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# Toronto Region Scoping Assessment Outcome Report

## DRAFT FOR REVIEW

February 2023

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# 1. Introduction

This Scoping Assessment Outcome Report is part of the Ontario Energy Board’s regional planning process, as defined through the Transmission System Code, Distribution System Code, and IESO license.

This is the third cycle of regional planning for the Toronto region, and it was initiated in fall 2022. Information and links to earlier products are available on the IESO webpage, [here](#). The Needs Assessment is the first step in the regional planning process and was carried out by the Study Team led by Hydro One. The [Needs Assessment Report](#) was finalized on December 19, 2022 and identified some needs that may require further regional coordination. This need information was an input into the Scoping Assessment. The Study Team reviewed the nature and timing of all the known needs in the region to determine the most appropriate planning approach. It also considered past or ongoing initiatives in the region, including the recent Pathways to Decarbonization report.

The Scoping Assessment considers three potential planning approaches for the region (or sub-regions, if applicable), including: an IRRP – where both wires and non-wires options have potential to address needs; a Regional Infrastructure Plan (RIP) – which considers wires-only options; or a local plan undertaken by the transmitter and affected local distribution company – where no further regional coordination is needed.

This Scoping Assessment report:

- Lists the needs requiring more comprehensive planning, as identified in the Needs Assessment report;
- Reassesses the areas that need to be studied and the geographic grouping of the needs (if required);
- Considers impacts on planning assumptions and potential outcomes on needs resulting from local and provincial policy goals;
- Determines the appropriate regional planning approach and scope where a need for regional coordination or more comprehensive planning is identified;
- Establishes a terms of reference for an IRRP, if an IRRP is required; and
- Establishes the composition of the IRRP Technical Working Group.

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## 2. Study Team

The Scoping Assessment was carried out with the following participants:

- Independent Electricity System Operator (IESO)
- Hydro One Networks Inc. (Transmission)
- Toronto Hydro Electric Systems Limited (Toronto Hydro)
- Alectra Utilities Corporation
- Elexicon Energy Inc.
- Hydro One Networks Inc. (Distribution)

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## 3. Categories of Needs, Analysis and Results

### 3.1 Overview of the Toronto Region

The Toronto electricity planning region includes the area within the municipal boundary of the City of Toronto. The electricity supply to the Toronto Region is shown in Figure 1. The region is supplied by a network of 230 kV lines that run along the northern and western edges of the city, and into the core from the east, providing supply points for step-down stations that supply these areas. The central core of the City of Toronto is supplied by a 115 kV network that connects to the 230 kV system through two 230/115 kV autotransformer stations (Leaside Transformer Station (TS) and Manby TS). A small number of distribution feeders from Toronto also supply customers in the City of Mississauga and City of Pickering.

In addition to the transmission infrastructure described above, the Portlands Energy Centre (550 megawatt [MW] summer capacity) is a natural gas-fired combined cycle power plant that provides a major source of supply to Toronto. This station is located near the Eastern waterfront and is connected to the Hearn Switching Station (SS) shown in Figure 1.

Numerous distributed energy resource (DER) facilities are located throughout the City. For example, through previous procurements such as the Feed-in Tariff program, Renewable Energy Standard Offer Program, and Combined Heat and Power (CHP) Standard Offer Program, approximately 1,900 individual renewable and CHP facilities have been placed in service in the City of Toronto. The total combined electrical supply capacity of these DERs is 106 MW.<sup>1</sup>

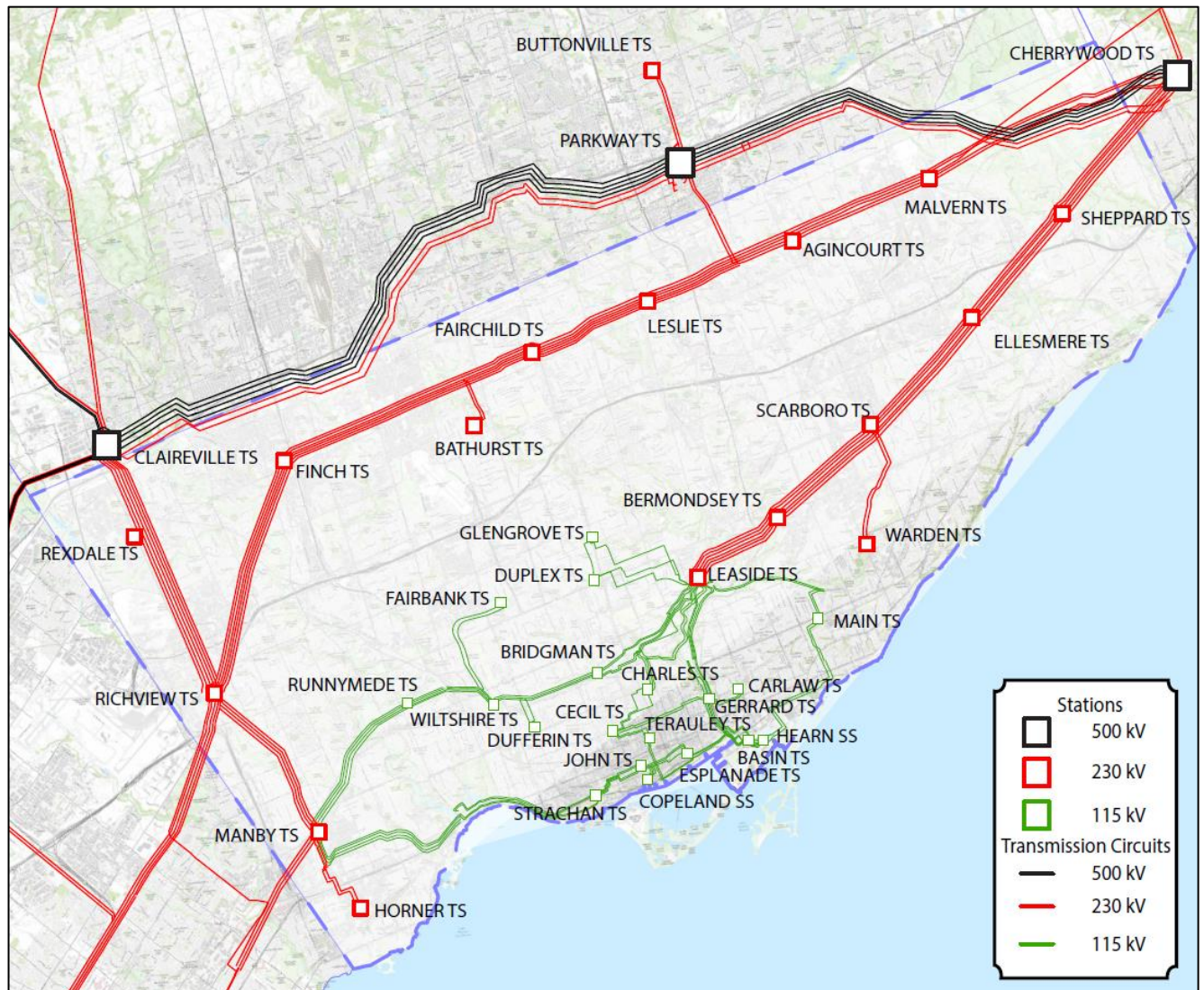
The region is summer peaking and the 2022 peak summertime electricity demand in the Toronto region was approximately 4,400 MW.<sup>2</sup>

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<sup>1</sup> This translates to about 40 MW of “effective” capacity that system planners can count on during the peak demand period (assuming 34% capacity factor for solar PV, 13.6% for wind, and 100% for all other fuel types, including CHP).

<sup>2</sup> The peak electricity demand in summer 2006 was 5,305 MW; in summer 2022, demand was 4,356 MW.

**Figure 1 | Electricity Infrastructure of the Toronto Region**



### 3.1.1 Indigenous Communities

Toronto is home to Indigenous peoples from across Canada. Located near Toronto are the Mississaugas of the New Credit, Six Nations of the Grand River, the Haudenosaunee Confederacy Chiefs Council and MNO Toronto and the York Region Métis Council. The Huron Wendat of Wendake, Quebec have archaeological resources in southern Ontario, including the Toronto area, due to their historical presence there. The IESO will notify New Credit, Six Nations, HCCC, York Region Métis Council and Huron Wendat that regional planning for Toronto is getting underway and invite them to participate in engagement activities.

## 3.2 Background of the Previous Planning Process

The first cycle of the regional planning process for the Toronto region was formally completed in January 2016 with the publication of Hydro One’s Regional Infrastructure Plan (RIP) for the Central Toronto area, following the publication of an IRRP for Central Toronto in April 2015. In February 2017, an update was published to reflect plans to convert commuter heavy rail (Metrolinx - GO) from diesel to electric power.

In mid-2017, Hydro One identified a number of transmission system end-of-life needs in Toronto over the next ten years. The scale and timing of these needs necessitated the initiation of another regional planning cycle. Hydro One initiated a Needs Assessment, which officially started the next regional planning cycle for the region. The Needs Assessment was completed in October 2017, and subsequent Scoping Assessment was completed in 2018. An IRRP was initiated in 2018, and released in 2019. This plan focused on replacement of assets nearing their end of life, and preparing to address local and regional capacity needs emerging in the longer term.

The second round of regional planning for the Toronto region was completed in March 2020, with the release of the Hydro One led RIP.

An updated analysis for the Richview to Manby Upgrade project (now known as the “Etobicoke Greenway Project”) was conducted in 2021. This analysis reaffirmed the findings in the 2019 IRRP and 2020 RIP and recommended the project go ahead.

## 3.3 Needs Identified

For this round of regional planning, Hydro One’s Needs Assessment provided an update on needs identified in the previous planning cycle and the implementation of projects recommended to address them. It also identified new needs in the Toronto region based on the most up-to-date sustainment plans and a new 10-year demand forecast. A summary of the current projects and plans underway to respond to existing needs, plus the new needs, are outlined below.

### 3.3.1 Projects and Plans Underway or Complete to Address Previously Identified Needs

The Needs Assessment report lists the needs identified from the previous planning cycle, and provides an update on the status of project implementation for the options recommended to address them (see Table 1). These projects provide a starting point for future assessments and will be accounted for in this planning cycle.

**Table 1 | Needs Identified in the Previous Cycle with Implementation Plan Update**

Need	Solution and Timing
Copeland TS Phase 2, address capacity need	In-service 2024
Bridgman TS transformer replacement (T11, T12, T13, T14)	Expected completion 2024



Need	Solution and Timing
Fairbank TS transformer replacement (T1, T2, T3, T4)	Expected completion 2024
Main TS transformer replacement (T3, T4)	Expected completion 2024
John TS transformer replacement (T5, T6)	Expected completion 2025
C5E/C7E underground cable replacement between Esplanade TS and Terauley TS	Expected completion 2026
Richview TS to Manby TS 230 kV Corridor Upgrade	Expected completion 2026

Since the previous regional planning cycle, the following additional projects have also been implemented by Hydro One:

- Second DESN at Horner TS, complete 2021-2022
- Refurbishment projects at Runnymede TS (T3, T4), Sheppard TS (T3, T4), and Strachan TS (T12), complete 2021-2022
- Replacement of John TS transformers (T1, T2, T4), complete 2019-2021

### 3.3.2 Needs Requiring Further Coordination or Study in the Current Planning Cycle

The Needs Assessment then identified new or updated needs in the Toronto region using the 10-year station-level demand forecast provided by the local distribution companies (LDCs), updated end-of-life asset condition information from Hydro One, as well as the conservation and demand management (CDM) and distributed generation (DG) forecast provided by the IESO. Several of these needs were determined through the Needs Assessment not to require further coordinated study through the regional planning process (see Table 2). However, many may still require a significant amount of planning or have a shared impact with other system assets or needs. For example, any needs dealing with major right of ways, even routine maintenance or like-for-like replacement, may have an impact on shared, downstream, or alternate facilities. Stepdown station asset renewal needs can also be linked to broader needs, if the station is located within a rapidly growing or supply constrained area. These types of needs do not require coordinated study through an IRRP, but should still be considered in scope of further regional planning activities to ensure that outage schedules and other shared impacts are appropriately accounted for.

**Table 2 | Needs Determined in the Needs Assessment to not Require Further Coordinated Planning**

Need #	Station/Circuit	Description of Need
1	Richview TS to Manby TS 230 kV Corridor <sup>3</sup>	• Line Capacity Need
2	Manby TS, autotransformers (T7, T9, T12) <sup>4</sup>	• Asset renewal need
3	115 kV H1L/H3L/H6LC/H8LC: Leaside Jct. to Bloor St. Jct. overhead section	• Asset renewal need
4	115 kV L9C/L12C: Leaside TS to Balfour Jct. overhead section	• Asset renewal need
5	Strachan TS: T14 & T13/T15	• Asset renewal need
6	Charles TS: T3/T4	• Asset renewal need
7	Duplex TS: T1/T2 & T3/T4	• Asset renewal need
8	Basin TS: T3/T4	• Asset renewal need
9	Scarboro TS: T23	• Asset renewal need
10	Fairchild TS: T1 & T3/T4	• Asset renewal need
11	Bermondsey TS: T3/T4	• Asset renewal need
12	Malvern TS: T3	• Asset renewal need
13	Fairbank TS	• Station Capacity Need
14	Strachan TS	• Station Capacity Need

<sup>3</sup> Further regional planning is not required as the project was recommended in the previous cycle of regional planning. Hydro One is developing the project, with an expected in-service date of mid-2026.

<sup>4</sup> Hydro One will proceed with development work for replacing end-of-life autotransformers. However, the overall need for transformation capacity in Toronto as a whole will be assessed in the upcoming IRRP.

The remaining needs, which were determined through the Needs Assessment to require further coordinated study are listed in Table 3. Most needs deal directly with capacity constraints, or load restoration, as a range of solutions may be considered and the impact on broader system operation would need to be evaluated. Note that some step down station capacity needs (Fairbank TS and Strachan TS) were not included in this list, as solutions to address needs have already been identified.

**Table 3 | Needs identified in the Needs Assessment as Requiring Further Study**

Need #	Station/Circuit	Description of Need
1	115 kV Manby TS to Riverside Jct. Corridor	<ul style="list-style-type: none"> <li>Line capacity need</li> </ul>
2	230 kV Parkway TS to Richview TS Corridor	<ul style="list-style-type: none"> <li>Line capacity need</li> </ul>
3	115kV Leaside TS to Wiltshire TS Corridor	<ul style="list-style-type: none"> <li>Line capacity need</li> </ul>
4	230/115kV Manby W Autotransformers <sup>5</sup>	<ul style="list-style-type: none"> <li>Autotransformer capacity need</li> </ul>
5	230/115kV Leaside TS Autotransformers	<ul style="list-style-type: none"> <li>Autotransformer capacity need</li> </ul>
6	Sheppard TS	<ul style="list-style-type: none"> <li>Station capacity need</li> </ul>
7	Basin TS	<ul style="list-style-type: none"> <li>Station capacity need</li> </ul>
8	Glengrove TS	<ul style="list-style-type: none"> <li>Station capacity need</li> </ul>
9	Finch TS / Bathurst TS	<ul style="list-style-type: none"> <li>Station capacity need</li> </ul>
10	Warden TS	<ul style="list-style-type: none"> <li>Station capacity need</li> </ul>
11	Loss of C14L/C17L	<ul style="list-style-type: none"> <li>Load restoration need</li> </ul>
12	Loss of C18R/P22R	<ul style="list-style-type: none"> <li>Load restoration need</li> </ul>

<sup>5</sup> Hydro One will proceed with development work for replacing end-of-life autotransformers. However, the overall need for transformation capacity will be looked at in the upcoming IRRP.

### 3.3.3 Analysis of Needs and Identification of Region

The Study Team has discussed the needs in the Toronto region and potential planning approaches to address them. The preferred planning approach is generally informed by:

- Timing of the need, including lead time to develop solutions
- The potential linkages between needs and their required coordination, particularly if across overlapping LDC territories or planning regions
- The opportunity for public engagement to inform outcomes
- The potential for exploring multiple types of options to meet the needs (including non-wires alternatives)
- The potential for regional changes having implications on the upstream bulk power system

In general, the more complex a series of needs are and the greater the need for coordination and engagement, the more likely an IRRP will be selected. If needs have few available solutions, are relatively straight forward, and can be implemented without affecting neighbouring areas or the bulk power system, then a more streamlined planning approach with a narrower scope may be appropriate.

The participants agreed that for each of the identified needs requiring further study, a range of alternatives including wires and non-wires solutions should be assessed. Additionally, several needs were identified which do not require further coordinated planning, but should still be considered in scope of further study as the implementation and timing of solutions have the potential to affect other needs in the area. These include needs whose previously recommended solutions are already underway, and asset renewal needs with the potential to affect overall capacity needs in the area.

Based on discussions, it was agreed that an IRRP should be undertaken to further assess these needs. The scope of an IRRP includes an assessment of CDM, DERs, and other community-based solutions. A Draft Terms of Reference for the IRRP is attached in Appendix B.

The participants also agreed, for the purpose of the next regional plan, that the City of Toronto should not be divided into sub-regions. While most of the needs identified impact electricity infrastructure in the downtown area, some needs have been identified in other parts of Toronto, outside of the central part of Toronto.

Lastly, because none of the needs identified directly impact facilities that supply customers of Alectra Utilities Corporation, Elexicon Energy Inc., or Hydro One Distribution, it was agreed that the core Working Group for the IRRP will include the IESO, Toronto Hydro, and Hydro One Transmission. The other utilities will be informed and invited to participate if any needs, or proposed solutions, may affect their facilities or customers.

### 3.3.4 Additional Considerations Associated with Growth and Electrification Targets

The City of Toronto has identified certain areas of the city that will undergo further development and growth. One of these areas is the Port Lands, located in the southern portion of Toronto at the mouth of the Don River. Together with Waterfront Toronto, the City has plans for the Port Lands to be “home to sustainable new communities that deliver affordable housing and job opportunities, along with renewed connections to the water and natural environment.”<sup>6</sup> As such, the currently undeveloped portions of the Port Lands are expected to undergo a significant increase in electricity demand, affecting nearby infrastructure, in particular Basin TS.

Another area of interest is the Downsview area, particularly the area surrounding the Downsview Airport. An update to the secondary plan (known as “Update Downsview”) aims to “plan for a new community within the City and reconnect the Downsview lands with the surrounding neighbourhoods” after Bombardier leaves the Downsview Airport by the end of 2023<sup>7</sup>. Update Downsview plans to facilitate new housing, jobs, parks and other community services in the area. This will likely affect the 230 kV stations located in northern Toronto, primarily Bathurst TS and Finch TS and the circuits that supply them.

For the upcoming IRRP, the Toronto Working Group will engage with stakeholders and communities to ensure growth plans in these areas are considered and reflected in the IRRP electricity demand forecast.

### 3.3.5 Pathways to Decarbonization Report

In December 2022, the IESO published its [Pathways to Decarbonization Report](#). This report was created in response to the Ministry of Energy’s request to evaluate a moratorium on new natural gas generating stations in Ontario and to develop an achievable pathway to decarbonization in the electricity system. The report considered the resource and bulk system implications for meeting two time specific scenarios:

- A “2035 Moratorium” scenario, which considers the potential results of a moratorium on natural gas generation in Ontario’s electricity sector, with a phase out by 2035, where feasible. This scenario also considered the impact of greater uptake of electrified transportation options, among other electrification objectives
- A “2050 Pathways” scenario, which goes beyond the 2035 Moratorium case to consider the phase out of all GHG emitting generation resources, as well as significant demand growth based on theoretical, aggressive, policy-driven electrification in three major sectors: transportation, building heat and industrial process

In the report, the IESO committed to ensuring “that regional planning processes for Toronto and York Region address the unique challenges for local reliability of phasing out natural gas”. Specifically, the Pathways to Decarbonization Report stated:

*“The IESO will ensure that future bulk and regional planning activities... further assess the identified needs and reinforcement options and make recommendations for next steps, including*

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<sup>6</sup> Waterfront Toronto: <https://www.waterfronttoronto.ca/our-projects/scope-scale/port-lands>

<sup>7</sup> Update Downsview: <https://www.toronto.ca/city-government/planning-development/planning-studies-initiatives/update-downsview/>

*development work. In particular, upcoming regional planning activities for both Toronto and York Region will need to examine options for the eventual replacement of the local reliability benefits provided by existing gas.”*

The IESO recognizes the government of Ontario is actively consulting on the Pathways to Decarbonization report. Outcomes of that consultation may inform the IESO’s approach to this regional plan. As such, the Terms of Reference for the Toronto IRRP may be amended at a future time to account for additional objectives, activities, and assumptions required to align deliverables with new provincial direction.

### **3.3.6 GTA Bulk Supply Study**

In December 2022, the IESO also published the [2022 Annual Planning Outlook](#) (APO). The APO is an annual report that provides a long-term view of Ontario's electricity system, forecasting system needs and exploring the province’s ability to meet them. The 2022 APO identified potential issues in the bulk system (i.e. the system that transfers large amounts of power across the province) due to increasing demand and the planned retirement of the Pickering Nuclear Generating Station and indicated that the IESO would undertake a GTA Bulk Supply Study in 2023. This study will review the capability of the bulk power system to deliver power into the broader GTA load centre. As the GTA Bulk Supply Study will be conducted in parallel with regional planning in Toronto, its findings (i.e. needs and recommended solutions) will be coordinated with the Toronto IRRP, and vice-versa.

## 4. Conclusion and Next Steps

The Scoping Assessment concludes that:

- Based on the available information, an IRRP is to be undertaken for the Toronto region;
- No sub-regions within Toronto will be created for the IRRP; the region should be treated as a whole for the purpose of developing a comprehensive plan;
- The implementation of recommendations from the previous planning cycle should continue;
- The composition of the IRRP Working Group will include the IESO, Toronto Hydro, and Hydro One Transmission. Other Local Distribution Companies in the region will be informed of any needs or solutions that may affect their facilities or customers;
- Given the significant anticipated scope of the study, the full 18-month timeline for completion of the IRRP is expected to be required;
- In addition to addressing the needs identified in the Needs Assessment, two focus areas will be examined in detail in the IRRP: Port Lands and Downsview;
- The Toronto IRRP will co-ordinate its findings with the GTA Bulk Supply Study, and vice-versa;
- The IESO may amend the Terms of Reference for the Toronto IRRP as required to align with provincial direction following consultation related to the Pathways to Decarbonization Report.

All IRRPs will include opportunities for engagement with local communities and stakeholders, as well as include discussion of any local initiatives focused on energy and/or reducing GHG emissions, and how the IRRP can coordinate with these plans. This could include Community Energy Plans, Net-Zero strategies, or similar. Particular attention will be paid to opportunities for information sharing and/or coordination of goals and outcomes.

The draft Terms of Reference for the Toronto IRRP is attached in Appendix B.

## Appendix A – List of Acronyms

<b>Acronym</b>	<b>Definition</b>
APO	Annual Planning Outlook
CDM	Conservation and Demand Management
DER	Distributed Energy Resource
DG	Distributed Generation
FIT	Feed-in-Tariff
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resource Plan
kV	Kilovolt
LDC	Local Distribution Company
MW	Megawatt
NERC	North American Electric Reliability Corporation
NPCC	Northeast Power Coordinating Council
OEB	Ontario Energy Board
ORTAC	Ontario Resource and Transmission Assessment Criteria
RIP	Regional Infrastructure Plan
TS	Transformer Station



# Appendix B – Toronto Region Integrated Regional Resource Plan (IRRP) Terms of Reference

## 1. Introduction and Background

These Terms of Reference establish the objectives, scope, roles and responsibilities, deliverables and timelines for an Integrated Regional Resource Plan (IRRP) for the Toronto region.

Based on the power system needs identified throughout the region (including a number of transmission stations and lines approaching end-of-life in the near term and medium term), strong urban growth and intensification projections in the City of Toronto, expansion of electrified transit, and potential demand and resource pressures from decarbonization policies, an IRRP is the appropriate planning approach for this region.

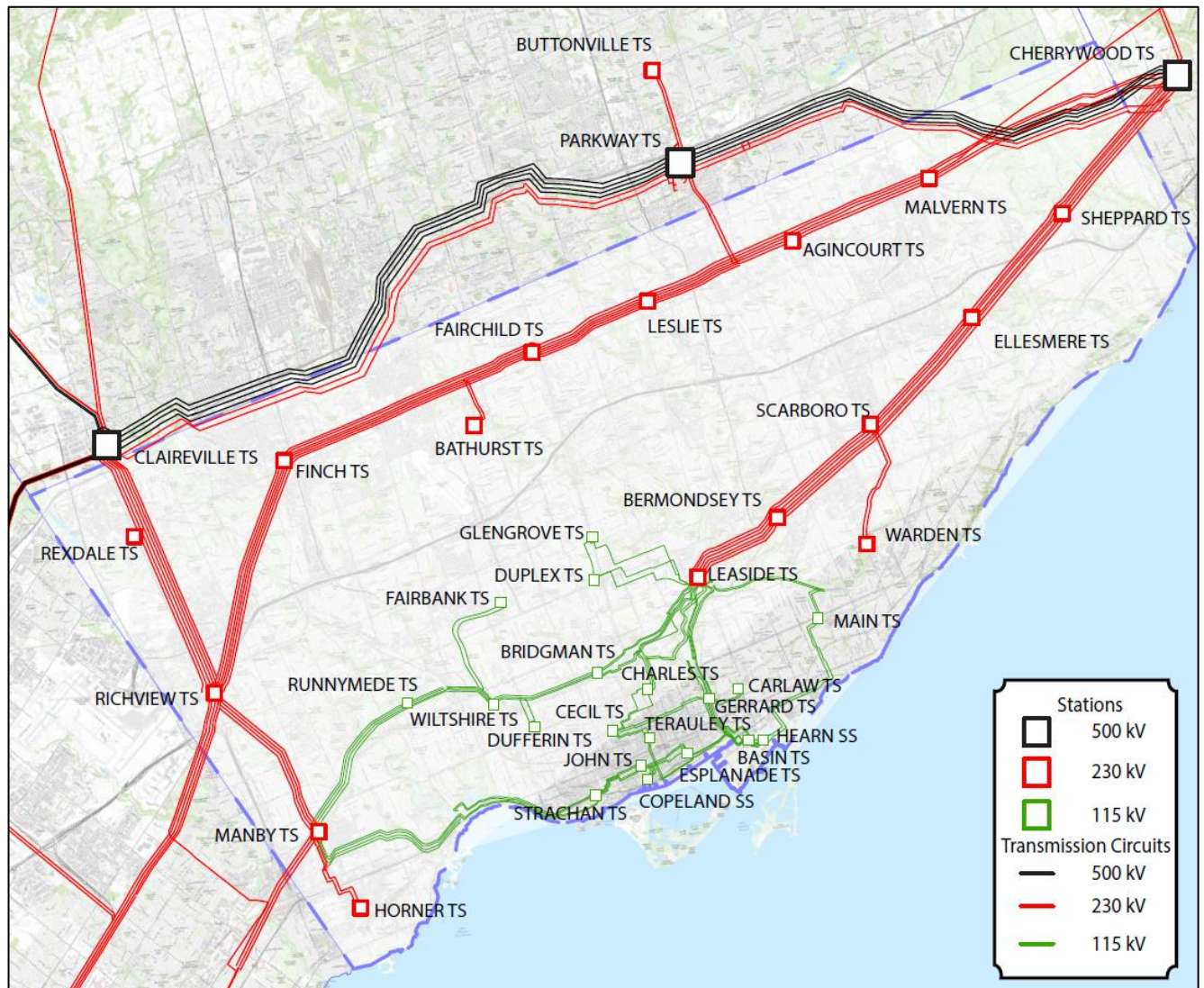
### 1.1 The Toronto Region

The Toronto electricity planning region includes the area within the municipal boundary of the City of Toronto. The electricity supply to the Toronto Region is shown in Figure 2. The region is supplied by a network of 230 kV lines that run along the northern and western edges of the city, and into the core from the east, providing supply points for step-down stations that supply these areas. The central core of the City of Toronto is supplied by a 115 kV network that connects to the 230 kV system through two 230/115 kV autotransformer stations (Leaside Transformer Station (TS) and Manby TS). A small number of distribution feeders from Toronto also supply customers in the City of Mississauga and City of Pickering.

Toronto is home to Indigenous peoples from across Canada. Located near Toronto are the Mississaugas of the New Credit, Six Nations of the Grand River, the Haudenosaunee Confederacy Chiefs Council and MNO Toronto and the York Region Métis Council. The Huron Wendat of Wendake, Quebec have archaeological resources in southern Ontario, including the Toronto area, due to their historical presence there. The IESO will notify New Credit, Six Nations, HCCC, York Region Métis Council and Huron Wendat that regional planning for Toronto is getting underway and invite them to participate in engagement activities.

For the purpose of this IRRP, no divisions are proposed that would create any sub-regions to assess within the City of Toronto.

**Figure 2 | Electricity Infrastructure of the Toronto Region**



## 1.2 Background

In December 2022, Hydro One completed the Needs Assessment report for the Toronto region. Several needs were identified, and a Scoping Assessment was subsequently commenced to determine the preferred planning approach. An IRRP is ultimately recommended on the basis of the scale of load growth anticipated, potential for diverse types of solution (including wires and non wires), and long term uncertainty associated with city development plans and the potential impact of municipal, provincial, and federal decarbonization and electrification policies.

## 2. Objectives

1. Assess the adequacy and reliability of the portion of the IESO-controlled grid<sup>8</sup> that provides electricity supply to the Toronto region over the next 25 years.<sup>9</sup>
2. Account for major asset renewal/end-of-life needs, capacity needs, enhancing reliability and resilience, uncertainty in the outlook for electricity demand, and local priorities in developing a comprehensive plan.
3. Consider potential impacts of electrification targets and other policy decisions on needs identified and recommended outcomes, consistent with provincial direction.
4. Evaluate opportunities for cost effective non-wires alternatives, including conservation and demand management (CDM) and distributed energy resources (DER), as well as wires approaches for addressing the needs identified.
5. Develop an implementation plan that maintains flexibility in order to accommodate changes in key assumptions over time. The implementation plan should identify actions for near-term needs, preparation work for medium-term needs, and planning direction for the long-term.

## 3. Scope

### 3.1 Needs to be Addressed

The IRRP will develop and recommend an integrated plan to meet the needs of the Toronto region. The plan is a joint initiative involving Toronto Hydro, Hydro One Transmission, and the IESO,<sup>10</sup> and will account for input from the community through engagement activities. The plan will integrate the electricity demand outlook scenarios, CDM, DER uptake, transmission and distribution system capabilities, and align with relevant community plans, bulk system developments, and policy direction as applicable.

The scope of the Toronto IRRP includes the following needs, as identified in the Needs Assessment:

**Table 4 | Needs Identified in the Needs Assessment as Requiring Further Study**

Facilities	Type of Need	Expected Timing <sup>11</sup>
115 kV Manby TS to Riverside Jct. Corridor	Line capacity need	2028
230 kV Parkway TS to Richview TS Corridor	Line capacity need	Beyond 2031
115kV Leaside TS to Wiltshire TS Corridor	Line capacity need	Beyond 2031

<sup>8</sup> The scope of the assessment includes transmission stations.

<sup>9</sup> The typical planning horizon in a regional study is 20 years; however, Toronto Hydro produces a long-range forecast spanning 25 years and this forecast will be used as the basis for assessing long-term system needs in the IRRP.

<sup>10</sup> Alectra Utilities, Elexicon Energy Inc. and Hydro One Distribution are also supplied by feeders from Toronto. These utilities will not form part of the core Technical Working Group. However, they will be informed of any developments that may impact their facilities and/or customers.

<sup>11</sup> For end-of-life needs, the date refers to the anticipated timing that a solution will need to be in place. These timelines will be subject to further review and analysis in subsequent planning stages.

Facilities	Type of Need	Expected Timing <sup>11</sup>
230/115kV Manby W Autotransformers	Autotransformer capacity need	Beyond 2031
230/115kV Leaside TS Autotransformers	Autotransformer capacity need	Beyond 2031
Sheppard TS	Station capacity need	Beyond 2031
Basin TS	Station capacity need	Beyond 2031
Glengrove TS	Station capacity need	Beyond 2031
Finch TS / Bathurst TS	Station capacity need	Beyond 2031
Warden TS	Station capacity need	Beyond 2031
Loss of C14L/C17L	Load restoration need	2031
Loss of C18R/P22R	Load restoration need	2031

Other identified needs in the Needs Assessment not listed in Table 4 above will proceed with Local Planning or Regional Infrastructure Planning as appropriate. Hydro One will keep the Working Group informed on development of options to those needs.

### 3.2 Additional Considerations Associated with Growth and Electrification Targets

The City of Toronto has identified certain areas of the city that will undergo further development and growth. One of these areas is the Port Lands, located in the southern portion of Toronto at the mouth of the Don River. Together with Waterfront Toronto, the City has plans for the Port Lands to be “home to sustainable new communities that deliver affordable housing and job opportunities, along with renewed connections to the water and natural environment.”<sup>12</sup> As such, the currently undeveloped portions of the Port Lands are expected to undergo a significant increase in electricity demand, affecting nearby infrastructure, in particular Basin TS.

Another area of interest is the Downsview area, particularly the area surrounding the Downsview Airport. An update to the secondary plan (known as “Update Downsview”) aims to “plan for a new community within the City and reconnect the Downsview lands with the surrounding neighbourhoods” after Bombardier leaves the Downsview Airport by the end of 2023<sup>13</sup>. Update Downsview plans to facilitate new housing, jobs, parks and other community services in the area. This will likely affect the 230 kV stations located in northern Toronto, primarily Bathurst TS and Finch TS and the circuits that supply them.

For the upcoming IRRP, the Toronto Working Group will engage with stakeholders and communities to ensure growth plans in these areas are considered and reflected in the IRRP electricity demand forecast.

<sup>12</sup> Waterfront Toronto: <https://www.waterfronttoronto.ca/our-projects/scope-scale/port-lands>

<sup>13</sup> Update Downsview: <https://www.toronto.ca/city-government/planning-development/planning-studies-initiatives/update-downsview/>

### 3.3 Pathways to Decarbonization Report

In December 2022, the IESO published its [Pathways to Decarbonization Report](#). This report was created in response to the Ministry of Energy's request to evaluate a moratorium on new natural gas generating stations in Ontario and to develop an achievable pathway to decarbonization in the electricity system. The report considered the resource and bulk system implications for meeting two time specific scenarios:

- A "2035 Moratorium" scenario, which considers the potential results of a moratorium on natural gas generation in Ontario's electricity sector, with a phase out by 2035, where feasible. This scenario also considered the impact of greater uptake of electrified transportation options, among other electrification objectives
- A "2050 Pathways" scenario, which goes beyond the 2035 Moratorium case to consider the phase out of all GHG emitting generation resources, as well as significant demand growth based on theoretical, aggressive, policy-driven electrification in three major sectors: transportation, building heat and industrial process

In the report, the IESO committed to ensuring "that regional planning processes for Toronto and York Region address the unique challenges for local reliability of phasing out natural gas". Specifically, the Pathways to Decarbonization Report stated:

*"The IESO will ensure that future bulk and regional planning activities... further assess the identified needs and reinforcement options and make recommendations for next steps, including development work. In particular, upcoming regional planning activities for both Toronto and York Region will need to examine options for the eventual replacement of the local reliability benefits provided by existing gas."*

The IESO recognizes the government of Ontario is actively consulting on the Pathways to Decarbonization report. Outcomes of that consultation may inform the IESO's approach to this regional plan. As such, this Terms of Reference may be amended at a future time to account for additional objectives, activities, and assumptions required to align the Toronto IRRP deliverables with new provincial direction.

### 3.4 GTA Bulk Supply Study

In December 2022, the IESO also published the [2022 Annual Planning Outlook](#) (APO). The APO is an annual report that provides a long-term view of Ontario's electricity system, forecasting system needs and exploring the province's ability to meet them. The 2022 APO identified potential issues in the bulk system (i.e. the system that transfers large amounts of power across the province) due to increasing demand and the planned retirement of the Pickering Nuclear Generating Station and indicated that the IESO would undertake a GTA Bulk Supply Study in 2023. This study will review the capability of the bulk power system to deliver power into the broader GTA load centre. As the GTA Bulk Supply Study will be conducted in parallel with regional planning in Toronto, its findings (i.e. needs and recommended solutions) will be coordinated with the Toronto IRRP, and vice-versa.

## 4. Activities

The IRRP process will consist of the activities as listed below. The activities and anticipated timelines are summarized in Table 5 at the end of this document. The first major planning activity following preparation of this Terms of Reference is the development of the electricity demand forecast to serve as the basis for conducting system assessments. The timing for initiating the assessment (Activity 3) and all subsequent plan development activities will be contingent on the Working Group agreeing on the demand forecast to be used.

- 1) Develop an electricity demand forecast for the Toronto region. This may be comprised of a number of electricity demand scenarios that account for uncertain elements that can affect (e.g., raise or lower) the need for electricity in the region:
- 2) Confirm baseline technical assumptions including infrastructure ratings, system topology and relevant base cases for simulating the performance of the electric power system. Collect information on:
  - a. Transformer, line and cable continuous ratings, long-term and short-term emergency ratings;
  - b. Known reliability issues and load transfer capabilities;
  - c. Customer load breakdown by transformer station;
  - d. Historical and present CDM peak demand savings and installed/effective DER capacity, by transformer station.
- 3) Perform assessments of the capacity, reliability and security of the electric power system under each demand outlook scenario.
  - a. Confirm and/or refine the needs listed earlier in this section using the demand outlook; establish the sensitivity of each need to different demand outlook scenarios.
  - b. Identify additional infrastructure capacity needs and any additional load restoration needs; if new needs are discovered, determine the appropriate planning approach for addressing them.
- 4) Identify options for addressing the needs, including, non-wires and wires alternatives. Where necessary, develop portfolios of solutions comprising a number of options that, when combined, can address a need or multiple needs.
  - a. Collect information about the attributes of each option: cost, performance, timing, risk, etc.
  - b. Develop cost estimates for all screened-in options as a means of informing further evaluations of alternatives.
  - c. Seek cost-effective opportunities to manage growth, by identifying opportunities to reduce electricity demand.
- 5) Evaluate options using criteria including, but not limited to the areas of: technical feasibility and timing, economics, reliability performance, risk, environmental, regulatory, and social factors. Evaluation criteria will be informed through community engagement activities and reflect attributes deemed important to the community-at-large.
- 6) Develop recommendations for actions and document them in an implementation plan, to address needs in the near-term and medium-term.

- 7) Develop a long-term plan for the electricity system in Toronto to address the identified long-term needs, taking into account uncertainty inherent in long-term planning, local and provincial policy goals, commitments, and climate change action plans.
  - a. Discuss possible ways the power system in Toronto could evolve to address potential long-term needs, support the achievement of local and provincial long-term policy goals and plans, and support the achievement of the long-term vision for the electricity sector.
  - b. During the development of the plan, seek community and stakeholder input to confirm the long-term vision, expected impacts on the electricity system, and inform the recommended actions through engagement.
- 8) Complete an IRRP report documenting the near-term and medium-term needs, recommendations, and implementation actions; and long-term plan recommendations.

In order to carry out this scope of work, the Working Group will consider the data and assumptions outlined in section 4 below.

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## 5. Data and Assumptions

The plan will consider the following data and assumptions:

- Demand Data
  - Historical coincident and non-coincident peak demand information and trends for the region
  - Historical weather correction, for median and extreme conditions
  - Gross peak demand forecast scenarios by TS, etc.
  - Coincident peak demand data
  - Identified potential future load customers, including transit expansions, electrification of personal vehicles, space heating/cooling, water heating, and other end-uses due to provincial and local GHG emissions reduction policies and targets
- Conservation and Demand Management
  - LDC CDM plans
  - Incorporation of verified LDC results and other CDM programs/opportunities in the area
  - Long-term conservation forecast for LDC customers, based on region's share of the provincial target found in the 2021-2024 CDM Framework
  - Conservation potential studies, if available
  - Potential for CDM at transmission-connected customers' facilities, if applicable
  - Load segmentation data for each TS based on customer type (residential, commercial, institutional, industrial)
  - Local building codes, energy performance requirements, etc.
- Local resources
  - Existing local generation resources, including distributed energy resources (DER), district energy resources, customer-based generation, as applicable
  - Existing or committed renewable generation from Feed-in-Tariff (FIT) and non-FIT procurements
  - Expected performance/dependability/output of local generation resources coincident with the local peak demand period
  - Future district energy plans, combined heat and power, energy storage, or other generation proposals, including requirements for on-site back-up and emergency generation
- Relevant local and provincial plans and studies, as applicable
  - LDC Distribution System Plans
  - Community Energy Plans and Municipal Energy Plans
  - City policies with an impact on electricity usage, including TransformTO
  - Municipal Growth Plans
  - Future transit plans impacting electricity use, including personal vehicle electrification, transit expansion (e.g. Ontario Line), and transit electrification (e.g. GO train electrification)
  - Pathways to Decarbonization Report
- Criteria, codes and other requirements
  - Ontario Resource and Transmission Assessment Criteria (ORTAC)
    - Supply capability



- Load security
    - Load restoration requirements
  - NERC Reliability Standards and NPCC Reliability Criteria and Directories, as applicable
  - OEB Transmission System Code
  - OEB Distribution System Code
  - Reliability considerations, such as the frequency and duration of interruptions to transmission delivery points
  - Other applicable requirements, including municipal requirements
- Existing system capability
    - Transmission line ratings as per transmitter records
    - System Limits as modelled, defined and determined by the IESO and incorporated into the IESO Power Flow base cases
    - Transformer station ratings (10-day LTR) as per asset owner
    - Load transfer capabilities
    - Technical and operating characteristics of local generation
  - End-of-life asset considerations/sustainment plans
    - Transmission assets
    - Distribution assets, as applicable
  - Other considerations, as applicable

## 6. Technical Working Group

The IRRP Technical Working Group will consist of planning representatives from the following organizations:

- Independent Electricity System Operator (*Lead for the IRRP*)
- Toronto Hydro Electric System Limited (Toronto Hydro)
- Hydro One Networks Inc. (Transmission)

The following LDCs will not be part of the IRRP Technical Working Group but will be informed of any developments that may impact their facilities and/or customers:

- Alectra Utilities Corporation
- Elexicon Energy Inc.
- Hydro One Networks Inc. (Distribution)

### 6.1 Authority and Funding

Each entity involved in the study will be responsible for complying with regulatory requirements as applicable to the actions/tasks assigned to that entity under the implementation plan resulting from this IRRP. For the duration of the study process, each participant is responsible for their own funding.

## 7. Engagement

Integrating early and sustained engagement with communities and stakeholders in the planning process was recommended to and adopted by the provincial government to enhance the regional planning and siting processes in 2013. These recommendations were subsequently referenced in the 2013 Long Term Energy Plan. As such, the Technical Working Group is committed to conducting plan-level engagement throughout the development of the Toronto IRRP.

The first step in engagement will consist of the development of a public engagement plan, which will be made available for comment before it is finalized. The data and assumptions as outlined in Section 5.0 will help to inform the scope of community and stakeholder engagement to be considered for this IRRP.

## 8. Activities, Timeline, and Primary Accountability

**Table 5 | IRRP Timelines & Activities**

Activity	Lead Responsibility	Deliverable(s)	Timeframe
1. Prepare Terms of Reference considering stakeholder input	IESO	Finalized Terms of Reference	March 2023
2. Develop the planning forecast for the region		Long-term planning forecast scenarios	Q2-Q4 2023
a. Establish historical coincident peak demand information	IESO		
b. Establish historical weather correction, median and extreme conditions	IESO		
c. Establish gross peak demand forecast	Toronto Hydro		
d. Establish existing, committed, and potential DG	IESO, Toronto Hydro		
e. Establish near- and long-term conservation forecast based on planned energy efficiency activities and codes and standards	IESO		

Activity	Lead Responsibility	Deliverable(s)	Timeframe
3. Confirm load transfer capabilities under normal and emergency conditions – for the purpose of analyzing transmission system needs and identifying options for addressing these needs	Toronto Hydro/ Hydro One	Load transfer capabilities under normal and emergency conditions	Q1 2024
4. Provide and review relevant community plans, if applicable	Toronto Hydro, communities, stakeholders, and IESO	Relevant community plans	Q1 2024
5. Complete system studies to identify needs over a 20-year time horizon  Obtain PSS/E base case  Apply reliability criteria as defined in ORTAC and other applicable criteria to demand forecast scenarios  Confirm and refine the need(s) and timing/load levels	IESO	Summary of needs based on demand forecast scenarios for the 20-year planning horizon	Q1-Q2 2024
6. Develop options and alternatives		Develop flexible planning options for forecast scenarios	Q2 2024
a. Conduct a screening to identify which wires and non-wires options warrant further analysis	IESO		
b. Verify the LMC of the system to better determine timing of needs and support options development	IESO		
c. Develop screened-in energy efficiency options	IESO and Toronto Hydro		

Activity	Lead Responsibility	Deliverable(s)	Timeframe
d. Develop screened-in local generation/demand management options	IESO and Toronto Hydro		
e. Develop the screened-in transmission and distribution alternatives (i.e., alignment with EOL sustainment plans, load transfers)	IESO, Hydro One Transmission, and Toronto Hydro		
f. Develop portfolios of integrated alternatives	IESO, Hydro One Transmission, and Toronto Hydro		
g. Technical comparison and evaluation	IESO, Hydro One Transmission, and Toronto Hydro		
7. Plan and undertake community & stakeholder engagement		Community and Stakeholder Engagement Plan  Input from local communities, First Nation communities, and Métis Nation of Ontario	Ongoing as required  IRRP engagement to be launched in Q2-Q3 2023
a. Early engagement including with local municipalities and First Nation communities within study area, First Nation communities who may have an interest in the study area, and the Métis Nation of Ontario	IESO, Hydro One Transmission, and Toronto Hydro		

Activity	Lead Responsibility	Deliverable(s)	Timeframe
b. Develop communications materials	IESO, Hydro One Transmission, and Toronto Hydro		
c. Undertake community and stakeholder engagement	IESO, Hydro One Transmission, and Toronto Hydro		
d. Summarize input and incorporate feedback	IESO, Hydro One Transmission, and Toronto Hydro		
8. Develop long-term recommendations and implementation plan based on community and stakeholder input	IESO	Implementation plan Monitoring activities and identification of decision triggers Procedures for annual review	Q1-Q2 2024
9. Prepare the IRRP report detailing the recommended near, medium, and long-term plan for approval by all parties	IESO	IRRP report	September 2024

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