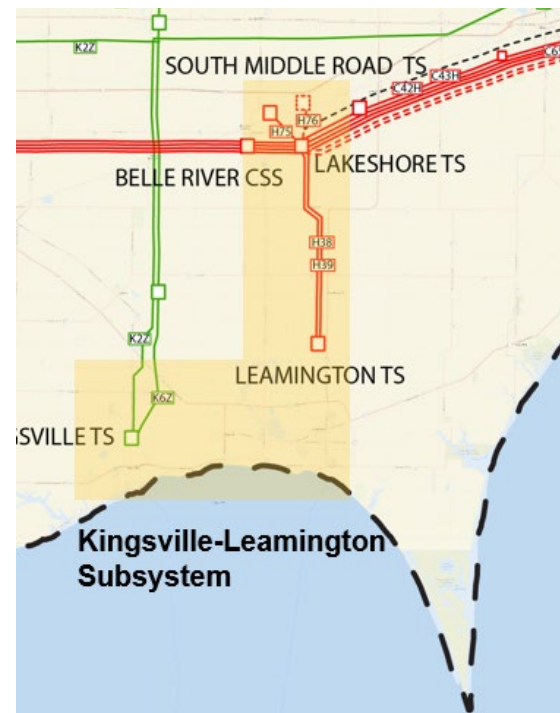
- **Station capacity:** Ability of a station to deliver power from the grid down to the distribution systems.
- **Supply capacity:** Ability of the system to supply power through the transmission lines to a local area.
- **Asset replacement:** Station or transmission equipment has reached end of life.
- **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.

Identified Sub-systems with Infrastructure Needs



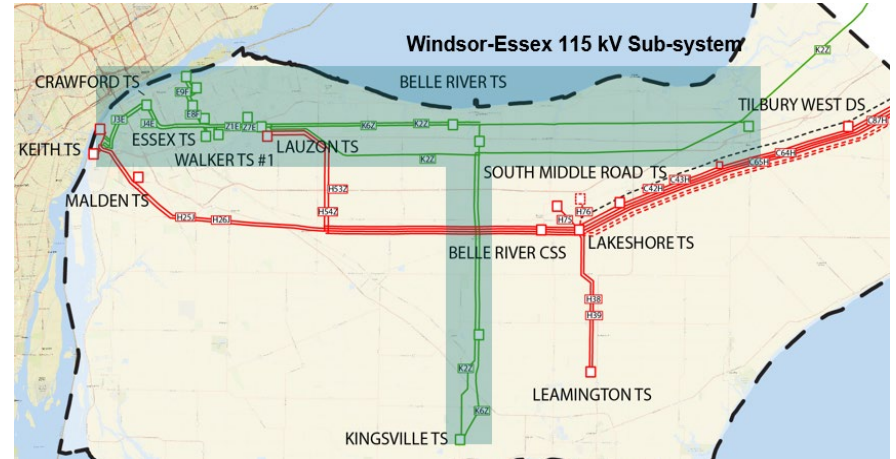
Reference Needs – Kingsville-Leamington Sub-system

| Need Type | Impacts | Need Timing |
|--|---|-----------------------|
| Station Capacity Ability of a station to deliver power from the grid to the distribution system. | Growth across the Kingsville-Leamington sub-system, including new greenhouse developments | Near-term (1-5 years) |
| Load Restoration Ability of the system to restore power after select contingencies. | 230-kV circuits south of Lakeshore | Immediate |
| | South Middle Road transmission station (TS) | Immediate |



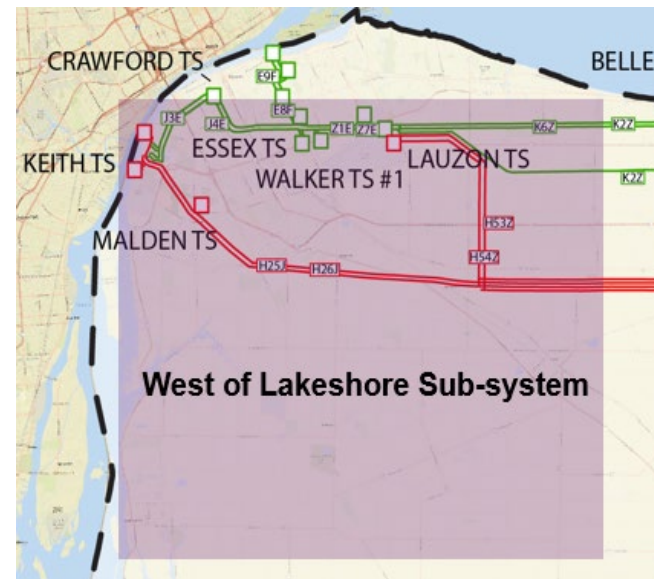
Reference Needs – Windsor-Essex 115-kV Sub-system

| Need Type | Impacts | Need Timing |
|---|--|-----------------------|
| Station Capacity Ability of a station to deliver power from the grid down to the distribution system. | Tilbury West Distribution Station (DS) | Long-term (11+ years) |
| | Belle River transmission station (TS) | Immediate |



Reference Needs – West of Lakeshore Sub-system

| Need Type | Impacted Equipment | Need Timing |
|---|--|--------------------------|
| Asset replacement Transmission equipment has reached end of life. | Lauzon transmission station (TS) (DESN2) | Medium-term (6-10 years) |
| Station Capacity Ability of a station to deliver power from the grid to the distribution system. | Lauzon TS (DESN2) | Medium-term (6-10 years) |
| | New industrial developments | Near-term (1-5 years) |
| Supply Capacity Ability of the system to supply power through the transmission lines to a local area. | 230-kV system west of Lakeshore | Medium-term (6-10 years) |

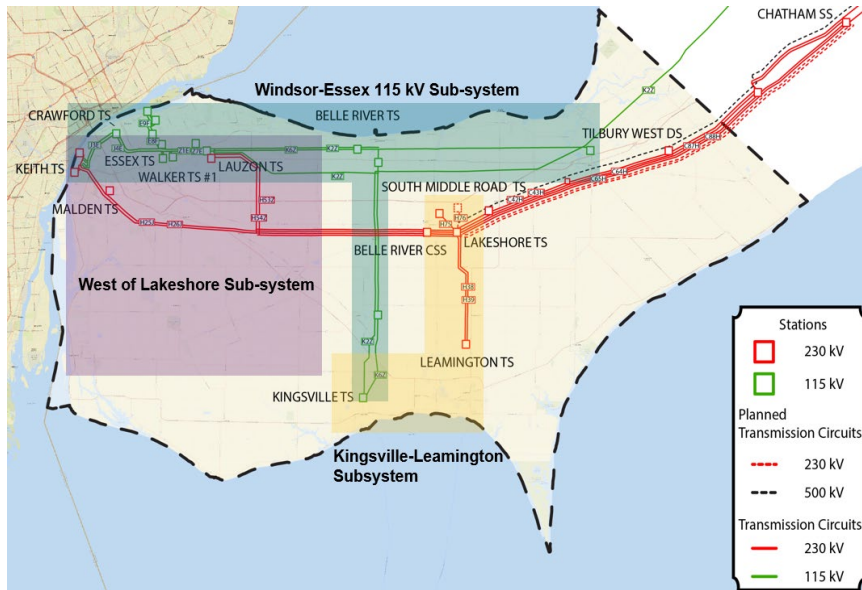


Needs – High Forecast

| Need Type | Sub-system | Impacts | Need Timing – High* | Need Timing – Reference |
|---|----------------------|---|---------------------|-------------------------|
| Station Capacity Ability of a station to deliver power from the grid down to the distribution system. | West of Lakeshore | Lauzon TS (DESN 2) | Near-term | Medium-term |
| | | Keith TS | Medium-term | None |
| | | Malden TS | Long-term | None |
| | | Walker Municipal Transformer Station (MTS) #2 | Long-term | None |
| | Windsor-Essex 115 kV | Tilbury West DS | Medium-term | Long-term |
| Supply Capacity Ability of the system to supply power through the transmission lines to a local area. | West of Lakeshore | West of Lakeshore 230 kV system | Near-term | Medium-term |
| | Windsor-Essex 115 kV | Windsor-Essex 115 kV system | Medium-term | None |

*Only needs not found in Reference forecast or with an accelerated Need Timing are listed.

Summary of Approach to Meet Needs



Recommended bulk transmission investments to date ensure sufficient supply to the region for the next 20 years.

Considering the forecasted and potential growth, the IESO plans reinforcement to set up the system to be able to more quickly respond when higher growth materializes, specifically:

- Reference forecast will drive firm near- and mid-term recommendations.
- High forecast will be used to establish plan based on load thresholds rather than need years, direct early development work, and identify sign-posts to trigger further investments.



Preliminary Wire and Non-Wire Options

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 (NWA), 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.

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

Evaluate the compatibility of the need with the various option types, based on technical requirements and permissibility under planning standards and criteria.

2. Need Traits

Further filter compatible options with high-level need traits (such as timing, size, and coincidence with system needs).

3. Additional Considerations

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.

Screening Results – Kingsville-Leamington Sub-system (Reference Forecast)

| Need Summary | Screened In | Screened Out |
|---|--|--|
| <p>Station capacity needs are considered in combination with new greenhouse developments.</p> | <p>Energy efficiency, demand response and wire options (such as new supply stations and connection lines, as previously recommended).</p> | <ul style="list-style-type: none"> • Distributed generation is not technically feasible at these stations. • Transmission-connected generation does not address the station capacity need. |
| <p>Load restoration needs at Lakeshore transmission station (TS) and South Middle Road TS.</p> | | <ul style="list-style-type: none"> • Non-wire alternatives are not technically feasible for load security or restoration needs, as explored in the 2021 Addendum study. |

Screening Results – Lakeshore 115-kV Sub-system (Reference Forecast)

| Need Summary | Screened In | Screened Out |
|---|--|--|
| <p>Station capacity needs at Tilbury West distribution station (DS) and Belle River transmission station (TS).</p> | <p>Distributed generation, energy efficiency, and wires options (such as load transfers and transformer upgrades and/or a new transformer station).</p> | <ul style="list-style-type: none">• Transmission-connected generation does not address the station capacity need as it is upstream of the limitation.• Demand response would require a significant portion of the primarily residential load to reduce energy consumption for up to 4-7 hours for consecutive days. |

Screening Results – West of Lakeshore Sub-system (Reference Forecast)

| Need Summary | Screened In | Screened Out |
|---|---|---|
| Asset replacement and station capacity needs at Lauzon transmission station (TS) (DESN2). | Wires options (such as transformer upgrades and/or a new transformer station). | <ul style="list-style-type: none">• Non-wire alternatives were screened out because combined with the asset replacement need, there is high potential for an inexpensive wire alternative. |
| Supply capacity needs for the 230-kV system west of Lakeshore and new industrial developments. | Transmission-connected generation, energy efficiency, and wires options (such as circuit upgrades or new circuits, leveraging the Order in Council for reinforcement). | <ul style="list-style-type: none">• Distributed generation is encompassed by assessing transmission-connected generation, while demand response has not been successfully demonstrated with industrial customers. |

High Forecast Considerations

- Indicates the need for additional station capacity needs in the Kingsville-Leamington if agricultural load growth in the region accelerates, which will depend on the location of growth.
- Further transmission line reinforcements or local generation West of Lakeshore may be needed to enable additional industrial load growth.
 - Flexibility of options to address the West of Lakeshore supply need emerging in the Reference forecast will be important to address further load.
 - A corridor study may be needed to identify potential paths to bring more transmission into the Windsor area.

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 August 29.

Please submit feedback to engagement@ieso.ca using feedback form.

Electricity Investment Costs

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

1. Approved projects have to be “just and reasonable”
 - Firm loads will drive near-term expenditures
 - Other scenarios will be used to develop plans for additional growth, but conditional on the load materializing, so as to not overburden the customers ahead of commitments
2. Benefactor pays approach
 - Costs associated to connection facilities are allocated to the connecting customer since they are dedicated to one or a small group of customers
 - Costs associated with network facilities are typically allocated to all ratepayers since they form part of a transmission system that is shared by all users



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 Windsor-Essex Region



Follow the Windsor-Essex 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:

- High-level wire and non-wire options screening
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Next Steps

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

August 8, 2024: Needs and potential options presented in a public engagement webinar.

August 29, 2024: Deadline for feedback to the IESO on needs and potential options.

Fall 2024: Options analysis and draft recommendations are presented in a public engagement webinar with an opportunity to provide feedback and conduct targeted engagements.

Q4 2024: 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 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](#).



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 Windsor-Essex 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

Team Lead,
System Operator

- Independent Electricity System Operator

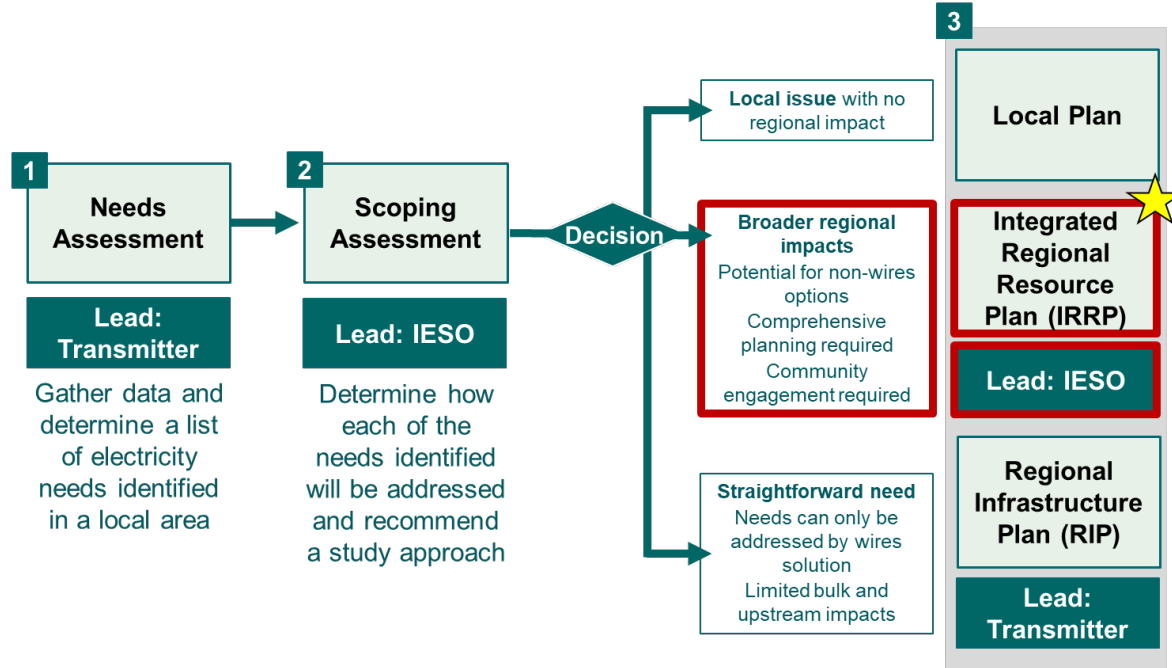
Lead Transmitter

- Hydro One Networks Inc. (Transmission)

Local
Distribution
Companies

- EnWin Utilities Ltd. (“EnWin”)
- Essex Powerlines Corporation
- E.L.K. Energy Inc.
- Entegrus Inc.
- Hydro One Networks Inc. (Distribution)

Determining the Need for an IRRP



Previous Regional Planning Cycle for Windsor-Essex

2019 Windsor-Essex electricity plan – Integrated Regional Resource Plan (IRRP) – recommended a number of actions to address emerging needs

| Recommendation | Status |
|---|---|
| IESO Grid Innovation Fund targeted call for indoor agriculture projects | On-going support provided between 2020 – 2023 |
| LED Incentive for greenhouses | On-going program until 2024 |
| Upsize Keith T11/T12 end-of-life 230/115 kV autotransformers | Expected in 2023 |
| Upsize Lauzon T5/T6 end-of-life stepdown transformers | Expected in 2026 |
| Decommission Keith TS end-of-life T1 (115 kV/27.6 kV) transformer | Complete |
| Two new supply stations connected to Lakeshore TS, South Middle Road DESN 1 & 2 | DESN 1 in-service in 2022; DESN 2 expected in 2025 |

Other Planning Recommendations

| Plan | Recommendation | Status |
|----------------------------------|---|-----------------|
| 2019 Windsor- Essex Bulk Plan | Leamington SS | In-service 2022 |
| | Chatham-to-Leamington double 230 kV circuit | Expected 2025 |
| 2021 West of London Bulk Plan | Lambton-to-Chatham double 230 kV circuit | Expected 2028 |
| | Initiate bilateral negotiations for Brighton Beach GS | On-going |
| | Longwood-to-Lakeshore single 500 kV circuit | Expected 2030 |
| | 550 MW of new or existing local resources | On-going |
| 2022 Windsor- Essex Addendum | Two new DESNs, connection lines to Lakeshore and option for tie line between Leamington and new DESNs | On hold |
| | Transfer excess Kingsville load to new DESNs | On hold |
| | Engage with customers on cost-justified measures for load restoration | On hold |