



GTA North (York Region) Scoping Assessment Outcome Report

October 12, 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 GTA North region (also known as “York Region”), and it was initiated in March 2023. Information and links to earlier products are available on the IESO webpage¹. The Needs Assessment is the first step in the regional planning process and was carried out by the Technical Working Group (TWG) led by Hydro One. The Needs Assessment Report² was finalized on July 14, 2023 and identified needs that require further regional coordination. The Technical Working Group reviewed the nature and timing of all the needs identified in the region through the Needs Assessment process, to determine the most appropriate planning approach. It also considered provincial initiatives, including the IESO’s recent Pathways to Decarbonization report and the provincial government’s Powering Ontario’s Growth report.

The Scoping Assessment process considers which of three potential planning approaches is most appropriate for addressing the region’s needs, including: an IRRP – where both wires and non-wires options have the potential to address the needs and are considered as alternatives; a Regional Infrastructure Plan (RIP), which considers only wires (transmission and distribution) options; or a local plan undertaken by the transmitter and affected local distribution company or customer, 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 determines whether sub-regions should be defined;
- 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.

¹ GTA North (York Region) Regional Planning Webpage, IESO. <https://www.ieso.ca/en/Get-Involved/Regional-Planning/GTA-and-Central-Ontario/GTA-North>

² Needs Assessment Report GTA North Region, Hydro One. <https://www.hydroone.com/abouthydroone/CorporateInformation/regionalplans/gtanorth/Documents/GTA%20North%20Region%20NA%20Report%20Final%20July%2014%202023.pdf>



2. Technical Working Group

The Scoping Assessment was carried out with the following participants:

- Independent Electricity System Operator (IESO)
- Alectra Utilities Corporation (Alectra)
- Hydro One Networks Inc. (Distribution)
- Newmarket-Tay Power Distribution Ltd (NT Power)
- Toronto Hydro-Electric System Limited (THESL)
- Hydro One Networks Inc. (Transmission), as the lead transmitter



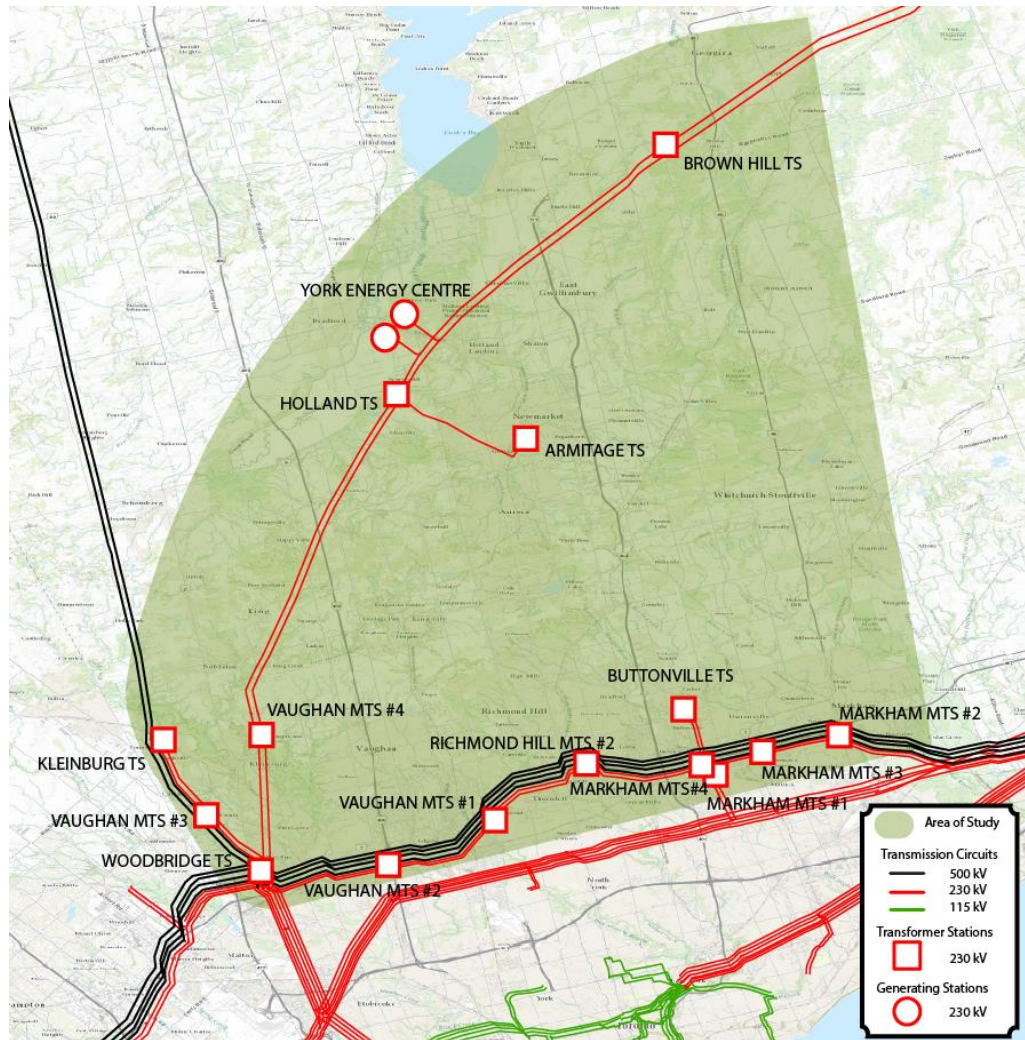
3. Categories of Needs, Analysis and Results

3.1 Overview of York Region

The GTA North Region, shown in Figure 1, roughly comprises the municipalities in the Regional municipality of York, including the Cities of Markham, Richmond Hill and Vaughan, the Towns of Aurora, East Gwillimbury, Georgina, Newmarket, Whitchurch-Stouffville, and the Township of King. Since the GTA North planning region roughly aligns with the boundaries of the Regional Municipality of York, it is commonly referred to as “York Region.”

Indigenous communities including Alderville First Nation, Beausoleil First Nation, Curve Lake First Nation, Chippewas of Georgina Island First Nation, Haudenosaunee Development Institute/Hereditary Chiefs Council, Hiawatha First Nation, Kawartha Nishnawbe, Mississaugas of Scugog Island First Nation, Rama First Nation, Six Nations of the Grand River and the Mississaugas of the Credit First Nation are located in or have historical interest in the area.

Figure 1 | York Region Electricity Infrastructure



York Region is one of the fastest growing regions in Ontario. Provincial policies, including the Places to Grow Act have played a key role in facilitating and driving development in this region. Extensive urbanization in these areas over the past decade has resulted in continued increase in electricity demand. In 2022, York Region had an electricity peak demand of over 2,000 MW. Under the most recent update to the Places to Grow Act³, significant population growth and intensification are expected to continue in York Region in the coming decades.

At the same time, many municipalities and communities in York Region are actively engaged in local energy planning activities and are exploring opportunities to better manage their energy uses using community-based energy solutions, such as energy storage, combined heat and power and renewable energy resources.

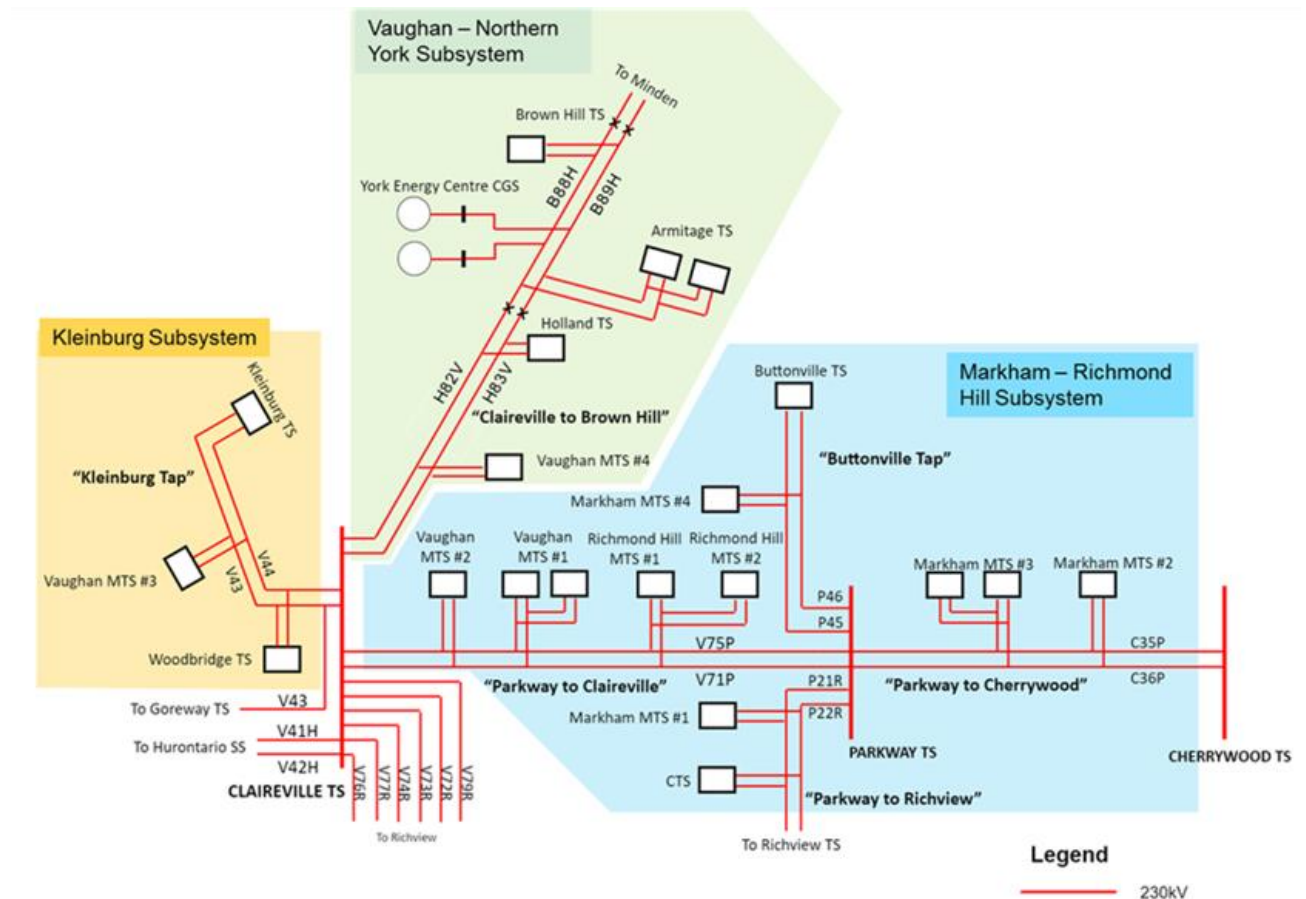
³ A Place to Grow. Growth Plan for the Greater Golden Horseshoe. Office Consolidation 2020 <https://files.ontario.ca/mmah-place-to-grow-office-consolidation-en-2020-08-28.pdf>

3.1.1 Electricity System Supplying York Region

The electricity system supplying York Region consists of a high voltage (230 kV) network of transmission lines, shown in Figure 2. In addition to delivering power to this area, this network also serves as a pathway for power to flow between northern and southern Ontario as well as across the GTA.

York Energy Centre (YEC), a 393 MW natural gas-fired generating station, also provides a local source of supply within the region.

Figure 2 | Single Line Diagram of York Region



Power from the 230 kV network is delivered to communities and customers through 16 transformer stations located throughout the region that supply low-voltage (<50 kV) distribution networks and, in some cases, large individual customers. In York Region, the low-voltage distribution systems that deliver power to homes and businesses are managed and operated by four local distribution companies (LDCs): Alectra, NT Power, THESL, and Hydro One Distribution.

For the purpose of regional planning, this 230kV network is broken down into three subsystems, as shown in Figure 2:

- **Kleinburg Subsystem (V44/V43)** - This subsystem consists of three step-down transformer stations that primarily supply rural and urban communities in Vaughan and Caledon, as well as some areas of Brampton, Mississauga, and Toronto. Power is delivered into this subsystem from Claireville TS.
- **Vaughan-Northern York Subsystem (B88H/B89H, H82V/H83V)** - This subsystem consists of five step-down transformer stations that supply northern Vaughan and communities in Northern York Region (Aurora, Newmarket, King, East Gwillimbury, Whitchurch-Stouffville and Georgina and the Chippewas of Georgina Island). YEC is connected to these 230 kV circuits. This subsystem also serves as a pathway for power to flow between northern and southern Ontario.
- **Markham-Richmond Hill Subsystem (V75P/V71P, P45/P46, P21R/P22R, C35P/C36P)** - This subsystem consists of 12 step-down transformer stations that are located in urban communities in the Markham, Richmond Hill and Vaughan areas. This subsystem also serves as a pathway for power to flow across the GTA along the Parkway Belt/Highway 407 transmission corridor.

3.2 Previous Regional Plans

The first cycle of the regional planning process for York Region was completed in 2016 with the publication of the Region’s first Integrated Regional Resource Plan (IRRP)⁴. This plan focused on ensuring there was adequate supply to support near-term growth in the Vaughan area and on minimizing the impact of supply interruptions under major outage conditions. It recommended a number of projects to support near-term growth and to maximize the use of the existing system, including the installation of a new transformer station in Vaughan and new switching equipment at Holland transformer station and on the Parkway Belt/Highway 407 corridor.

The second cycle of regional planning was completed in 2020⁵. This IRRP mainly focused on medium and long-term system and station capacity needs. It explored multiple alternatives to increase supply capacity to York Region in the long term. As most of the needs occurred in the long-term timeframe, this plan recommended actions to preserve options and that they be revisited in the third cycle of regional planning.

⁴ Available upon request to engagement@ieso.ca.

⁵ 2020 York Region IRRP, IESO. <https://www.ieso.ca/-/media/Files/IESO/Document-Library/regional-planning/York/York-IRRP-20200228.ashx>

3.3 Needs Identified

3.3.1 Needs Identified in the Needs Assessment Phase of the Current Planning Cycle

For this third cycle of regional planning, Hydro One's Needs Assessment Report 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 York Region based on a new 10-year station-level demand forecast provided by the local distribution companies (LDCs), updated transmission asset condition information, and updated conservation and demand management (CDM) and distributed generation (DG) forecasts provided by the IESO.

Some of these needs were determined through the Needs Assessment not to require further coordinated study through the regional planning process (see Table 1). However, most of the identified needs were determined to require a significant amount of planning, have a shared impact with other system assets or needs, or have the potential to be met with a combination of wires and non-wires alternatives. Therefore, the Needs Assessment concluded that these needs require further coordination (see Table 2).

Table 1 | Needs Determined in the Needs Assessment to not Require Further Coordinated Planning

Need #	Station/Circuit	Description of Need
1	Woodbridge TS	End of life replacement of transformer T5
2	Toubner TS	Build new station in Markham ⁶
3	Vaughan MTS #6	Build new station in Vaughan ⁴

⁶ This new station is for a single, large, industrial customer. Upstream effects of the new station on the 230 kV network will be studied in this cycle of regional planning.

Table 2 | Needs Identified in the Needs Assessment as Requiring Coordination

Need #	Location of Need	Need Type	Need Description
1	Kleinburg	Station Capacity	Significant new load is forecast to connect at the 44kV bus in the 2023-2024 period, exceeding its capacity.
2	Markham	Station Capacity	Markham area stations are expected to exceed their capacities by 2028
3	Buttonville Tap transmission corridor	System Capacity	Circuits supplying Markham MTS #4 and Buttonville TS are expected to exceed their capacities by 2028
4	Northern York Region	Station Capacity	Northern York region is expected to reach the area's stations' capacity by 2027
5	Vaughan	Station Capacity	Vaughan area stations are expected to exceed their capacities by 2030
6	Richmond Hill	Station Capacity	Richmond Hill area stations are expected to exceed their capacities by 2032
7	Claireville to Brown Hill transmission corridor	System Capacity	Loading on the Claireville TS x Brown Hill TS corridor is expected to exceed its capacity by the early 2030s.
8	Kleinburg Tap transmission corridor	Load Restoration	Inability to restore customer loads within the timelines established by planning criteria following a major system disturbance
9	Claireville to Brown Hill transmission corridor	Load Restoration	Inability to restore customer loads within the timelines established by planning criteria following a major system disturbance.
10	Buttonville Tap transmission corridor	Load Restoration	Inability to restore customer loads within the timelines established by planning criteria following a major system disturbance.

Need #	Location of Need	Need Type	Need Description
11	Parkway to Claireville transmission corridor	Load Security	The loss of this line can result in an interruption to over 600 MW of customer load, which is more than permitted by planning criteria

3.3.2 Determination of Study Scope

The Technical Working Group (TWG) has discussed the identified needs in York 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 implications on the upstream bulk power system
- The opportunity to explore effects of a high electrification scenario.

In general, the more complex a set of needs are and the greater the need for coordination and engagement, the more likely an IRRP will be selected as the preferred regional planning approach. If the needs are relatively straightforward, there are few feasible alternatives to address them, and solutions 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 TWG agreed that for each of the identified needs requiring coordination, a range of alternatives including wires and non-wires solutions should be assessed.

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

The TWG has also determined that, as the identified needs span all areas of York Region, and there may be alternatives that address multiple needs across the region, there is no benefit to defining sub-regions for separate study within this IRRP process. Therefore, the recommended IRRP scope covers York Region in its entirety. Additionally, several needs were identified which do not require further coordinated planning (see Table 1), 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.

3.3.3 Pathways to Decarbonization and Powering Ontario's Growth

In December 2022, the IESO published its Pathways to Decarbonization Report⁷. 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 Greenhouse Gas (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 processes

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."

In the provincial government's "Powering Ontario's Growth" report⁸, it is recognized that "growth to date has been met by existing transmission lines, energy efficiency programs and strategically located generation assets" and recognizes the challenge of "future demand growth and a shift away from natural gas electricity generation".

Accordingly, the York Region IRRP will evaluate a scenario in which YEC, a local gas-fired generation plant, is phased out. The Pathways to Decarbonization report had previously identified that this could not be achieved within the timelines considered by the 2035 Moratorium scenario, so the IRRP will include identification of required system investments needed to accommodate this phase-out, and an estimated timeline for how quickly this could be accomplished.

Consideration will also be given to a separate "high electrification" demand forecast that would examine and evaluate the needs that arise on the electricity system in York Region under a more aggressive decarbonisation scenario and provide recommendations on near-term actions to facilitate this transition.

⁷ Pathways to Decarbonization, IESO. <https://www.ieso.ca/-/media/Files/IESO/Document-Library/gas-phase-out/Pathways-to-Decarbonization.ashx>

⁸ Powering Ontario's Growth, Province of Ontario. <https://www.ontario.ca/page/powering-ontarios-growth>

A summary of planning scenarios for inclusion in the IRRP is provided in Table 3, below:

Table 3 | Summary of Planning Scenarios

Scenario	Demand Forecast	Generation Assumptions	Notes
1a	Basecase	Continued operation of York Energy Centre	Basecase Scenario. Needs and recommendations will form the main deliverables of the IRRP
1b	Basecase	Phase out of York Energy Centre	Identify incremental needs and recommended options resulting from York Energy Centre phase out
2	High Electrification	Phase out of York Energy Centre	Identify incremental needs and recommend options resulting from transition to net zero energy system

3.3.4 GTA Bulk Supply Study

In December 2022, the IESO also published the 2022 Annual Planning Outlook⁹ (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 York Region, its findings (i.e. needs and recommended solutions) will be coordinated with the York Region IRRP, and vice-versa.

⁹ 2022 Annual Planning Outlook. IESO. <https://www.ieso.ca/-/media/Files/IESO/Document-Library/planning-forecasts/apo/Dec2022/2022-Annual-Planning-Outlook.ashx>

4. Conclusion and Next Steps

The Scoping Assessment concludes that:

- An IRRP is to be undertaken for York Region;
- The IRRP Working Group will include the IESO, Alectra, NT Power, Hydro One Distribution, and Hydro One Transmission. Other LDCs in the region will be informed of any needs or solutions that may affect their facilities or customers;
- The IRRP will co-ordinate its findings with the GTA Bulk Supply Study, and vice-versa;
- Given the significant scope of the study, the full 18-month timeline for completion of the IRRP is expected to be required.

An IRRP was recommended on the basis of the scale of load growth anticipated, potential for diverse types of solutions (including wires and non wires), and long term uncertainty associated with regional development plans and the potential impact of municipal, provincial, and federal decarbonization and electrification policies.

All IRRPs include opportunities for engagement with local communities and stakeholders, including 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 other similar products. Particular attention will be paid to opportunities for information sharing and/or coordination of goals and outcomes.

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

Appendix A – List of Acronyms

Acronym	Definition
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
LMC	Load Meeting Capability
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
TWG	Technical Working Group



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

1. Introduction and Background

The GTA North Region (York Region) is one of the 21 electricity planning regions in Ontario as identified through the Ontario Energy Board's (OEB) Regional Planning Process. Since the geographical boundaries of GTA North Region roughly encompass the Regional Municipality of York, this planning region is often referred to as York Region.

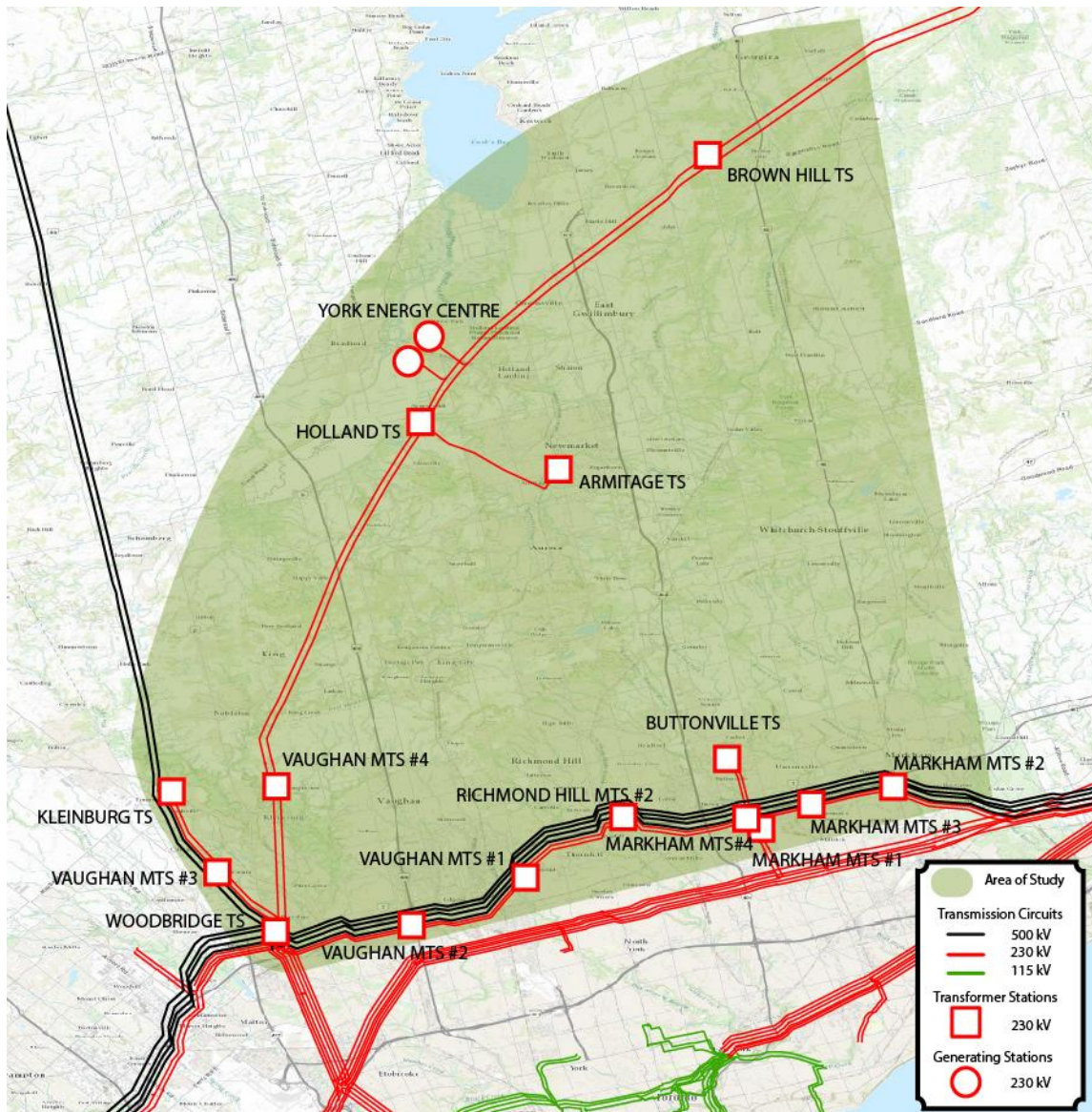
These Terms of Reference establish the objectives, scope, roles and responsibilities, deliverables and timelines for an Integrated Regional Resource Plan (IRRP) for York Region.

1.1 GTA North Region (York Region)

York Region, shown in Figure 3, roughly comprises the municipalities in the Regional municipality of York, including the Cities of Markham, Richmond Hill and Vaughan, the Towns of Aurora, East Gwillimbury, Georgina, Newmarket, Whitchurch-Stouffville, and the Township of King.

Indigenous communities including Alderville First Nation, Beausoleil First Nation, Curve Lake First Nation, Chippewas of Georgina Island First Nation, Haudenosaunee Development Institute/Hereditary Chiefs Council, Hiawatha First Nation, Kawartha Nishnawbe, Mississaugas of Scugog Island First Nation, Rama First Nation, Six Nations of the Grand River and the Mississaugas of the Credit First Nation are located in or have historical interest in the area.

Figure 3 | York Region Electricity Infrastructure



1.2 Background

In July 2023, Hydro One completed the Needs Assessment Report¹⁰ for York Region. Several needs were identified, and a Scoping Assessment was subsequently commenced to determine the preferred planning approach. An IRRP was recommended on the basis of the scale of load growth anticipated, potential for diverse types of solutions (including wires and non wires), and long term uncertainty associated with regional 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 that provides electricity supply to York Region over the next 20 years.
2. Account for 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 identified needs.
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, preparatory 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 York Region. The plan is a joint initiative involving the IESO, Alectra, NT Power, Hydro One Distribution, and Hydro One Transmission¹¹ 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 York Region IRRP includes the following needs, that were identified in the Needs Assessment as requiring coordination:

¹⁰ Hydro One: GTA North Needs Assessment Report, July 2023.

<https://www.hydroone.com/abouthydroone/CorporateInformation/regionalplans/gtanorth/Documents/GTA%20North%20Region%20NA%20Report%20Final%20July%2014%202023.pdf>

¹¹ A small portion of Toronto Hydro's service area is also supplied by feeders from some stations in York Region. Toronto Hydro 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.

Table 4 | Needs Identified in the Needs Assessment as Requiring Coordination

Need #	Location of Need	Need Type	Need Description
1	Kleinburg	Station Capacity	Significant new load is forecast to connect at the 44kV bus in the 2023-2024 period, exceeding its capacity.
2	Markham	Station Capacity	Markham area stations are expected to exceed their capacities by 2028
3	Buttonville Tap transmission corridor	System Capacity	Circuits supplying Markham MTS #4 and Buttonville TS are expected to exceed their capacities by 2028
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5	Vaughan	Station Capacity	Vaughan area stations are expected to exceed their capacities by 2030
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8	Kleinburg Tap transmission corridor	Load Restoration	Inability to restore customer loads within the timelines established by planning criteria following a major system disturbance
9	Claireville to Brown Hill transmission corridor	Load Restoration	Inability to restore customer loads within the timelines established by planning criteria following a major system disturbance.
10	Buttonville Tap transmission corridor	Load Restoration	Inability to restore customer loads within the timelines established by planning criteria following a major system disturbance.

Need #	Location of Need	Need Type	Need Description
11	Parkway to Claireville transmission corridor	Load Security	The loss of this line can result in an interruption to over 600 MW of customer load, which is more than permitted by planning criteria

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 project development.

3.2 Pathways to Decarbonization and Powering Ontario’s Growth

In December 2022, the IESO published its Pathways to Decarbonization Report¹². 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 Greenhouse Gas (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 processes

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.”

In the provincial government’s “Powering Ontario’s Growth” report¹³, it is recognized that “*growth to date has been met by existing transmission lines, energy efficiency programs and strategically located generation assets*” and recognizes the challenge of “*future demand growth and a shift away from natural gas electricity generation*”.

¹² Pathways to Decarbonization, IESO. <https://www.ieso.ca/-/media/Files/IESO/Document-Library/gas-phase-out/Pathways-to-Decarbonization.ashx>

¹³ Powering Ontario’s Growth, Province of Ontario. <https://www.ontario.ca/page/powering-ontarios-growth>

Accordingly, the York Region IRRP will evaluate a scenario in which YEC, a local gas-fired generation plant, is phased out. The Pathways to Decarbonization report had previously identified that this could not be achieved within the timelines considered by the 2035 Moratorium scenario, so the IRRP will include identification of required system investments needed to accommodate this phase-out, and an estimated timeline for how quickly this could be accomplished.

Consideration will also be given to a separate “high electrification” demand forecast that would examine and evaluate the needs that arise on the electricity system in York Region under a more aggressive decarbonisation scenario and provide recommendations on near-term actions to facilitate this transition.

A summary of planning scenarios for inclusion in the IRRP is provided in Table 5, below:

Table 5 | Summary of Planning Scenarios

Scenario	Demand Forecast	Generation Assumptions	Notes
1a	Basecase	Continued operation of York Energy Centre	Basecase Scenario. Needs and recommendations will form the main deliverables of the IRRP
1b	Basecase	Phase out of York Energy Centre	Identify incremental needs and recommend options resulting from York Energy Centre phase out
2	High Electrification	Phase out of York Energy Centre	Identify incremental needs and recommend options resulting from transition to net zero energy system

3.3 GTA Bulk Supply Study

In December 2022, the IESO also published the 2022 Annual Planning Outlook¹⁴ (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 York Region, its findings (i.e. needs and recommended solutions) will be coordinated with the York Region IRRP, and vice-versa.

¹⁴ 2022 Annual Planning Outlook. IESO. <https://www.ieso.ca/-/media/Files/IESO/Document-Library/planning-forecasts/apo/Dec2022/2022-Annual-Planning-Outlook.ashx>

4. Activities

The IRRP process will consist of the activities listed below. The activities and anticipated timelines are summarized in Table 6 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 scenarios 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 two electricity demand forecasts for York Region:
 - a. The first, a “business as usual” forecast, should account for all municipalities’ and LDCs’ committed long-term policy goals and plans, taking into account local and provincial policy goals, commitments, and climate change action plans. This is the primary forecast which will be used to identify needs, preferred options, and recommendations.
 - b. The second, a high electrification forecast, will represent the impacts of a net zero energy system by 2050, consistent with the Pathways to Decarbonization report. This forecast will be used to evaluate the incremental needs and develop recommendations to accommodate a net zero target.
- 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 and the YEC phase out 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 York Region 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 York Region 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.
 - i. This will include studying a scenario where transmission-connected gas generation is phased out per the timelines in the Pathways to Decarbonization report.
 - 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 5 below.

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
 - Municipal policies with an impact on electricity usage
 - Municipal Growth Plans
 - Future transit plans impacting electricity use, including personal vehicle electrification, transit expansion (e.g. Yonge subway extension), and transit electrification (e.g. GO train electrification)
 - Pathways to Decarbonization and Powering Ontario's Growth reports
- 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
- Asset renewal 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*)
- Alectra Utilities Corporation (Alectra)
- Hydro One Networks Inc. (Distribution)
- Newmarket-Tay Power Distribution Ltd
- Hydro One Networks Inc. (Transmission)

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 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 York Region 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 will help to inform the scope of community and stakeholder engagement to be considered for this IRRP.

8. Activities, Timeline, and Primary Accountability

Table 6 | IRRP Timelines & Activities

Activity	Lead Responsibility	Deliverable(s)	Timeframe
1. Prepare Terms of Reference considering stakeholder input	IESO	Finalized Terms of Reference	October 2023
2. Develop the planning forecast scenarios for the region		Long-term planning forecast scenarios	Q4 2023 – Q1 2024
a. Establish historical coincident peak demand information	IESO		
b. Establish historical weather correction, median and extreme conditions	IESO		
c. Establish gross peak demand forecast	LDCs		
d. Establish existing, committed, and potential DG	IESO, LDCs		
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	LDCs / Hydro One Transmission	Load transfer capabilities under normal and emergency conditions	Q1 2024
4. Provide and review relevant community plans, if applicable	LDCs, 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	Q2 – Q3 2024
6. Develop options and alternatives		Develop flexible planning options for forecast scenarios	Q3 – Q4 2024
a. Conduct a screening to identify which wires and non-wires options warrant further analysis	IESO		
b. Verify the load meeting capability (LMC) of the system to better determine timing of needs and support options development	IESO		
c. Develop screened-in energy efficiency options	IESO and LDCs		

Activity	Lead Responsibility	Deliverable(s)	Timeframe
d. Develop screened-in local generation/demand management options	IESO and LDCs		
e. Develop the screened-in transmission and distribution alternatives (i.e., alignment with EOL sustainment plans, load transfers)	IESO, Hydro One Transmission, and LDCs		
f. Develop portfolios of integrated alternatives	IESO, Hydro One Transmission, and LDCs		
g. Technical comparison and evaluation	IESO, Hydro One Transmission, and LDCs		
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 Q4 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 LDCs		

Activity	Lead Responsibility	Deliverable(s)	Timeframe
b. Develop communications materials	IESO, Hydro One Transmission, and LDCs		
c. Undertake community and stakeholder engagement	IESO, Hydro One Transmission, and LDCs		
d. Summarize input and incorporate feedback	IESO, Hydro One Transmission, and LDCs		
8. Develop 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 2025
9. Prepare the IRRP report detailing the recommended near, medium, and long-term plan for approval by all parties	IESO	IRRP report	April 2025

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