

EXPLANATORY NOTE

These are the original Terms of Reference for the York Region integrated regional planning study, which were developed by the regional planning working group in 2011. They detail the objectives, scope, key assumptions, study team, activities, accountabilities, and deliverables for the planning study, and reflect the context for regional planning at that time.

Since the development of these original Terms of Reference, there have been a number of key regulatory and policy changes that impact how regional planning is to be conducted in Ontario. The Ontario Energy Board (OEB) has endorsed a more structured and formalized regional planning process, which sets out the responsibilities of the working group, the timelines, and the documentation requirements for planning in Ontario's 21 electricity regions. Additionally, the Premier of Ontario has endorsed recommendations regarding stakeholder and community engagement in regional planning and the siting of large electricity infrastructure.

Included in the new framework for regional planning is the integrated regional resource planning process. The York Region regional planning study is being transitioned to align with this process, as well as with the planning and siting recommendations. The outcome of this process will be to complete and post online an Integrated Regional Resource Plan (IRRP), which will guide electricity planning in this region. During this transitional period, these original Terms of Reference are being made publicly available in order to better align with the new process and provide greater transparency to stakeholders. To access the most up-to-date schedules and other information related to this regional plan, please refer to the region's web page at: <http://powerauthority.on.ca/power-planning/regional-planning/gta-north/york>

Terms of Reference

Joint York Region Electricity Supply Study

1. Introduction

The Regional Municipality of York, which encompasses the municipalities of Vaughan, Richmond Hill, Markham, Aurora, Newmarket, King, East Gwillimbury, Whitchurch-Stouffville and Georgina, is one of the fastest growing regions in Ontario. Extensive urbanization in the last several years has resulted in electricity demand growth greater than the provincial average. Based on a number of planned developments, including further northward extension of Highway 404, the redevelopment of the Buttonville airport, and continuing urbanization throughout the region, there is a need for integrated planning to ensure that electricity supply can support the pace of development in the long term.

In terms of electricity supply, York Region can be viewed as two distinct sub-regions: north and south. Southern York Region, which includes the municipalities of Vaughan, Markham and Richmond Hill, is served at the distribution level by PowerStream, by feeders supplied primarily from several transformer stations connected to 230 kV transmission lines that follow the Highway 407 corridor, known as the “Parkway Belt”. In addition, some load is supplied from transformer stations along the Richview-Cherrywood 230 kV corridor further south. These stations are shared with other LDCs serving other parts of the GTA.

Northern York Region includes the municipalities of Aurora, Newmarket, King, East Gwillimbury, Whitchurch-Stouffville and Georgina, and is served at the distribution level by PowerStream, Newmarket Hydro and Hydro One. Transmission supply is from three transformer stations—Armitage, Holland and Brown Hill—that are connected to two 230 kV circuits, B82/83V, which originate at Claireville TS and extend northward towards Minden. These stations also supply some load that is outside the municipal boundary of York Region (e.g., Holland TS serves loads in the Southeastern part of Simcoe County). Urbanization in Northern York Region over the last 10-15 years has put intense pressures on the area’s transmission infrastructure. In 2005, the region had been identified as having critical reliability issues, as the load then served from Armitage TS was well beyond the station’s capacity (Holland TS did not exist at the time), and the ability to restore loads in the event of a transmission outage further south was extremely limited.

In 2005, upon the OEB’s direction, the OPA completed a local area supply study for Northern York Region that recommended an action plan to ensure continued supply reliability and load security in Northern York Region. The recommended actions, along with their current implementation status, are as follows:

- Add capacitors at Armitage TS—completed
- Install temporary/emergency load transfer capability:
 - up to 30 MW to Brown Hill TS—completed

- up to 20 MW to Southern York Region—completed¹
- Develop Conservation & Demand Management (CDM) resources:
 - 19 MW demand response (DR) resources under contract
 - Conservation efforts ongoing (est. 9 MW achieved by 2009)
- Build new Holland TS—completed; in-service June 2009
- Procure gas-fired peaking generation—York Energy Centre expected to be in service by September 2012
- Build a third transformer station (Aurora TS)—not needed yet, therefore not implemented

In the time since the 2005 plan was adopted, the following system developments have occurred in York Region:

- Launch of the Feed-in-Tariff (FIT) program, and expression of significant interest in development of renewable energy generation in York Region and surrounding areas through FIT applications.
- Continued load growth in Northern York Region, albeit at a slower pace than forecast due to the economic recession;
- Load growth in Southern York Region has caused the 230 kV circuits along the Parkway Belt to reach their limit to supply new transformation facilities without transmission reinforcement;
- Forecast load growth throughout York Region is expected to outstrip transformation supply in the medium term; and
- In November 2010, PowerStream indicated to the OPA the need for additional capacity in the PowerStream south supply area (Vaughan, Richmond Hill and Markham) and in the Aurora area.

These developments call for a new regional plan that incorporates recent developments and system assumptions, updated demand forecasts reflecting the economic recession and recovery, and current planning criteria. Given the coincident timing of expected load growth in Northern and Southern York Region, and the limited capacity of the existing 230 kV network to supply new transformation facilities, the OPA and LDCs agree that it makes sense to study Northern and Southern York Region together, to determine whether integrated solutions exist that can meet the needs of the region as a whole.

This Terms of Reference establishes the objectives, scope, roles and responsibilities, activities and timelines for an integrated regional supply study of York Region.

2. Objectives

1. To assess the adequacy of electricity supply to customers in York Region over a 20-year timeframe, focusing on near-term requirements (within the next 5 years), mid-term optionality (5-10 years out) and long-term direction (10-20 years in the future).

¹ The load transfer capability to Southern York Region was meant to be a temporary measure to address supply reliability concerns prior to Holland TS coming in service, and are no longer available.

2. To develop integrated demand and supply options to address the identified needs, and to address long-term planning needs (e.g., coordinate with municipal planning to establish corridors along new roads, railways, etc.).
3. To develop an implementation plan for the recommended options.

3. Scope

This Electricity Supply Study will develop a regional plan to meet supply needs of specific pockets of York Region at various time horizons. The study is a joint initiative involving the OPA, LDCs, and Hydro One, and the IESO, and will incorporate input from other agencies as required. The study will integrate load growth projections, bulk system needs, relevant community plans, FIT and other generation uptake, as well as local constraints to ensure that system adequacy needs arising from assessment of projected load growth are appropriately captured.

Study Period

This study will assess near-term requirements, mid-term optionality and long-term direction for York Region over a 20-year period, commencing in the summer of 2010. In this context, near-term refers to the next 5 years; mid-term to the next 5-10 years; and long term to the next 10-20 years.

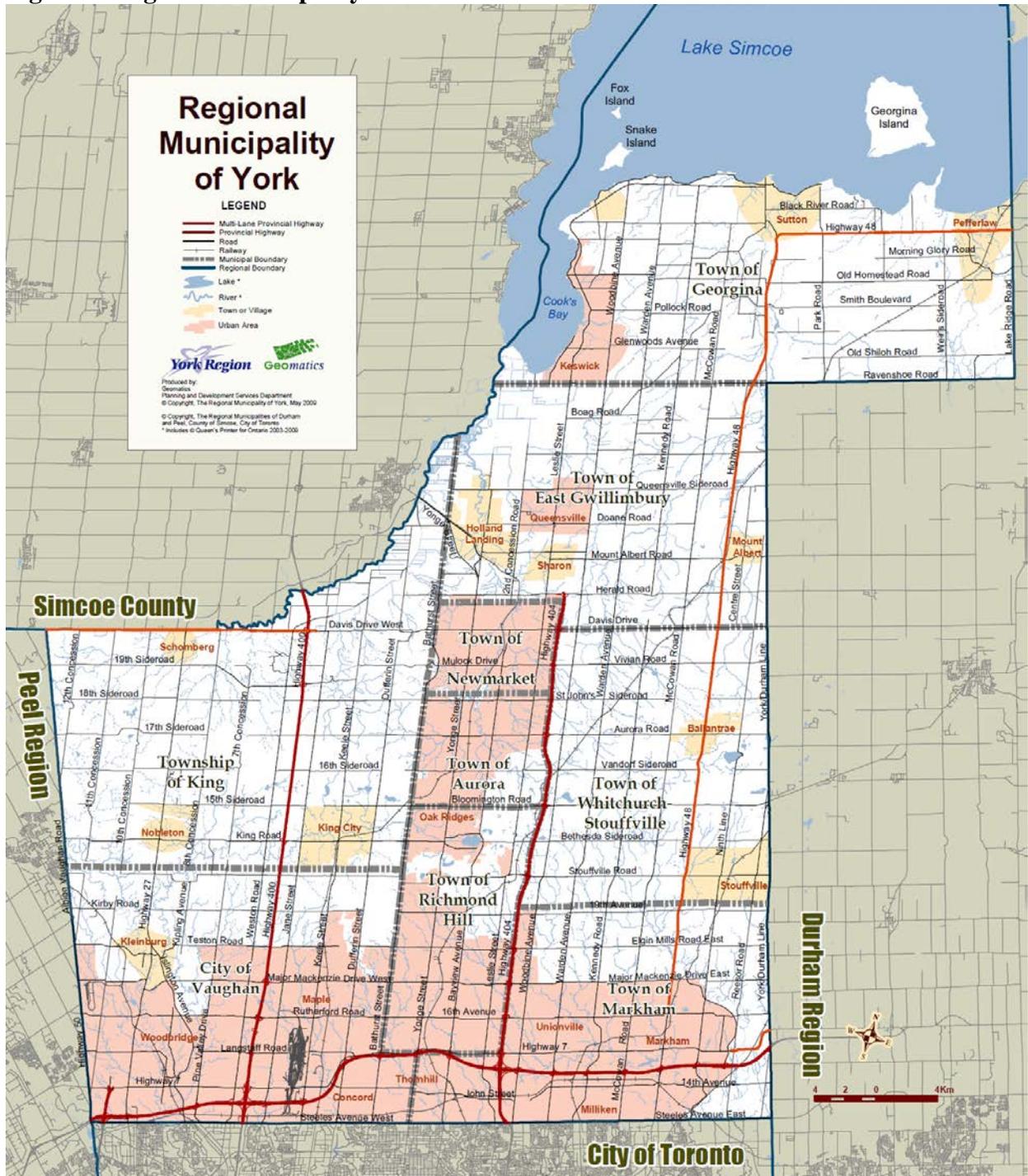
Electricity Supply System

The area covered by this study is defined by electrical rather than municipal boundaries. While it approximately encompasses the Regional Municipality of York (shown in Figure 1), the electrical infrastructure does serve some loads outside the municipal boundary. For example, Holland TS serves load in the Bradford area of Simcoe County, in addition to loads in York Region.

For the purposes of this study, “York Region” is defined as those areas supplied from the following transmission circuits and transformer stations:

- B82/83V—Holland TS, Armitage TS, and Brown Hill TS
- V43/V44 (Claireville-Kleinburg)—Woodbridge TS, Vaughan MTS #3, Kleinburg TS
- V71/75P (Parkway-Claireville)—Vaughan #1, Vaughan #2, Richmond Hill #1, Richmond Hill #2
- P21/22R (Parkway-Richview)—Markham MTS #1; only include to this junction
- C35/36P (Parkway-Cherrywood)—Markham MTS #2, Markham MTS #3
- P45/46 (Parkway-Buttonville)—Buttonville TS, Markham MTS #4

Figure 1. Regional Municipality of York



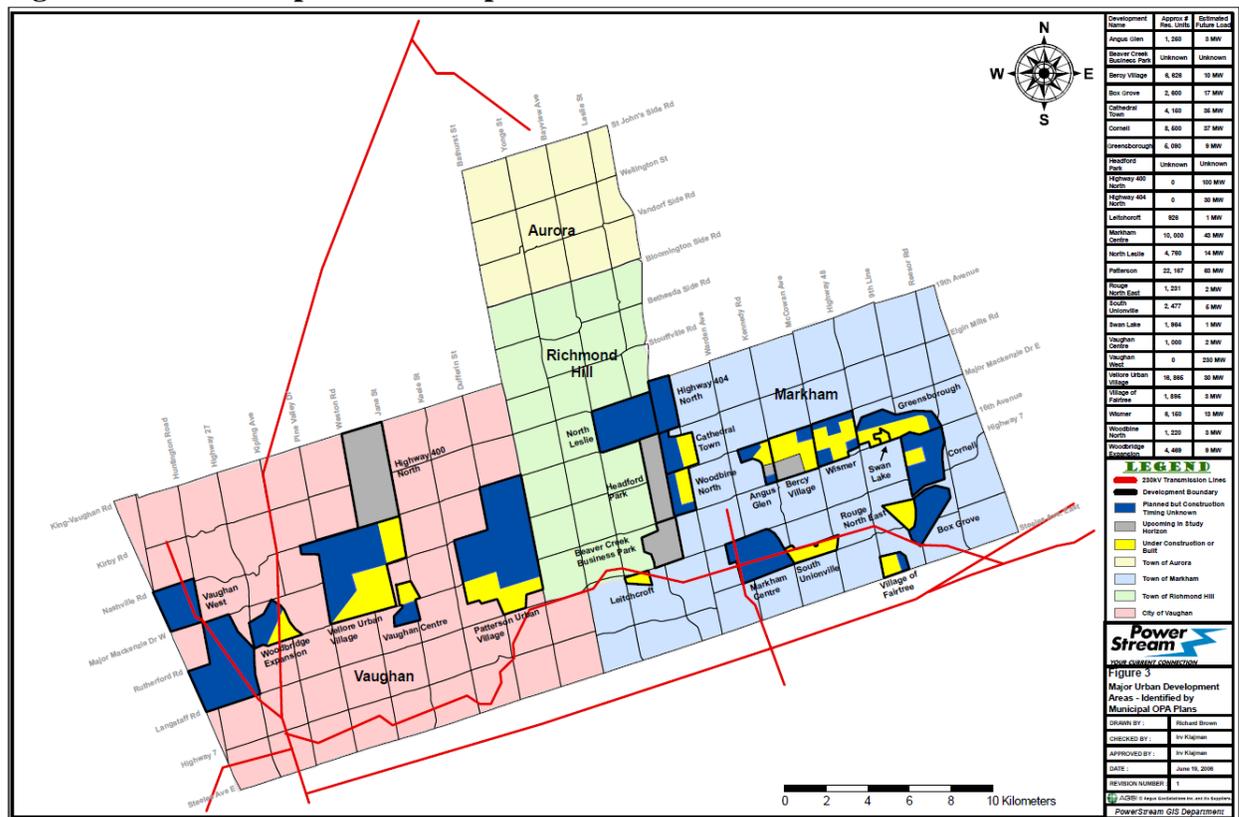
Source: <http://maps.york.ca/yorkexplorer/default.jsp>

Within this area, three load pockets where load growth is expected to outstrip supply in the medium term will be studied in detail:

- Vaughan—load growth is expected from several new developments along Highway 400, Highway 427 proposed extension and Dufferin Street (see Figure 2 below), and existing transformation capacity is reaching its limits

- Richmond Hill/Markham—new development is expected along Highway 404 in Richmond Hill/Markham, and in several other areas of Markham (see Figure 2), while existing transformation facilities are reaching their limits
- Newmarket/Aurora/Stouffville/Whitchurch/East Gwillimbury and surrounding areas—PowerStream and Hydro One expect continued load growth from new developments around the Highway 404 to the north and east of Newmarket and Aurora, and along the proposed extension from Green Lane North. In addition, the loads served from Holland and Armitage TS's, which include the municipalities listed above, as well as portions of adjacent regions (i.e., Holland area of Simcoe County, and Uxbridge in Durham Municipality) will be studied to determine if new transformation, initially identified in the 2005 study, will be needed within the study period.

Figure 2. New Developments Anticipated in PowerStream's Southern Service Area



Potential solutions to address needs identified for these areas will be reviewed for the area as a whole to determine if there are transmission options that can address multiple needs together.

The pockets described above do not include the more northerly parts of York Region, in particular those loads served from Brown Hill TS, as it is not anticipated that new supply will be needed in this area in the near to medium term. Nonetheless, as Brown Hill TS is supplied by common transmission infrastructure, and Hydro One Distribution has the ability to transfer loads between Brown Hill, Armitage and Holland TS's, including this area is necessary to understand the long-term outlook for the region. Furthermore, there is about 50

MW of Hydro One load in South Simcoe County and Durham region that is currently being supplied from Holland, Armitage and Brown Hill TS's. Therefore, load forecasts will be updated and potential future needs will be noted in this area, and as appropriate these will be integrated with the study areas noted above.

It should be noted that some of PowerStream's Southern York Region load is supplied by feeders originating at Finch, Fairchild, Agincourt and Leslie TS's. These stations are supplied by transmission circuits south of the City of Toronto boundary, along the Finch Corridor. For the most part, these feeders are fully loaded and their utilization is fairly static. Moreover, as new load growth is expected to occur further north, it is not ideally served from these locations. For this study, PowerStream's load on these transformer stations will be noted, but the circuits and stations on the Finch corridor will be out of scope for the purposes of identifying transmission needs and solutions.

Although this study will not include assessment of the adequacy of the GTA bulk supply system, the bulk supply system conditions and assumptions will be modeled as part of the study. If options identified through this study could have impacts on the bulk system, they will be taken into consideration as part of the bulk system development.

4. Key Assumptions

The study will consider the following key assumptions.

- Demand Data
 - Historical load data from 2005 (or earlier) to 2010
 - Extreme summer peak demand data
 - LDC load forecasts, accounting for conservation and distributed generation
 - Coincident York Region peak demand data including LDC load and direct-connect transmission customers
 - Coincident peak demand data for local pockets as required
- Distributed Generation (DG)
 - Existing DG facilities, including merchant generators and Non-Utility Generation (NUG) contracts
 - Existing or committed renewable generation from FIT and non-FIT procurements
 - Future district energy plans, CHP developments
- Relevant community plans
 - Green Energy plans and community long-term energy objective plans, as applicable
- Conservation and Demand Management (CDM) Programs
 - OPA-Contracted Province-Wide CDM Programs (Tier 1)
 - LDC Board-Approved CDM Programs (Tier 2 or 3)
 - Long-term CDM forecast
- Reliability Criteria (as per the Ontario Resource and Transmission Assessment Criteria)

- Load supply capability
- Load supply security/load restoration requirements as per Section 7.2
- Existing area network
 - Line ratings as per Hydro One database
 - Capability as per current IESO PSS/E base cases
- Bulk System assumptions to be applied to the existing area network
 - York Energy Centre (2-unit gas-fired peaker plant with contract capacity of 393 MW) assumed in-service September 2012
 - Transmission-connected FIT generation
 - Any system enhancements identified through the ECT to be included in the study when they are available (likely spring 2011)
- Other assumptions, as applicable
 - End-of-life/asset condition
 - Stranded assets

5. Study Team/Authority/Funding

Study Team

The core study team will consist of planning and engineering representative/s from the following organizations:

- Ontario Power Authority (*Team Lead*)
- PowerStream Inc.
- Newmarket Hydro
- Hydro One Distribution
- Hydro One Transmission
- Independent Electricity System Operator

Support from other groups as required.

Input from other entities such as large transmission connected industrial customers to be sought from Hydro One as required.

Authority

Each entity involved in the study will follow its own internal process on the approval of the proposed implementation plan resulting from this study.

Funding

For the duration of the study process, each participant is responsible for their own funding as necessary, for the study work required to be completed.

6. Activities and Primary Accountability

- Prepare draft Terms of Reference (*OPA*)
- Accept Terms of Reference (*All*)
- Establish demand data including:
 - Historical data (*OPA*)
 - Forecast data (*each LDC*)
- Establish existing, committed and potential DG including FIT and non-FIT uptake (*OPA and LDCs*)
- Provide information on Green Energy and other relevant community plans (*LDCs*)
- Establish conservation and DR programs to be included (*OPA and LDCs*)
- Complete system studies to identify supply need (*OPA, Hydro One, IESO*)
 - Obtain PSS/E base case from IESO
 - Include bulk system assumptions as identified in Key Assumptions
 - Apply reliability criteria as defined in ORTAC
 - Establish need
- Develop options (*All*)
 - Conservation options (*OPA and LDCs*)
 - Local generation options (*OPA and LDCs*)
 - Transmission or distribution options including maximizing existing infrastructure capability (*OPA, Hydro One and LDCs for Dx options*)
 - Study impact of options on bulk system capability (*OPA, Hydro One, IESO*)
- Screen out and evaluate the most likely options (*OPA*)
 - Technical comparison, system studies, etc
 - Economic assessment
 - i. Lowest cost (NPV) perspective
 - ii. Affordability perspective
 - High-level environmental and social acceptance assessment
- Recommendation of option/course of action (*OPA*)
 - Report of recommended option or course of action for development work
- Development of implementation plan (*All*)

7. Deliverables

- Terms of Reference
- Statement of need

- Draft Study Report
- Final Study Report
- Implementation Plan

8. Communication and Stakeholdering

- The OPA will organize study team meetings when appropriate.
- Communication with other stakeholders external to the working group will be held when appropriate.