SEPTEMBER 25, 2025

Toronto Regional Electricity Planning

Webinar #4 – Options Analysis and Draft Recommendations

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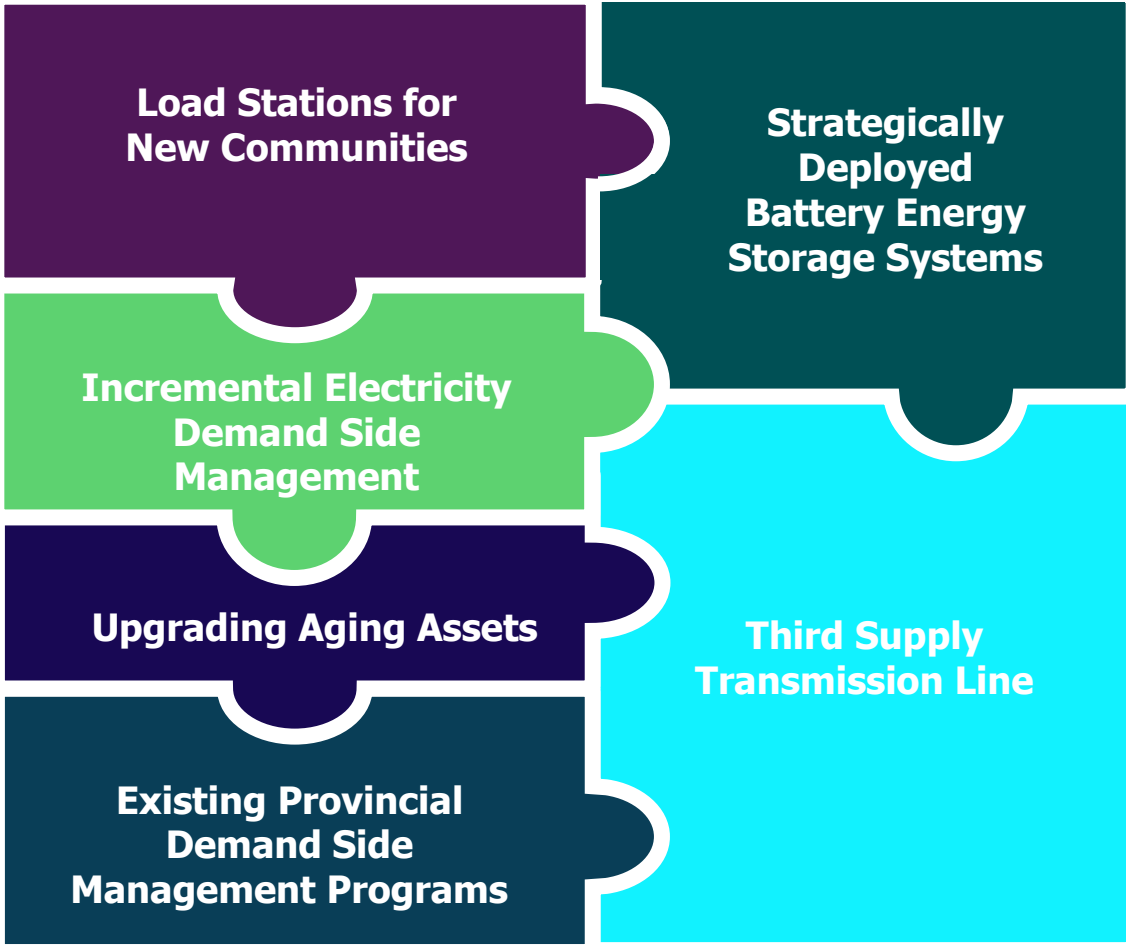
Traditional Territory Acknowledgement

The IESO acknowledges that Toronto is the traditional territory of many nations, including the Mississaugas of the Credit, the Anishnabeg, the Haudenosaunee and the Wendat peoples, and is now home to many diverse First Nations, Inuit and Métis peoples.

We also acknowledge that Toronto is covered by Treaty 13 signed with the Mississaugas of the Credit First Nation, and the Williams Treaties signed with seven First Nations.

Meeting Toronto's Regional Electricity Needs



Agenda

1. Ontario's Electricity Sector and the IESO's Role
2. Local Achievable Potential Study Update
3. Recap: Overview of Demand Forecasts, Electricity Needs, Options Screening and Feedback Received
4. Options Analysis and Draft Recommendations
5. Next Steps & Discussion

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

<<< **Communities** >>>

Executive Summary

- **Electricity demand is expected to grow by 70% to 100% in Toronto by 2044**, driven by urban development (housing, commercial), new economic development around digitization/data centres, and climate action (policy and consumer-driven electrification of heating and transportation).
- Several electricity system reliability needs arise from demand exceeding the capacity of transmission stations and lines that serve customers across the City of Toronto. Large scale wire solutions will be needed, including a third supply into Toronto, to meet this growth and ensure reliability of electricity supply.
- A **detailed options analysis was completed** to identify a draft set of integrated planning recommendations that will ensure that Toronto can grow and maintain a reliable system.
- The plan recommends a mix of new large-scale transmission infrastructure, battery energy storage systems, upgrades to existing infrastructure and incremental electricity Demand Side Management (eDSM), including residential solar/storage systems. Among the plan's draft recommendations is a strong call to action for customers to participate in eDSM and Distributed Energy Resources (DER) program opportunities.
- **Together, these solutions form an integrated approach to improve reliability and resilience, while meeting growing Toronto's electricity needs.** Your input will help ensure that local perspectives and relevant information are considered as the IESO finalizes the Integrated Regional Resource Plan (IRRP).

Seeking Input

Today the IESO is seeking feedback on the following components of the Plan:

- What feedback is there on the proposed recommendations?
- What information needs to be considered with respect to implementing these proposed recommendations?
- How can the IESO continue to engage as these recommendations are implemented, or to help prepare for the next planning cycle?

IESO welcomes written feedback until October 9, 2025.

Please submit feedback to engagement@ieso.ca.

Local Achievable Potential Study Update

Recap: Local Achievable Potential Study (1/2)

- Building on the previous success of the IESO and Toronto Hydro initiatives, the Local Achievable Potential Study (L-APS) will identify how much incremental energy efficiency, load flexibility, and behind-the-meter distributed energy resources (DERs) can be cost-effectively implemented above and beyond what is already included in the IRRP's demand forecasts.
- The IESO retained consultant ICF to deliver the study.
- Toronto Hydro provided support to the IESO with respect to the characteristics of the city's built environment, its electricity distribution system and the IRRP's demand forecasts.
- The results from the L-APS will be used to inform the Toronto IRRP's recommendations regarding using incremental electricity demand-side management to reduce or delay electricity needs.

- Measures in scope include:
  - **Behind the Meter Distributed Energy Resources (DERs)*** including battery storage and solar.
  - **Energy efficiency** measures including heat pumps, HVAC, lighting, appliances, weatherization, and hot water.
  - **Demand Response** including EV charging, HVAC equipment, and water heaters.

*Front-of-meter DERS – including utility-scale solar, wind, and battery storage – are considered separately as solutions in the Toronto regional planning process. See the IESO's July 10 webinar materials on Toronto IRRP Options Screening for more information.

Recap: Local Achievable Potential Study (2/2)

- The IESO presented the draft results of the study at the August 21 engagement webinar.
- Participants sought more details on the methods, input assumptions, and results.
- IESO subsequently posted the study's draft report, a variety of supporting appendices, and data tables to provide more information, and extended the deadline for feedback to provide stakeholders additional review time.

Draft eDSM Achievable Potential in 2045	**Planned eDSM in IRRP forecasts in 2045**	**Estimated incremental opportunity in 2045**
1,066 MW summer 805 MW winter	847 MW summer 757 MW winter	250 MW summer 50 MW winter

How Feedback has been Considered in L-APS (1/4)

Key Areas of Feedback	Incorporating Feedback/Considering Feedback
The LAPS should consider District Energy Systems and front-of-meter wind, solar, and battery	As previously communicated, the potential for District Energy Systems and front-of-meter wind, solar, and batteries to contribute to meeting regional needs is explored in the Toronto IRRP process, but outside of the eDSM-focused Local Achievable Potential Study.
Customer program participation assumptions are too conservative	The IESO has directed ICF to revise customer participation curves to better reflect the historic success of eDSM programming, strong local support, and continued investment in program marketing while remaining defensible. The changes will be reflected in the final achievable potential results.
Comparison of draft results with results of other APS	While caution must be exercised in comparing results across potential studies with different scenarios and input assumptions, comparison of ICF's L-APS draft results with results from the most recent provincial EE and DER potential studies confirms the L-APS draft estimates of achievable potential are of similar magnitude. The Toronto planning region represents approximately 20% of provincial load. Scaling the provincial achievable potential results from Guidehouse's 2022 EE potential study produces 672 MW vs. 578 MW from the draft L-APS results in 2042 (the final year of the provincial EE study). Similarly, scaling the provincial achievable results for included behind-the-meter DER and DR measures from Dunsky's 2022 DER potential study results (under the BAU+ scenario) produces 349 MW vs. the 396 MW from the draft L-APS results in 2032 (the final year of the provincial DER study).

How Feedback has been Considered in L-APS (2/4)

Key Areas of Feedback	Incorporating Feedback/Considering Feedback
Analysis should assume declining DER technology costs over time	The L-APS analysis reflects effects of declining costs for DER technologies over time.
The L-APS cost-effectiveness testing should consider local health/economic/climate benefits of additional eDSM investment	EDSM programs in Ontario are required to meet industry-standard cost-effectiveness tests that ensure that programs deliver greater benefits than costs to the ratepayers funding them. Aligning the L-APS economic analysis with these tests, specifically the Program Administrator Cost test, helps ensure that there is a clear pathway to pursue additional eDSM potential identified through the study.
Detail provided on methods, assumptions, and results	Since the August 21 webinar, the IESO has published a variety of supplementary information to provide more details on methods, assumptions, and draft results for stakeholder review. IESO will work to include additional information and data as appropriate in the final report, including on the impacts of the individual steps to arrive at the final solar PV achievable potential

How Feedback has been Considered in L-APS (3/4)

Key Areas of Feedback	Incorporating Feedback/Considering Feedback
Comparison with potential estimates of other parties	As general practice, the IESO does not comment on analysis produced by other parties. In comparing the results of the L-APS with analysis produced by other parties it is important to consider that: 1. Reflecting current policy and the implementation mechanisms available to the IESO, the L-APS is intended to provide a credible estimate of the peak demand savings that could be acquired through **voluntary** customer participation in cost-effective eDSM incentive programs. Estimated potential will naturally be lower than analysis that assumes **mandatory** customer installation of solar PV (or other eDSM actions), ignores cost considerations, etc. 2. "Nameplate" capacity values are not relevant for planning purposes as they do not represent energy production during the peak periods that drive needs (e.g. 100 MW or 1000 MW of solar PV will both have very limited impact on meeting energy needs on winter evenings) 3. The L-APs results do not include potential from front-of-meter generation and storage resources, or district energy systems.

How Feedback has been Considered in L-APS (4/4)

Key Areas of Feedback	Incorporating Feedback/Considering Feedback
Exclusion of Vehicle-to-Grid/Building (V2G/B)	The IESO has provided a detailed explanation of why V2G/B is not considered a viable non-wires option in the memo posted on the Toronto IRRP engagement page. The IESO acknowledges the variety of V2G/B research and demonstration activity taking place across North America and internationally, including projects supported by the IESO's Grid Innovation Fund. However; as detailed in the memo, given the current status of the technology and programs, the IESO does not have confidence that V2G/B could be credibly modelled in the L-APS, and more fundamentally, does not have confidence that a that program of meaningful scale could be delivered cost-effectively in the near-term.

L-APS Next Steps

- The IESO is working to publish a more comprehensive response to written feedback.
- Consultant ICF is currently updating the L-APS modelling based on feedback from stakeholders and additional review by the IESO.
- The model updates are expected to have a relatively modest impact on overall achievable potential.
- The updated results will be presented in the final report to be posted on the Toronto IRRP engagement page.

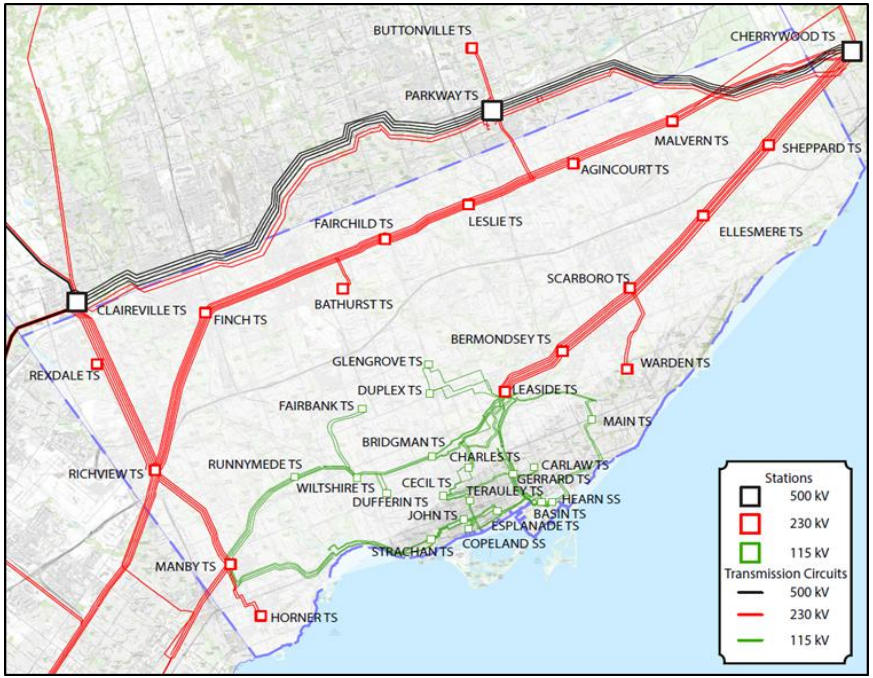
Recap: Overview of Demand Forecasts, Electricity Needs, Options Screening and Feedback Received

Regional Electricity Planning for Toronto

Regional planning aims to ensure access to affordable and reliable electricity across Ontario, considering the unique needs of each region, and a range of integrated resource options.

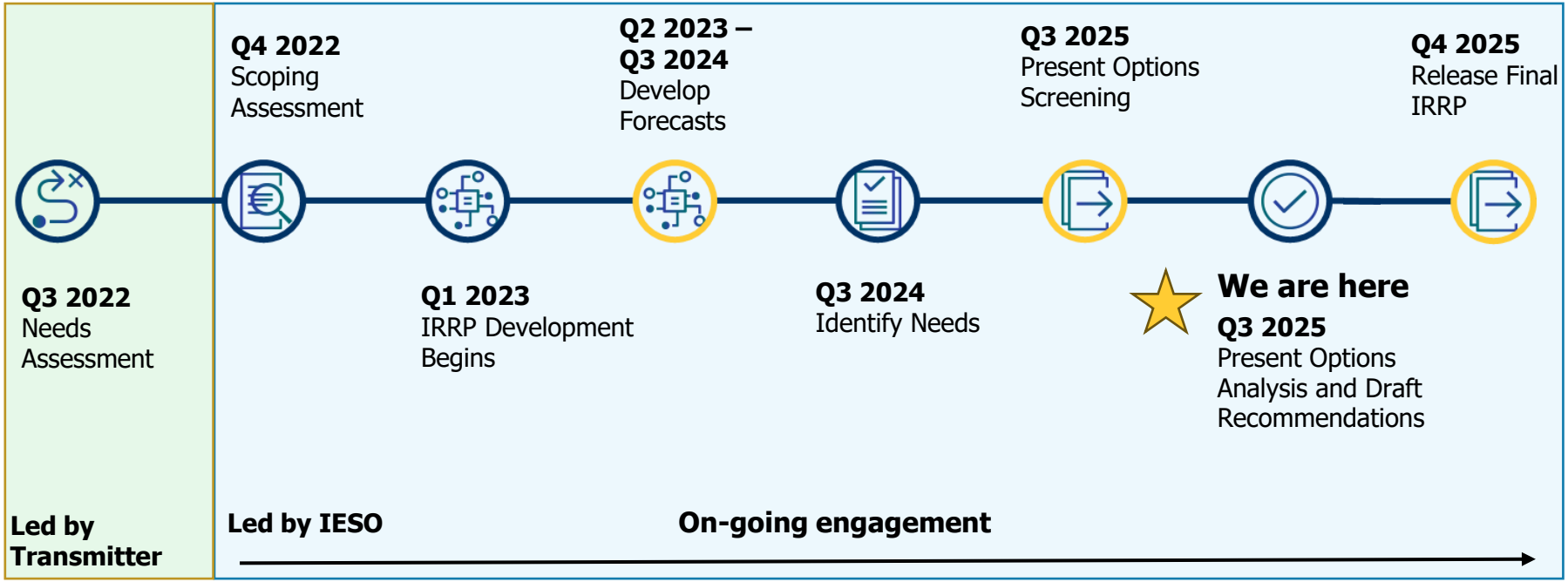
Regional planning is completed at regular intervals to ensure that planning is flexible and responsive to a range of uncertain future outcomes, and to support timely decision-making for both short and long lead-time solutions.

The IRRP for Toronto is being informed by a Technical Working Group with Hydro One Networks Inc., and Toronto Hydro-Electric System Ltd., coordinated by the IESO.



Map: Electricity Infrastructure Supplying Toronto

Regional Planning Timeline



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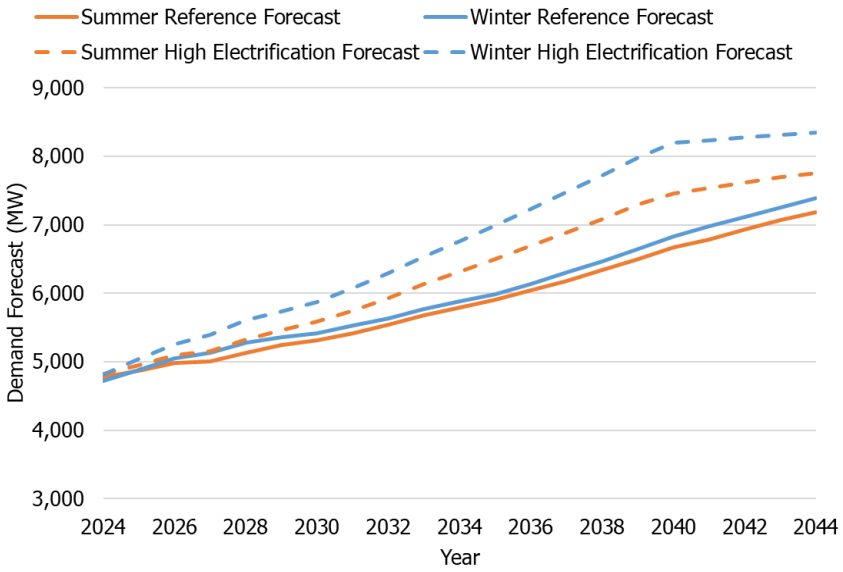
Recap: Electricity Demand Forecast for Toronto

- Toronto's electricity demand could increase **70% to 100% by 2044** (reference case and high-electrification), driven by economic development, intensification and electrification.
- Forecasts consider climate, economy, electrified heating and vehicle load and data centres, firm customer connection requests, with consideration for load transfers between step-down stations.
- The outlook for demand continues to be monitored and will be evaluated annually following the IRRP.

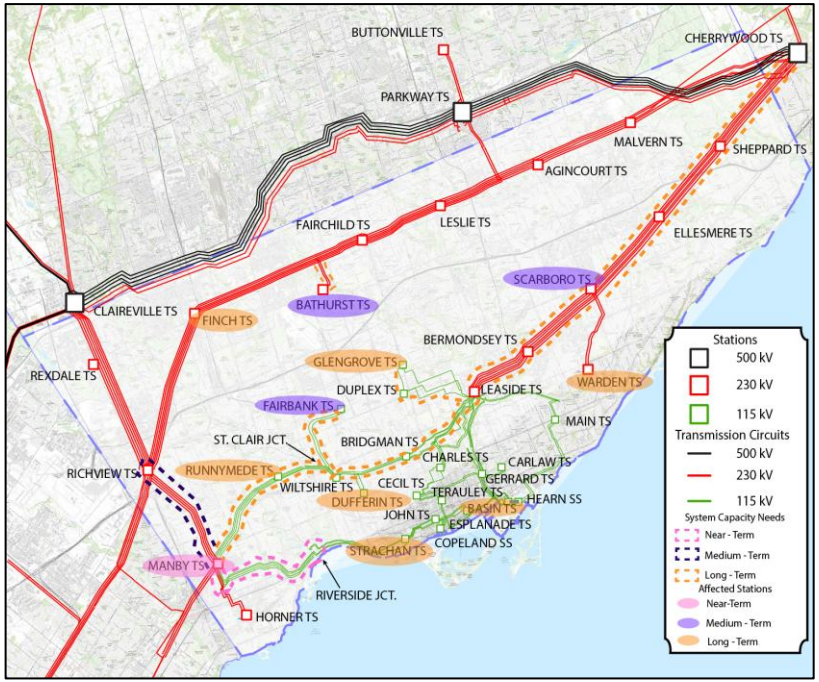


Recap: Electricity Needs in Toronto

Based on forecasted growth, several transmission system needs have been identified:

Timing	Impacted Equipment
Near-term	1 Station capacity need 1 System capacity need
Medium-term	3 Stations capacity needs 1 System capacity need
Long-term	7 Stations capacity needs 6 System capacity needs

Under this planning scenario, the Portlands Energy Centre is assumed in-service, for understanding the system needs driven primarily by growth and electrification.



Recap: Summary of Options Screening Results

Type of Needs	Screened In - further evaluated in the plan	Screened Out – cannot be relied on to meet the need(s)
Station Capacity (Ability to step power down from the transmission system to supply the local distribution network)	• **Wires** (such as new or expanded station or line infrastructure); and • **Wires plus integrated solutions** including eDSM, and DERs* including battery storage, renewables and district energy	• Transmission connected large generation such as wind and solar generation, and wind and/or solar + battery storage • Gas generation
Supply Capacity (Ability to deliver sufficient power through the transmission lines to supply step-down stations)	• **Wires** (such as new or expanded station or line infrastructure); and • **Wires plus integrated solutions** including eDSM, transmission connected battery, and DERs* including battery storage and renewables**	• Transmission connected large generation such as wind and solar generation, and wind and/or solar + battery storage • Gas generation

* Typically connected to local distribution systems and that can generate or store energy, or control load

** Excluding north Toronto

Summary of Key Regional Plan Feedback

Key Area of Feedback	Incorporating Feedback/Considering Feedback
Local preference to support and align plans with Toronto's climate action effort, including **decarbonization**, Transform TO net-zero strategy, and to plan for **reduced reliance on Portlands Energy Centre** in the future (i.e., post-2035)	• The IESO screened-out any consideration of natural gas generation as an option. • Decarbonization (i.e., planning for more electrified heating and electric vehicles) has been considered at multiple levels, with the expectation that frequent monitoring and close collaboration with community partners will be needed post-IRRP publication; City of Toronto Plan Official Plan, TransformTO, Green Bus program, etc. are key inputs to the demand forecast (at different levels among the forecast scenarios). • The ability of plan alternatives to supply growth from decarbonization and to enable a future with reduced reliance on the Portlands Energy Centre were assessed.
Local preference to ensure that **non-wire options** will form part of the regional plan	• The IESO screened-in energy efficiency, DERs and battery storage in an integrated assessment with grid reinforcements to fully address system needs, and evaluated these options for technical feasibility, cost, timing, and impact on system reliability. • Outcomes of the evaluation are being shared today; for further details refer to Toronto Regional Plan – Options Screening Response to Feedback document.
Greater transparency in information and assumptions, and decision making	• The IESO makes information available to enable meaningful feedback throughout the development of the plan. • The IESO prepared a Toronto IRRP Information Package that contains all publicly available resources and data referenced throughout the Toronto regional plan.

Information and Resources Shared

Below includes a list of information and resources shared throughout the development of the IRRP. A full list can be found here.

- Toronto engagement website includes recorded webinars, presentations, and responses to be feedback.
- IRRP Forecasting Methodology, Data Table 1, Data Table 2, Data Table 3
- Hourly Needs Data Profiles
- Local Achievable Potential Study Technical Approach Document
- Draft Report Local Achievable Potential Study
  - Residential Measure Characterization
  - Commercial Measure Characterization
  - Industrial Measure Characterization
  - Additional Modelling Inputs
  - Draft Technical, Economic, and Achievable Potential Data Tables
  - Memorandum on Consideration on Bidirectional Charging in Non-Wires Analysis

Background on Planning Studies

Both non-wires and wires were assessed to ensure a balance of considerations for addressing Toronto's growth needs.

Priority is placed on fully utilizing existing infrastructure before recommending additional grid reinforcements and new infrastructure. Given Toronto's tight geography and density, often **a single solution can address multiple system needs.**

The suite of recommended solutions being proposed includes grid reinforcements (new transmission infrastructure and upgrades to existing infrastructure), a region-wide call to action for aggressive participation in energy efficiency including identifying opportunities for expanded and/or geotargeted demand-side management (eDSM) and opportunities for battery storage. The recommended solutions form an **integrated strategy to enable economic growth, intensification and electrification while maintaining reliability**.

Given the range of uncertainty respecting demand drivers, and customer uptake in energy efficiency and DERs, the Technical Working Group will frequently monitor and update planning assumptions at least annually to remain nimble and either make adjustments or reinitiate detailed planning as needed.

Options Evaluation

Wire and non-wire options are evaluated based on the following key considerations:

Technical Feasibility	• Can the option be executed? i.e., outlook for technology, proximity to customers, routing and spacing considerations, operation
Ability to Address Needs	• Does it address the need while complying with the established reliability standards and criteria for the electric power system?
Cost-Effectiveness	• Is there the ability to solve multiple needs simultaneously? • How much can it cost and what are the benefits?
Lead Time	• New transmission infrastructure is expected to take at least 5-7 years – how does this compare to the timing of needs?
Community Considerations	• Input from community preferences and feedback regarding potential options, for example does it improve resilience for extreme weather?

IRRP Options Analysis & Draft Recommendations

Western Toronto

Recap: Electricity Needs in Western Toronto

			Magnitude	
Need	**Impacted Infrastructure**	**Timing**	**5 years from need date**	**10 years from need date**
Station Capacity	Manby West TS*	Short term	30 MW	60 MW
	Fairbank TS	Long term	20 MW	N/A
	Strachan TS	Long term	10 MW	N/A
	Manby East TS*	Long term	N/A	N/A
Supply Capacity	Manby TS x Riverside Jct.*	Short term	30 MW	60 MW
	Manby TS x Riverside Jct.*	Short term	70 MW	100 MW
	Richview TS to Manby TS	Medium term	20 MW	170 MW
	St. Clair Jct. x Fairbank TS	Long term	20 MW	40 MW

*Different infrastructure within the same station or corridor

Western Toronto Supply Needs – Non-Wire Options

Option	Incremental eDSM	Battery Energy Storage System (BESS) in the areas supplied by Manby West
Technical Feasibility	✓ Currently feasible	✓ Technically feasible; connection arrangement(s) will need to be confirmed by proponent(s) with HONI and/or THESL
Ability to Meet Need	✓ Can reduce/defer needs ✓ Alleviates need on Manby TS autotransformers and circuits	✓ Can reduce/defer needs, up to 72 MW/631 MWh by 2040
Other Considerations	Up to estimated 60 MW by 2040 of incremental eDSM in Western Toronto pocket (areas supplied from Manby West)	Provides capacity/energy benefits to the provincial grid, needed regardless of local needs. Opportunities to procure BESS, including Long Term RFP and any Toronto Hydro led NWA programs. Reduces chance of RAS being used.
Cost	$0 million*	-$30 million to $0* (to meet need up to 2040)
Lead Time	1-2 years – cumulative savings building over time	3 years

*Net system benefit

Western Toronto Supply Needs – Wire Options

Option	Manby East & West Crossover Option	Permanent transfer of Copeland MTS T2/T4 (Western Toronto) to (Eastern Toronto) Leaside Supply	Permanent transfer of partial Fairbank TS (Western Toronto) load to Downsview TS (Northern Toronto)
Technical Feasibility	× Not feasible due to short circuit constraints	✓ Currently feasible	✓ Currently feasible
Ability to Meet Need	✓ Can reduce/defer needs ✓ Alleviates need on Manby TS autotransformers	✓ Can reduce/defer needs ✓ Alleviates need on Manby TS autotransformers and circuits	✓ Can reduce/defer needs ✓ Alleviates need on Manby autos and circuits (Manby to Fairbank)
Other Considerations	The scope of a future short circuit study will be initiated in the RIP. The short circuit study aims to understand the technical limitations and propose options to alleviate this issue	Maximizes utility of new infrastructure in Eastern Toronto Constraints to operation of station and distribution impacts to be examined in RIP	Maximizes utility of new infrastructure in Northern Toronto. Alleviates St. Clair to Fairbank Supply need. Load transfers start after Fairbank TS reaches limit (2037)
Cost	$15-20 million	N/A	Included in Downsview TS cost
Lead Time	N/A	<3 years	<3 years (Require Downsview TS to be in-service)

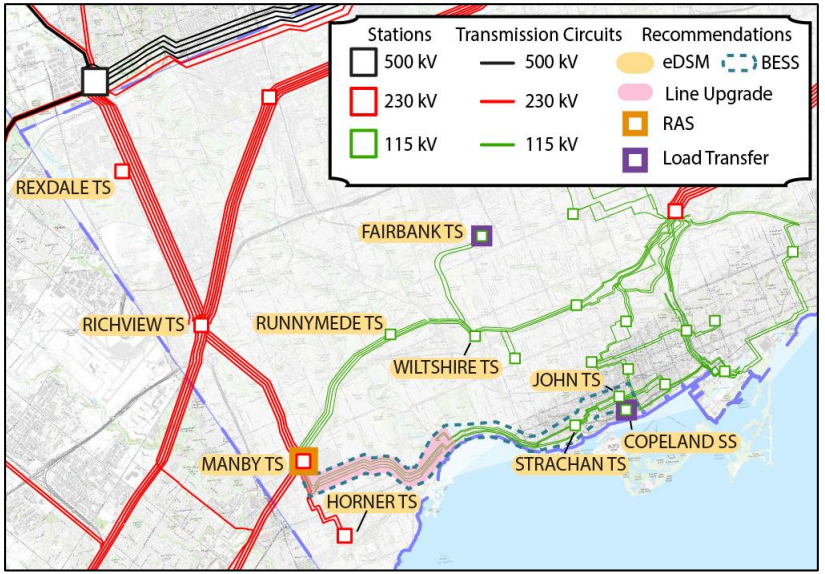
Western Toronto Supply Needs – Wire Options

Option	Re-conductor K13J and K14J (Manby to Riverside)	Reliance on Manby RAS
Technical Feasibility	✓ Currently feasible	✓ Currently feasible
Ability to Meet Need	✓ Can reduce/defer needs	✓ Can reduce/defer needs ✓ Alleviates need on Manby TS autotransformers and circuits (Manby to Copeland)
Other Considerations	Option was endorsed by Ministry of Energy and Mines as an early action in the Integrated Energy Plan.	Maximizes utility of existing operating scheme Expand RAS to add circuit overloads
Cost	$25 million	N/A
Lead Time	3 years	2 years for expansion (RAS is already in-service)

Western Toronto Supply Capacity – Draft Recommendations

Due to strong, continued demand growth pressures, various capacity needs in Western Toronto have been identified. The following integrated solutions are recommended for the IRRP:

- **Targeted incremental eDSM to manage demand.**
- **Battery Energy Storage System (BESS)** in the areas supplied by Manby West TS to support the grid during peak demand periods and/or during maintenance outages.
- **Upgrade the existing transmission lines** between Manby TS and Riverside Junction to improve capacity and reliability as endorsed in the Integrated Energy Plan. These circuits are at the end of their expected service lifetime and require refurbishment.
- **Expand the Remedial Action Scheme (RAS) at Manby TS** to enable system adjustments in real time to prevent overloads.
- **Permanently transfer load** from Copeland TS to Leaside TS supply and from Fairbank TS to the future Downsview TS to balance demand across the grid and improve reliability.



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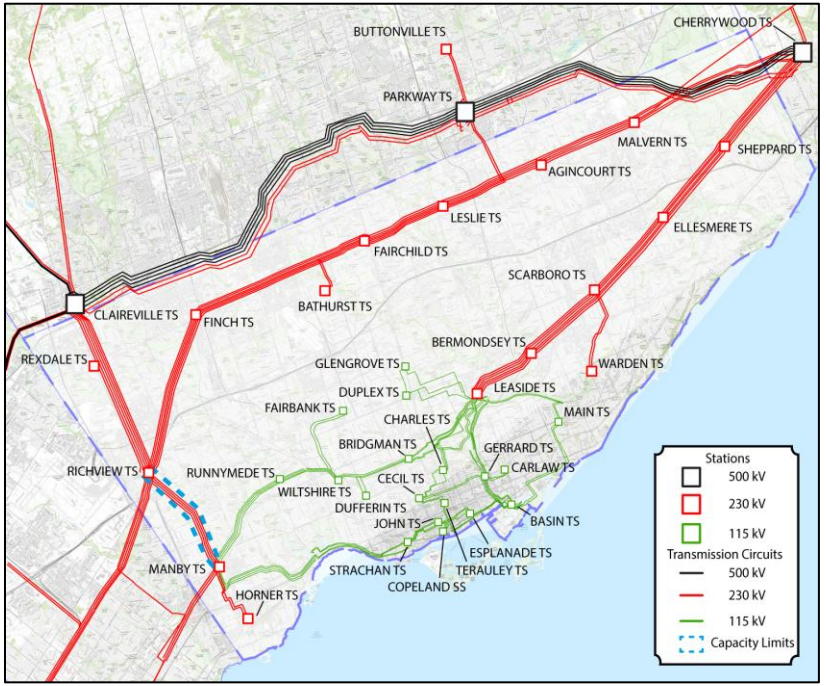
Western Toronto – Supply to Manby from Richview TS

As demand continues to grow in Toronto and west of Toronto, the Richview TS to Manby TS lines could reach their capacity limits as early as 2032, or earlier, if the pace of electrification increases. The Richview to Manby transmission lines play a critical role in delivering bulk electricity to parts of downtown Toronto, Etobicoke and Mississauga.

The Etobicoke Greenway Project, currently under construction, will reinforce Richview to Manby supply, helping to maintain reliability and support growth.

As future needs on the corridor are influenced by the demand forecasts and potential solutions in ongoing plans (the GTA West IRRP and the South and Central Bulk Study), the IESO is continuing to evaluate options to ensure any further solutions will meet the needs across regions. These ongoing studies will consider the impact of Toronto's electricity forecast as part of their analysis.



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Western Toronto Station Needs – Draft Recommendation

The Technical Working Group recommends the following to address capacity needs at Fairbank TS, Strachan TS, and Manby TS:

- **Incremental eDSM targeted to manage demand within the Manby West TS area.**
- **Targeted infrastructure upgrades are proposed:**
  - Fairbank TS: Transfer load to Downsview TS to reduce system pressures when Fairbank reaches capacity
  - Strachan TS: Implement up to 19 MW of incremental eDSM by 2040 (beyond 20 MW planned) to help delay the need for infrastructure updates.
  - Collaborate with THESL to encourage the siting of BESS facilities in the Manby West area.
- **Monitoring Recommended:**
  - Manby East autotransformers: No immediate action is required, but electricity needs could emerge after 2037 under high electrification scenarios. The Technical Working Group recommends monitoring this station in future planning cycles.

IRRP Options Analysis & Draft Recommendations

Northern Toronto

Recap: Electricity Needs in Northern Toronto

			Magnitude	
Electricity Need	**Impacted Infrastructure**	**Timing**	**5 years from need date**	**10 years from need date**
Station Capacity	Bathurst TS	Medium term	80 MW	180 MW
	Finch TS	Long term	10 MW	N/A
Supply Capacity	Bathurst Jct. x Bathurst TS (circuits P22R and C20R)	Long term	100 MW	N/A

The high electrification forecast accelerates the needs at Finch TS to the medium-term and increases the need size, while the rest of the need timing remains unchanged.

Northern Toronto - Options Overview

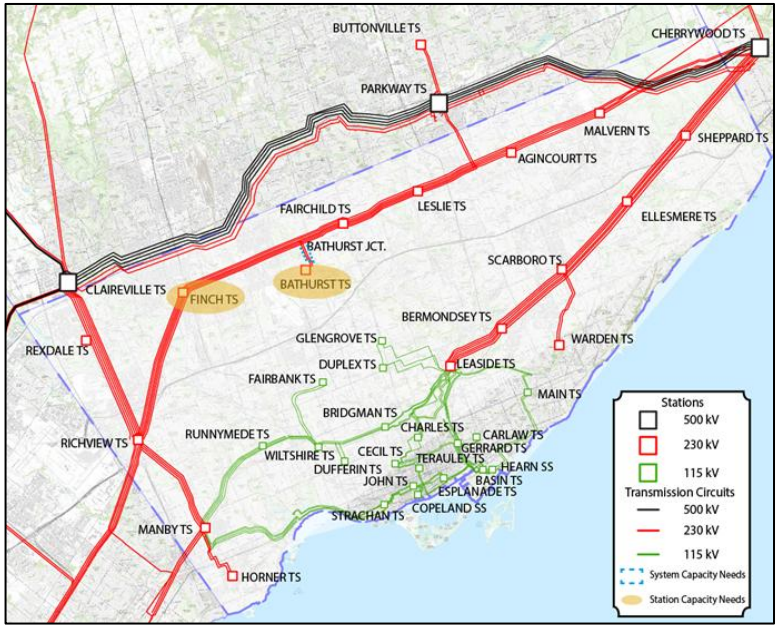
Northern Toronto is growing rapidly, especially at the Downsview neighbourhood. This growth will exceed the capacity of existing infrastructure at Bathurst and Finch Transformer Stations. Toronto Hydro proposed a new Downsview TS, connected to the Finch transmission corridor, as part of its 2025 Distribution System Plan.

The regional planning team studied two connection options:

- Building a Downsview Switching Station
- Connecting Downsview TS to two Finch Corridor circuits

Non-wire alternatives were screened-out due to the scale of new demand and the need to physically connect new customers throughout the planned development. However, eDSM will be an important consideration in the community's ultimate design.

The City of Toronto and Enwave have identified the Downsview area as an opportunity for district energy to further alleviate electricity needs. The Technical Working Group recommends that the City of Toronto and Enwave keep Toronto Hydro informed of their plans to implement district energy in the area.



Northern Toronto Needs – Options Analysis

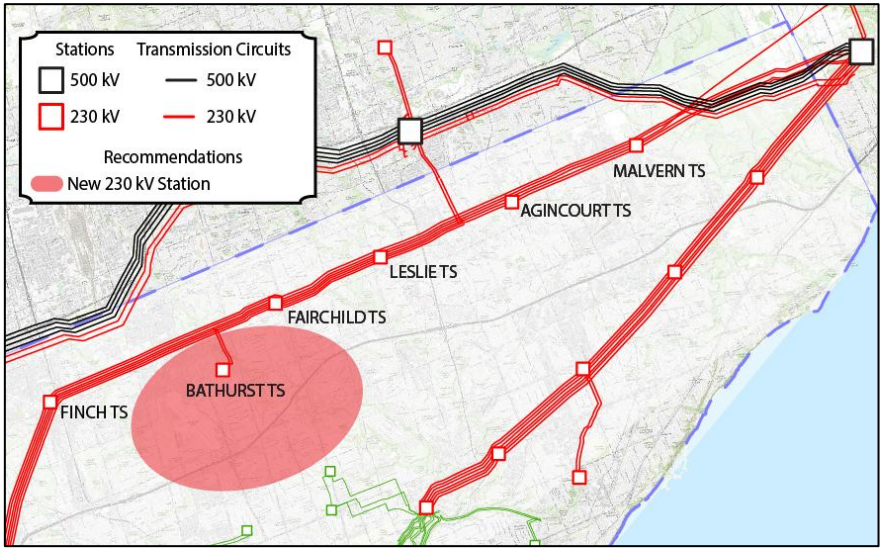
Option	Downsview TS and Downsview Switching Station (SS)	Downsview TS and Connection to Cherrywood to Richview 230 kV circuits
Technical Feasibility	✓ Currently feasible	✓ Currently feasible
Ability to Meet Need	✓ Can reduce/defer needs	✓ Can reduce/defer needs
Other Considerations	Downsview SS was part of THESL's recent rates application and was subsequently approved by the OEB	Will have to connect to Cherrywood to Richview circuits only to avoid overloading of Parkway to Richview circuits
Cost	$170 million	<$170 million (direct connection to two of CxR circuits is expected to be less than building a new switching station)
Lead Time	5-7 years	5-7 years

Northern Toronto - Draft Recommendations

To address the Northern Toronto station and supply capacity needs, it is recommended to proceed with the new 230 kV station Downsview TS.

The preferred connection arrangement will be determined by Hydro One and Toronto Hydro during the Regional Infrastructure Plan (RIP).

The new station will accommodate further growth in Northern Toronto and load transfers to alleviate western Toronto needs (e.g., Fairbank TS and Manby TS) and enable development as planned in the Updated Downsview Secondary Plan.



IRRP Options Analysis & Draft Recommendations

Eastern Toronto

Recap: Electricity Needs in Eastern Toronto

			Magnitude	
Electricity Need	**Impacted Infrastructure**	**Timing**	**5 years from need date**	**10 years from need date**
Station Capacity	Scarboro TS	Medium term	130 MW	150 MW
	Glengrove TS	Long term	20 MW	N/A
	Warden TS	Long term	20 MW	40 MW
	Dufferin TS	Long term	30 MW	N/A
	Basin TS	Long term	50 MW	100 MW
	Sheppard TS	Long term	10 MW	30 MW
Supply Capacity	Bridgman TS x Barlett JCT	Long term	20 MW	N/A
	Leaside TS x Bridgman TS*	Long term	20 MW	40 MW
	Leaside TS x Bridgman TS*	Long term	50 MW	N/A
	Hearn SS x Basin TS	Long term	80 MW	N/A

* Different circuits within the same corridor

Leaside to Bridgman to Dufferin – Non-Wire Options

Option	Incremental eDSM	BESS at Dufferin TS
Technical Feasibility	✓ Currently feasible	✓ Technically feasible; connection arrangement(s) will need to be confirmed by proponent(s) with HONI and/or THESL
Ability to Meet Need	✓ Can reduce/defer needs	✓ Can reduce/defer needs
Other Considerations	Up to estimated 32 MW by 2040 of incremental eDSM and behind-the-meter generation at Dufferin TS and Bridgman TS (beyond 41 MW planned).	Requires at least 41 MW / 401 MWh of capacity by 2041 Provides capacity/energy benefits to the provincial grid, needed regardless of local needs. Opportunities to procure BESS, including Long Term RFP and any Toronto Hydro led NWA programs. Reduces chance of RAS being used.
Cost	$0 million*	-$18 million to $0* (to meet need up to 2041)
Lead Time	1-2 years, savings building over time	3 years

*Net system benefit

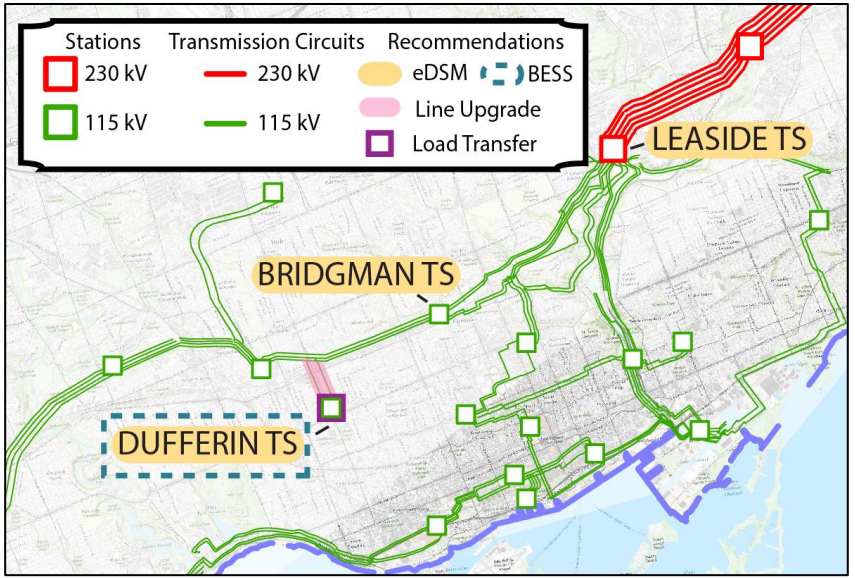
Leaside to Bridgman to Dufferin – Wire Options

Option	Increase transmission capacity to Dufferin TS	Permanent transfer Dufferin TS load to expanded Wiltshire TS	Resolve transmission limits on all lines supplying Dufferin TS
Technical Feasibility	✓ Currently feasible	✓ Currently feasible	✓ Currently feasible
Ability to Meet Need	✓ Can reduce/defer needs	✓ Can reduce/defer needs	✓ Can reduce/defer needs
Other Considerations	Involves upgrading 1.3 km of underground circuits between Dufferin TS and Bartlett Jct to a higher capacity, allowing Dufferin TS to be loaded to its station limit.	Involves upsizing the T1/T6 transformers at Wiltshire TS to add additional capacity. Alleviates Dufferin TS and upstream circuit needs from Leaside to Bridgman.	Involves rebuilding overhead lines including 1.7 km from Leaside TS to Bayview JCT, 2.2 km from Bayview JCT to Birch JCT, 1.4 km from Birch JCT to Bridgman TS and a 2.2 km underground section between Bayview JCT to Birch JCT.
Cost	$33 million	$60 million	$150 million
Lead Time	7 years	5 years	7 years

Leaside to Bridgman to Dufferin – Draft Recommendation

To meet growing energy needs and improve reliability from Leaside TS to Bridgman TS and Dufferin TS, the following draft recommendations are proposed as integrated solutions:

- **Incremental eDSM targeted to manage demand.**
- **BESS** at Dufferin TS to support the grid during peak demand periods and/or during maintenance outages.
- **Load Transfers** to permanently resupply some Dufferin TS demand following future upgrades to nearby Wiltshire TS.
- **Upgrade 115 kV circuits supplying Dufferin TS:** HONI and THESL to investigate reinforcements to utilize Dufferin TS capability.



Leaside to Bloor to Hearn – Options Analysis

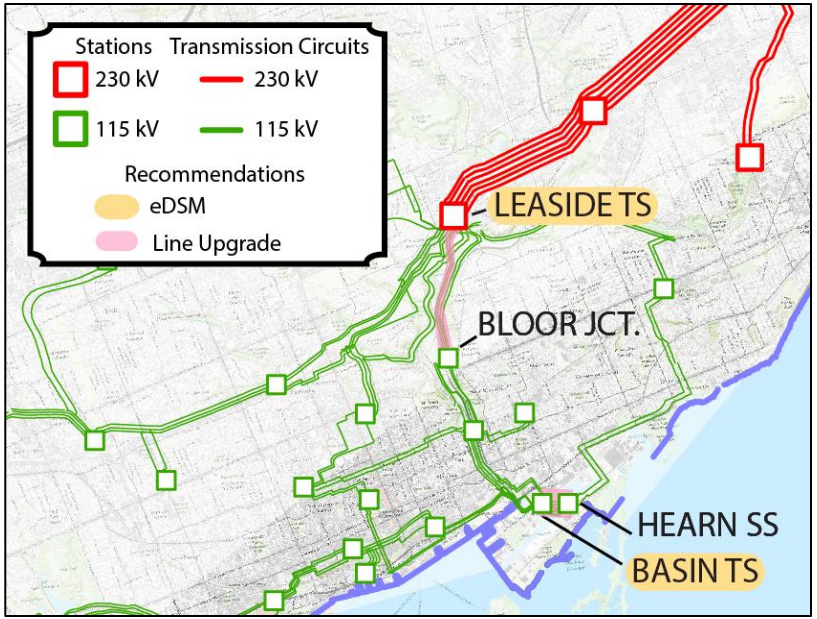
Option	Address End-of-Life and increase transmission capacity on H1L and H3L circuits from Leaside TS to Bloor JCT	Increase transmission capacity on H1L and H3L circuits from Hearn SS to Basin TS	Incremental eDSM
Technical Feasibility	✓ Currently feasible	✓ Currently feasible	✓ Currently feasible
Ability to Meet Need	✓ Can reduce/defer needs	✓ Can reduce/defer needs ✓ Can also alleviates need on Leaside to Bloor section	✓ Can reduce/defer needs ✓ Alleviates need on Leaside stations and circuits
Other Considerations	Net incremental benefit to be minimal, as circuits need to be replaced given their condition.	Section is very short (~500 m). Upgrading of lines can be done in parallel with new station upgrade.	Up to estimated 16 MW of incremental eDSM at Carlaw TS and Gerrard TS in 2040 (beyond 15 MW planned).
Cost	$20 million	$3 million	$0*
Lead Time	7 years	7 years	1-2 years, savings building over time

*Net system benefit

Leaside to Bloor to Hearn – Draft Recommendation

To meet growing energy needs and improve reliability along the Leaside to Bloor to Hearn, the Technical Working Group is recommending the following integrated solutions:

- **Line Upgrade:** Upgrades to key transmission circuits (H1L and H3L) from Leaside TS to Bloor JCT, and from Hearn SS to Basin TS, will help move more electricity across the city, reduce bottlenecks and address aging infrastructure.
- **Incremental eDSM to manage demand.**



Station Capacity Needs – Draft Recommendations

The Technical Working Group recommends the following to address capacity needs at Scarboro TS, Sheppard TS, and Glengrove TS:

Targeted Upgrades are Proposed:

- **Glengrove TS:** While energy-saving programs could slightly reduce demand, the potential is limited at Glengrove TS. Future planning will explore shifting some electricity load to nearby Duplex TS from Glengrove TS to better manage growth.
- **Scarboro TS:** Scarborough is growing rapidly, especially due to the Golden Mile Secondary Plan, where new communities are planned, this will exceed the capacity of existing infrastructure. To support this development, Toronto Hydro proposed adding a new DESN at Scarboro TS by 2030 as part of its 2025 Distribution System Plan. The City of Toronto and Enwave have identified the Golden Mile as an opportunity for district energy to further alleviate electricity needs. The Technical Working Group recommends that the City of Toronto and Enwave keep Toronto Hydro informed of their plans to implement district energy in the area.
- **Sheppard TS:** Toronto Hydro and Hydro One are also exploring ways to boost capacity at Sheppard TS using existing infrastructure.

Station Capacity Needs – Draft Recommendations

The Technical Working Group recommends the following to address capacity needs at Dufferin TS, Basin TS and Warden TS:

Targeted Upgrades are Proposed:

- **Dufferin TS:** A battery storage system is proposed to help meet rising demand and improve reliability. Additional energy efficiency efforts could further reduce pressure on the station and surrounding supply network.
- **Basin TS:** New or expanded station capacity will be needed by 2035 to support the Port Lands phased redevelopment; however, district energy systems if built into the Port Lands could reduce peak electricity demand and affect timing of the new or expanded station. The Technical Working Group recommends that planning be started to determine the station size and location, in collaboration with the City of Toronto.

Monitoring Recommended:

- **Warden TS:** Load transfers from Warden TS to expanded Scarboro TS will ensure Warden TS remains under station limit. Future growth will be monitored closely during the annual reviews and subsequent planning cycles.

IRRP Options Analysis & Draft Recommendations

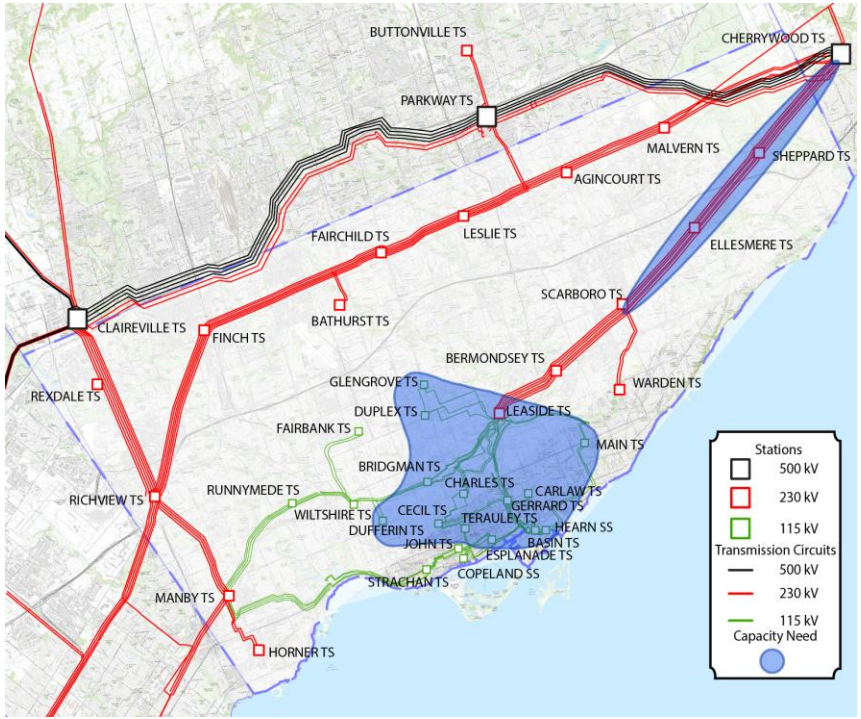
Toronto Third Supply

Need for Toronto Third Supply (1)

There is medium to long-term electricity supply need in the downtown core and eastern portion of the City of Toronto.

The need is primarily driven by economic development, local growth and development plans, including secondary plans for the Port Lands district and the Golden Mile in Scarborough.

Due to this growth, electricity demand is expected to exceed the capacity of the transmission system in 10 to 15 years, creating a reliability need by 2038.



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Need for Toronto Third Supply (2)

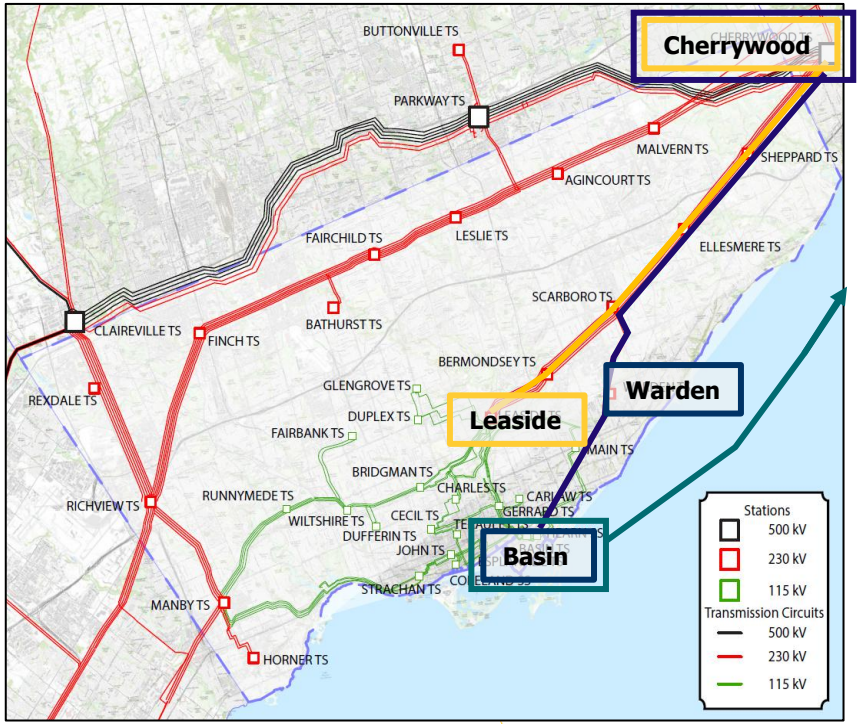
- Transmission reinforcement will be needed by 2038 to address the growing demand for electricity in Toronto. This advances to 2034 when considering the Portlands Energy Centre (PEC) contract expiry.
- With or without the supply contributions from PEC, meeting the significant need identified for eastern Toronto due to the significant forecasted growth requires a large-scale wires solution.
- The third transmission supply line addresses this need while delivering substantial other benefits to Toronto and provincial electricity ratepayers.

Third Supply Line Options

Given the significant electricity demand in Toronto, a third transmission supply line is required.

Three transmission options were studied, each guided by a desire to minimize land-use impacts by using existing infrastructure corridors or go underground or underwater:

1. An overland route from Cherrywood TS (Pickering) to Leaside TS in Toronto, highlighted in yellow on map.
2. A mix of overland and underground route segments from Cherrywood TS to the Port Lands in Toronto, highlighted in blue on the map.
3. An underwater route from Darlington or Cherrywood TS to the Port Lands in Toronto, highlighted in teal on the map.



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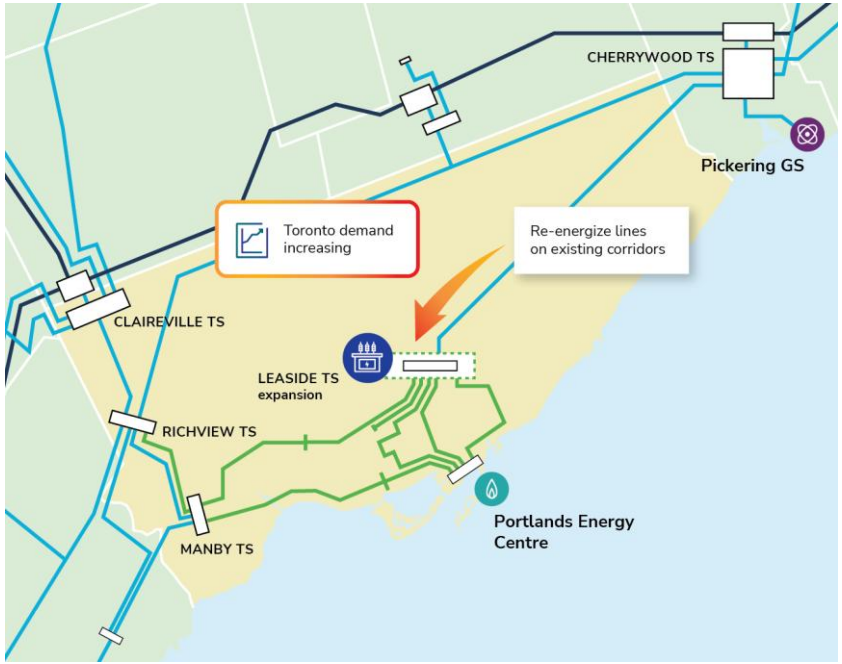
The Options: Overhead to Leaside

Expand Existing Transmission Path to Leaside Transformer Station:

- Expand the Leaside TS by adding new transformation equipment and supply lines from Cherrywood TS to Leaside TS.
- There is an idle, two-circuit line on the existing corridor that will need to be upgraded and re-energized.
- Further reinforcements to the 115 kV system downstream of Leaside TS will be needed, but the analysis indicates that these upgrades can be coordinated with end-of-life refurbishments of these aging transmission assets.



The Options: Overhead + Underground to Port Lands

New Transmission Supply Downtown from Scarborough:

- Expand Hearn station in the Port Lands to accommodate new equipment and new lines from Warden TS and lines from Cherrywood TS to Warden TS.
  - Community impact will depend on what can be built underground, detailed study required.
- Option utilizes a portion of the idle line from Cherrywood TS along the existing corridor; undergrounding remaining lines between the corridor, or Warden TS, to downtown may be only option. Goes through dense areas of Toronto.

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The Options: Underwater to Port Lands

New Transmission Supply Path to Downtown through Lake Ontario:

- Expand the Hearn station in the Port Lands area to add equipment, and new underwater supply lines (from either Bowmanville or Pickering or from Bowmanville via Pickering).
  - The IESO assessed potential land requirements and land availability to accommodate terminal stations in the Port Lands and at Bowmanville.
- This option can deliver broader bulk system benefits as it completely bypasses Cherrywood TS and Leaside TS.

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Key Third Supply Feedback Received (1/2)

Key Areas of Feedback	Incorporating Feedback/Considering Feedback
Consideration of land-use and other impacts for the third line transmission routing options	• Each option was assessed in terms of land use, and developed to maximize existing infrastructure corridors, underground or underwater segments. The results are being shared today. • The next step in the process, including the design, development, and route analysis and selection will be carried out by the transmission developer, subject to all regulatory and environmental reviews and approvals to ensure that impacts are appropriately addressed. There will be more opportunities for engagement throughout.
Understanding the need for a third supply line	• Given the growing electricity demand, a third transmission supply line into the city will be required. New transmission ensures we maintain the high levels of reliability that electricity consumers in Toronto have today, required by North American electricity planning standards.
Request for greater transparency of the evaluation of the proposed third line	• The IESO undertook a detailed options analysis of the preliminary third transmission line based on reliability performance, system resilience, bulk power system impacts, implementation complexity (i.e., land impacts), cost, as well as other considerations such as community preference and feedback. Outcomes are being shared today.
Treaty rights holder consideration, including potential Environmental and Archaeological impacts.	• The IESO continues to engage with communities that hold treaty rights and have expressed an interest in the Toronto IRRP. Technical briefings have been provided to help address environmental concerns, and the IESO is working closely with communities to provide capacity funding that supports their meaningful participation.

Key Third Supply Feedback Received (2/2)

Key Areas of Feedback	Incorporating Feedback/Considering Feedback
Concern third transmission line would bring nuclear energy into city	• This third transmission line would connect the city to the provincial grid which is supplied by a cost-effective diverse mix of supply resources.
Consider non-wire alternatives	• The Technical Working Group (TWG) has determined that non-wires solutions are an important part of this integrated plan to ensure reliability for Toronto. The TWG has identified locations where BESS has been screened in. The IESO has screened-in incremental eDSM to help defer or reduce the needs in Eastern Toronto, however it is not enough to meet the need on its own.
Connect the line to renewable generation such as wind	• As part of the regional planning process, offshore wind generation is not considered to address regional electricity needs due to the provincial moratorium on offshore wind development in Ontario. • The IESO considered each option's ability to enable future generation connection in areas where new connections, including renewables and storage, are currently limited or constrained.
Share a timeline for PEC phaseout	• The TWG evaluated a scenario for reduced reliance on Portlands Energy Centre, to understand the capability/flexibility of the options to ensure a reliable and affordable supply of power to the City of Toronto under different future scenarios. The IRRP will not make a recommendation for timing to phase-out for PEC – that is beyond the scope of the IRRP.

Option Analysis Criteria

In line with the Integrated Energy Plan (IEP), the IESO considered each option's ability to support demand growth in Toronto while considering land use implications, the ability to enhance supply diversity and system resilience, and factors such as costs and development lead time:

Reliability performance – Ability to supply Toronto's future demand in accordance with the established reliability criteria for electric power systems.

System resilience – Impact on the power system's ability to withstand or recover from major events such as a loss of Manby TS, and the flexibility to support a range of possible futures.

Broader system impacts– Benefits to upstream bulk transmission network.

Implementation complexity – Impacts on land-use and ability to manage potential risks throughout development and implementation of the option.

Cost-effectiveness for ratepayers – Cost effectiveness of the option in providing power reliably and safely to consumers.

Third Supply Options Evaluation

	Overhead to Leaside	Overhead+Underground to Port Lands	Underwater to Port Lands
Local Supply	Address demand to 2042	Addresses demand to 2044	Addresses demand beyond 2044
System Resilience	Similar to today: two supply points	Moderate improvement: new supply downtown, still supplied from Cherrywood	Significant improvement: new supply from a separate bulk connection; potential for black-start
Broader System Impacts	Leads to increased flows through Cherrywood TS, potentially requiring upgrades	Leads to increased flows through Cherrywood TS, potentially requiring upgrades	Alleviates flows through Cherrywood TS, enabling growth in surrounding municipalities
Land Impacts	Along existing transmission ROW; concerns about Meadoway impact and Rouge Park; expansion needed at the Leaside end	Along existing transmission ROW and underground; concerns about Meadoway impact and Rouge Park; new station property needed at Port Lands near Hearn SS	Two new HVDC converter stations required – one at either end; minimal to no land needed for cable; new station property needed at Port Lands near Hearn SS
Estimated Capital Costs	$800 million: estimate too preliminary to assign an accuracy range	$900 million: estimate too preliminary to assign an accuracy range	$1.5 billion: planning estimate, range up to -50% to +100%

*For detailed information on options refer to slides 52 to 54.

IESO Preferred Option: Underwater Line

- The IESO's preferred option is a new underwater high voltage direct current (HVDC) transmission link connecting downtown Toronto to Bowmanville SS via Lake Ontario, based on its merits versus the alternatives.
- The target in-service date for the facilities is as close as possible to 2034.

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Underwater Line: Summary of Rationale and Considerations

The IESO studied three options. The underwater supply line has several merits over the other options:

1. Enables the most long-term growth, particularly under high growth scenarios.
2. Minimal impact to land and urban communities.
3. Diversifies Toronto's electricity supply and enhances resilience against extreme events (serves as a geographically separate point of interconnection to the grid).
4. Enables broader system benefits (e.g., reducing loading on upstream transmission to efficiently address overall GTA growth; supporting reducing reliance on PEC; enabling connection of future supply resources).
5. Allows more growth around the GTA as it frees up transmission capacity on upstream bulk stations and other transmission lines.

Next Steps & Engagement on Third Line

- The IESO will continue to work with government for direction on next steps.
- All transmission projects will be required to comply with federal, provincial and municipal approvals, permits or requirements, including an Environmental Assessment.
- The Environmental Assessment process will assess potential effects of new transmission infrastructure, determine measures to avoid or mitigate these effects, and evaluate route alternatives. There will be continued engagement with communities to ensure they are informed on next steps including project siting and/or route selection.

Linkages to Other Plans

The IESO is conducting a South and Central Bulk Study, which will examine broader system-level needs and opportunities across southern and central Ontario.

- Given the scale and complexity of electricity needs in Toronto, the bulk study will play a key role in connecting the recommendations from the Toronto IRRP to the bulk transmission system. This includes the integration of the third supply to Bowmanville SS to supply Toronto and the scope of the new double-circuit 500-kilovolt transmission line from the Bowmanville SS towards the GTA.

In parallel, the GTA West IRRP is also underway. Electricity demand in the region is expected to grow significantly, which will increase pressure on key transmission lines, particularly the Richview to Manby corridor that also supports parts of Toronto and Mississauga.

To address this, the South and Central Bulk Study and the GTA West IRRP is currently exploring system-wide solutions, while considering the impact of Toronto's electricity forecast including reinforcements to the FETT interface and a potential new 230 kV double-circuit line from Trafalgar to Oakville.

By aligning regional and bulk planning efforts, the IESO aims to develop a coordinated and cost-effective approach to meeting electricity demand across the province.

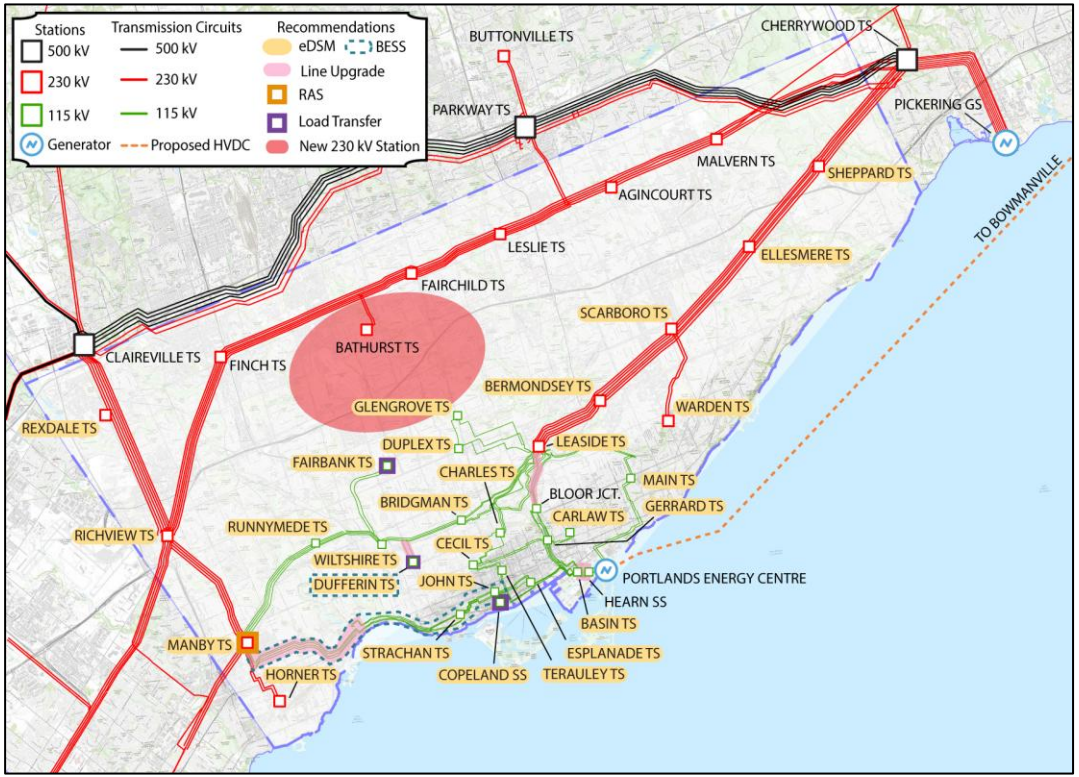
Summary Toronto IRRP Draft Recommendations

As Toronto continues to grow, electricity demand is forecast to increase significantly. Immediate action is needed to keep the power system reliable and ready for the future. To meet the needs and prepare for future growth an integrated plan has been recommended, which will:

- **Manage demand and balance the grid** through eDSM programs across the whole city, and permanent load transfers in key areas. A region-wide call to action for aggressive participation in energy efficiency including identifying opportunities for expanded and/or geotargeted eDSM.
- **Support the grid during peak times or outages** by adding new battery storage.
- **Boost reliability and capacity** by upgrading key existing infrastructure (e.g., Manby x Riverside, Leaside x Bloor) and expanding remedial action scheme at Manby TS.
- **Add a third supply line into Toronto** to enable the most long-term growth, diversify Toronto's electricity supply, enhance resilience, and enable future generation connection.
- **Develop connection facilities for new communities** by initiating work on new or expanded stations at Downsview, Scarboro (Golden Mile) and Basin (Port Lands).
- **Plan for the future** by monitoring key stations like Manby TS, Warden TS and Glengrove TS for long-term needs.

These options will take advantage of the existing transmission system's capabilities, improve reliability, and enable growth driven by economic development, intensification and electrification to ensure the system is ready for future growth.

Summary of Draft Recommendations Map



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Next Steps & Discussion

Next Steps for the Toronto IRRP

The IESO will continue to engage and inform. Participants can expect to hear from the IESO at these milestones:

Toronto IRRP	Local Achievable Potential Study (L-APS)
• Feedback accepted until October 9. • IRRP report will be completed and published on the Toronto Regional Planning website on October 31.	• Draft L-APS Report and corresponding data tables, posted to the Toronto Regional Planning website. • Final L-APS study results will be completed and published on the Toronto Regional Planning website.

Following the IRRP Publication

- For wire solutions (with the exception of the Third Line recommendation), Hydro One will lead the development of a Regional Infrastructure Plan, which assesses and develops a detailed plan on how wire options can be implemented.
- The IESO will continue to work with Government for direction on next steps for the Third Line Recommendation.
- For non-wire solutions, new energy efficiency programs would be implemented through the IESO's electricity Demand Side Management Framework, battery energy storage systems and DERs could be implemented through IESO procurements or other implementation paths to be determined in collaboration with Toronto Hydro.
- All projects will be required to comply with federal, provincial and municipal approvals, permits or requirements, including an Environmental Assessment, if applicable.
- Regional planning is completed at regular intervals, with updates every five years, or earlier if system needs arise, ensuring that evolving demand will be addressed. This approach ensures the system remains responsive to changing needs, while supporting economic growth, community growth, and long-term reliability across Toronto.

Discussion

Today the IESO is seeking your feedback on the following components of the Plan:

- What feedback is there on the proposed recommendations?
- What information needs to be considered regarding these recommendations?
- How can the IESO continue to engage as these recommendations are implemented, or to help prepare for the next planning cycle?

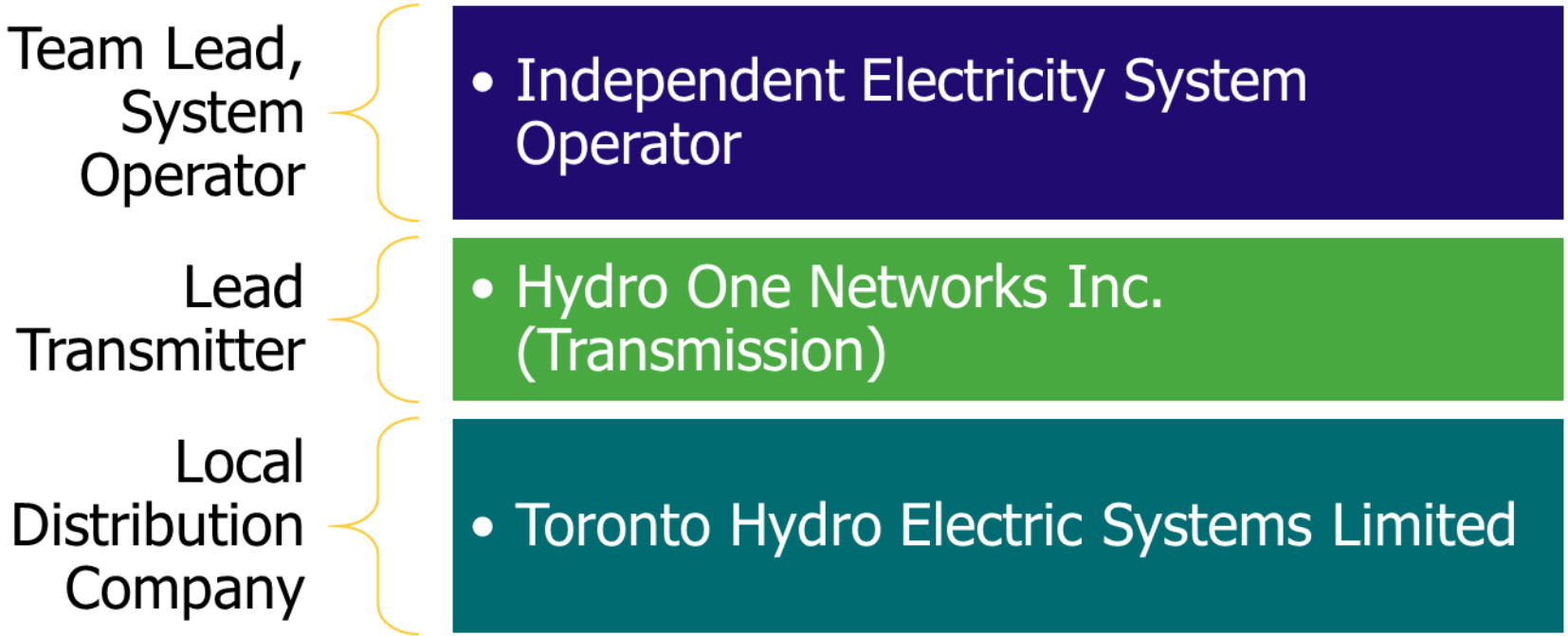
The IESO welcomes written feedback until October 9, 2025.

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

Visit the PoweringGTA.ca website to learn more about active regional plans in the GTA.

Appendix

Toronto Regional Planning Working Group



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 Toronto Region

Follow the Toronto regional planning activities online

Visit the PoweringGTA.ca website to learn more about active regional plans in the GTA

Indigenous Energy Support Program (IESP)

Funding for Community-Led Energy Capacity-Building Projects

Learn more at ieso.ca/IESP or contact the IESO's Indigenous Engagement team at iesp@ieso.ca

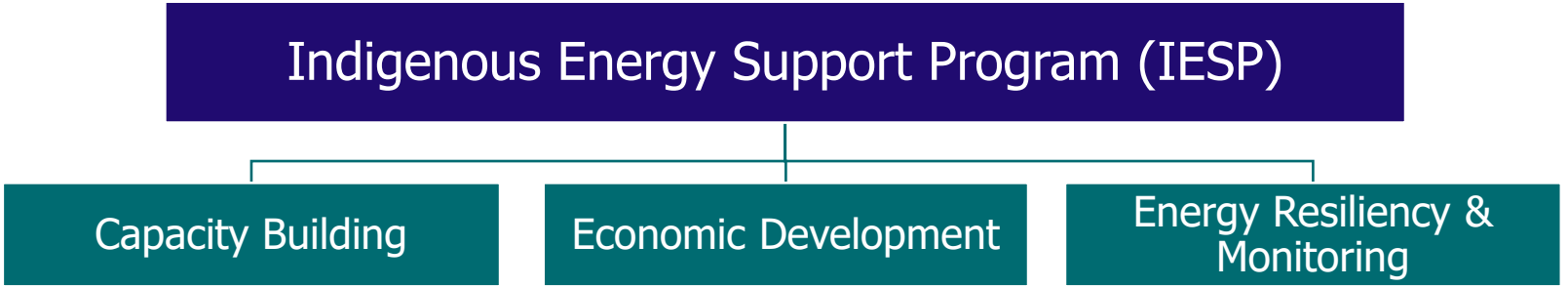
Indigenous Energy Support Program (IESP) Overview

The Indigenous Energy Support Program (IESP) promotes broad equitable participation in Ontario's energy sector by supporting community capacity building. Funding is available to eligible Indigenous communities and organizations across Ontario for:

- Community energy planning
- Energy skills-building, education and awareness
- Hiring of a Community Energy Champion (CEC)
- Energy infrastructure development

IESP Areas of Funding

The IESP provides support through three Areas of Funding (AOF).



IESP Maximum Funding Amounts

Area of Funding	Capacity Building	Economic Development	Energy Resiliency & Monitoring
Maximum Funding Amount	**Part A**: Up to $195,000	Up to $250,000	Up to $135,000
	Part B: Up to $150,000	Up to $500,000* (Remote Projects Development)	

Funding support for eligible expenses associated with supporting diesel reduction initiatives in **Identified Remote First Nations Communities**

IESP Project Types

Capacity Building (Part A) Up to $195,000	Capacity Building (Part B) Up to $150,000	Economic Development Up to $250,000*	Energy Resiliency & Monitoring Up to $135,000
CEC Salary Up to $165,000 for 3 years	**Community Energy Engagement** Up to $75,000	**Feasibility Study** Up to $50,000	**New Community Energy Plan** Up to $135,000
Additional Qualification Top Up (if applicable) Up to $15,000 for 3 years	**Energy Skills Building** Up to $75,000	**Partnerships** Up to $85,000	**Update Community Energy Plan** Up to $75,000
CEC Expenses Up to $15,000 for 3 years	**Innovative Knowledge & Data Sharing** Up to $60,000	**Project Development** Up to $250,000	
		Innovation Up to $250,000	
		Remote Projects Development Up to $500,000	

Except for an additional $500,000 available to **Identified Remote First Nations Communities under "Remote Projects Development" within the Economic Development Area of Funding*