BARRIE / INNISFIL SUB-REGION
INTEGRATED REGIONAL RESOURCE PLAN

Part of the South Georgian Bay/Muskoka Planning Region | December 16, 2016

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Integrated Regional Resource Plan

Barrie/Innisfil Sub-region

This Integrated Regional Resource Plan ("IRRP") was prepared by the Independent Electricity System Operator ("IESO") pursuant to the terms of its Ontario Energy Board licence, EI-2013-0066.

The IESO prepared the IRRP on behalf of the Barrie/Innisfil Sub-region Working Group (the "Working Group"), which included the following members:

- Independent Electricity System Operator
- PowerStream Inc.
- InnPower Corporation
- Hydro One Networks Inc. (Distribution)
- Hydro One Networks Inc. (Transmission)

The Working Group assessed the adequacy of electricity supply to customers in the Barrie/Innisfil Sub-region over a 20-year period; developed a flexible, comprehensive, integrated plan that considers opportunities for coordination in anticipation of potential demand growth scenarios and varying supply conditions in the Barrie/Innisfil Sub-region; and developed an implementation plan for the recommended options, while maintaining flexibility in order to accommodate changes in key conditions over time.

The Working Group members agree with the IRRP's recommendations and support implementation of the plan through the recommended actions, subject to obtaining all necessary regulatory and other approvals.

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List of Abbreviations

Abbreviations	Descriptions
CDM or Conservation	Conservation and Demand Management
CFF	Conservation First Framework
CT	Current Transformer
DG	Distributed Generation
DR	Demand Response
EA	Environmental Assessment
FIT	Feed-in Tariff
Hydro One	Hydro One Networks Inc.
IESO	Independent Electricity System Operator
IAP	Industrial Accelerator Program
Innisfil Hydro	Innisfil Hydro Distribution Inc.
InnPower	InnPower Corporation
IRRP	Integrated Regional Resource Plan
kV	Kilovolt
LAC	Local Advisory Committee
LAP	Local Achievable Potential
LDC	Local Distribution Company
LMC	Load Meeting Capability
LTEP	(2013) Long-Term Energy Plan
LTR	Limited Time Rating
MS	Municipal Substation
MVA	Mega Volt Amp
MW	Megawatt
OEB or Board	Ontario Energy Board
OPA	Ontario Power Authority
ORTAC	Ontario Resource and Transmission Assessment Criteria
PowerStream	PowerStream Inc.

Abbreviations	Descriptions
PPWG	Planning Process Working Group
PPWG Report	Planning Process Working Group Report to the Board
RIP	Regional Infrastructure Plan
ROW	Right-of-Way
TOU	Time-of-Use
TPS	Traction Power Station
TS	Transformer Station
TWh	Terawatt-Hours
Working Group	Technical Working Group for Barrie/Innisfil Sub-region IRRP

1. Introduction

This Integrated Regional Resource Plan ("IRRP") addresses the electricity needs for the Barrie/Innisfil Sub-region over the next 20 years. This report was prepared by the Independent Electricity System Operator ("IESO") on behalf of the technical Working Group composed of the IESO, PowerStream Inc. ("PowerStream"), InnPower Corporation ("InnPower"), Hydro One Distribution and Hydro One Transmission.[1]

In Ontario, planning to meet the electrical supply and reliability needs of a large area or region is done through regional electricity planning, a process that was formalized by the Ontario Energy Board ("OEB" or "Board") in 2013. In accordance with the OEB's regional planning process, transmitters, distributers and the IESO are required to carry out regional planning activities for 21 electricity planning regions at least once every five years. The Barrie/Innisfil Sub-region is within the South Georgian Bay/Muskoka planning region, one of the OEB's 21 identified areas (Figure 1-1).

Figure 1-1: Map of the South Georgian Bay/Muskoka Region

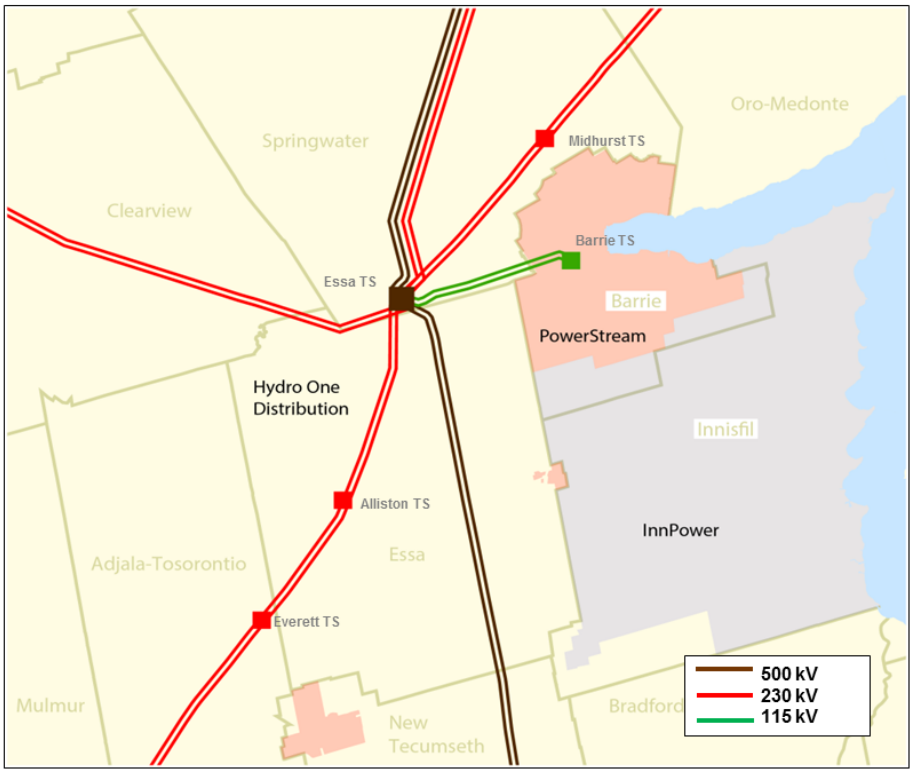
[1] For the purpose of this report, "Hydro One Transmission" and "Hydro One Distribution" are used to differentiate the transmission and distribution accountabilities of Hydro One Networks Inc. ("Hydro One"), respectively.

The Barrie/Innisfil Sub-region roughly encompasses the following municipalities:

- City of Barrie
- Town of Innisfil
- Township of Essa
- Township of Springwater
- Township of Clearview
- Township of Mulmur
- Township of Adjala-Tosorontio
- Town of New Tecumseth
- Town of Bradford West Gwillimbury

The study is focused on addressing the forecast load growth in south Barrie and the Town of Innisfil; however, it considers other needs throughout the sub-region. The study area is shown in Figure 1-2, along with the service area of each local distribution company ("LDC") in the sub-region.

Figure 1-2: Map of Barrie/Innisfil Sub-region



This IRRP identifies power system capacity and reliability requirements, and coordinates the options to meet customer needs in the sub-region over the next 20 years. Specifically, this IRRP

identifies immediate investments that are required to meet near- and medium-term needs in the sub-region, respecting the lead time for development.

This IRRP also identifies options to meet long-term needs, but given forecast uncertainty, the longer development lead time and the potential for technological change, the plan maintains flexibility for long-term options and does not recommend specific investments or projects at this time. Instead, the long-term plan identifies near-term actions to consider alternatives, engage with the community, and gather information to lay the groundwork for determining options for future analysis. These actions are intended to be completed before the next IRRP cycle, scheduled for 2020 or sooner, depending on demand growth, so that the results can inform decisions should any be needed at that time.

This report is organized as follows:

- A summary of the recommended plan for the Barrie/Innisfil Sub-region is provided in Section 2;
- The process and methodology used to develop the plan are discussed in Section 3;
- The context for electricity planning in the Barrie/Innisfil Sub-region and the study scope are discussed in Section 4;
- Demand forecast scenarios, and conservation and distributed generation ("DG") assumptions, are described in Section 5;
- Electricity needs in the Barrie/Innisfil Sub-region are presented in Section 6;
- Alternatives and recommendations for meeting needs are addressed in Sections 7 and 8;
- A summary of engagement to date and moving forward is provided in Section 9; and
- A conclusion is provided in Section 10.

2. The Integrated Regional Resource Plan

The Barrie/Innisfil Sub-region IRRP provides recommendations to address the sub-region's forecast electricity needs over the next 20 years, based on the application of the IESO's Ontario Resource and Transmission Assessment Criteria ("ORTAC"). This IRRP identifies forecast electricity needs in the sub-region over the near term (up to five years, or 2015 through 2019), medium term (six to 10 years, or 2020 through 2024) and longer term (11-20 years, or 2025 through 2034). These planning horizons are distinguished in the IRRP to reflect the different levels of forecast certainty, lead time for development, and planning commitment required over these time horizons. The IRRP was developed based on consideration of planning criteria, including reliability, cost, feasibility and flexibility; and, in the near term, it seeks to maximize the use of existing electricity system assets.

This IRRP identifies and recommends specific projects for implementation in the near term. This is necessary to ensure that they are in-service in time to address the area's more urgent needs, respecting the lead-time for development of the recommended projects or actions. This IRRP also identifies possible long-term electricity needs. However, as these needs are forecast to arise in the future, it is not necessary, nor would it be prudent given forecast uncertainty and the potential for technological change, to recommend specific projects at this time. Instead, near-term actions are identified to gather information and lay the groundwork for future options. These actions are intended to be completed before the next IRRP cycle so that their results can inform further discussion at that time.

The Barrie/Innisfil IRRP includes a near-term project to rebuild Barrie Transformer Station ("TS"). Given the timing of the need, the Working Group issued a hand-off letter in December 2015 to request that Hydro One begin development work on this project.[2] The need and rationale for this near-term project are outlined in Section 6.2.1. The full near-, medium-, and long-term plans are summarized below.

2.1 Near-Term and Medium-Term Plan (2015-2024)

The plan to meet the near- and medium-term needs of electricity customers in the Barrie/Innisfil Sub-region was developed to maximize the use of the existing electricity system in consideration of planning criteria such as reliability, cost, and feasibility, as outlined earlier in

[2] http://www.ieso.ca/Documents/Regional-Planning/South-Georgian-Bay-Muskoka/Barrie/Innisfil_IESO-letter-to-HydroOne-20151207.pdf

Section 2. The near-term plan was also developed to be consistent with the long-term development of the sub-region's electricity system.

To address the near-term end-of-life and capacity needs at Barrie TS, the aforementioned new transmission project to rebuild Barrie TS is underway. The near- and medium-term plan also includes a load transfer to be completed by PowerStream to relieve Barrie TS, and a feeder relocation and expansion project, to be carried out by InnPower and Hydro One Distribution, to increase InnPower's feeder supply capacity from Barrie TS. The elements of the plan are outlined in further detail below.

Recommended Actions

1. Rebuild and Uprate Barrie TS and E3/4B to 230 kV

To mitigate challenges posed by both Barrie TS and related 115 ("kilovolt") kV supply infrastructure reaching end-of-life, and to address the near-term capacity needs at Barrie TS, Hydro One is developing the "Barrie Area Transmission Reinforcement" project. The project will rebuild the existing Barrie TS and uprate its existing supply from 115 kV to 230 kV, increasing the supply capacity to the area. A Class Environmental Assessment ("EA") process is currently underway. The existing Barrie TS site is well situated for supplying the near- and medium-term forecast load growth in the south Barrie and Innisfil areas. The targeted in-service date for the project is the end of 2020.

2. PowerStream Load Transfer – From Barrie TS to Midhurst TS

PowerStream is planning to transfer up to 27 ("megawatt") MW of load from Barrie TS to Midhurst TS by 2020, assuming full data centre load growth. This will increase the incremental capacity available at Barrie TS and provide additional transfer points between Barrie TS and Midhurst TS. This will address near-term capacity needs and provide additional reliability benefits during emergency situations.

3. Relocate and Expand InnPower Feeder Supply from Barrie TS

Currently, Hydro One Distribution is allocated one feeder from the existing Barrie TS, the 13M3 feeder, which is used solely to supply their embedded LDC InnPower. The capacity of this feeder is forecast to be exceeded in 2020. The rebuilt Barrie TS will include one additional feeder position, which can be used to address this need. Additionally, the existing InnPower supply uses an idle Hydro One Transmission right-of-way ("ROW"). The use of this ROW for

sub-transmission purposes limits future long-term options for new transmission facilities in the south Barrie and Innisfil area. It is recommended that Hydro One Distribution and InnPower develop a plan to build new 44 kV feeders to support InnPower's forecast growth and enable the existing 13M3 feeder to be relocated out of the Hydro One Transmission corridor. The proposed in-service date for the new feeders is the end of 2020.

2.2 Longer-Term Plan (2025-2034)

In the long-term, the Barrie/Innisfil Sub-region's electricity system is expected to reach its capacity. This is based on the IRRP planning forecast presented in Section 5.6, which is consistent with municipal growth plans and the province's *Places to Grow Act, 2005*. Beginning in the mid to late 2020s, there is a forecast need for new transformer station capacity, particularly in the south Barrie and Innisfil areas. The capacity of the upgraded Barrie TS and the existing Everett TS are forecast to be exceeded in 2026 and 2027, respectively. Transformer station capacity in the Barrie area is forecast to be exceeded in 2031, and the sub-region's transformer capacity is forecast to be exceeded by the end of the study period in 2034. Additionally, in 2034, there is a need for supply capacity for the broader South Georgian Bay/Muskoka Region based on the ratings of the 230/500 kV autotransformers at Essa TS. Any plans to address the station capacity needs must be coordinated with a plan to address this long-term transmission system needs at Essa TS, as they are interrelated.

A number of alternatives are possible to meet the sub-region's long-term needs. While specific solutions do not need to be committed today, it is appropriate to begin work now to gather information, monitor developments, engage the community, and develop alternatives to support decision making in the next iteration of the IRRP.

This IRRP sets out near-term actions required to ensure that options remain available to address future needs, if and when they arise.

Recommended Actions

1. Implement Conservation and Distributed Generation

The implementation of provincial conservation targets established in the 2013 Long-Term Energy Plan ("LTEP") is a key near-term action of the Barrie/Innisfil Sub-region's long-term plan. In developing the demand forecast, peak demand impacts associated with meeting

provincial targets were assumed before identifying the residual needs; this is consistent with the province's Conservation First policy.[3] Meeting provincial conservation targets amounts to approximately 37 MW, or 19%, of the forecast demand growth, during the first 10 years, and a total of 82 MW, or 23% of the total forecast demand growth, by the end of the study period.

To ensure these savings materialize, it is recommended that the LDCs' conservation efforts be focused as much as possible on measures that will contribute to meeting the Conservation First energy targets while also maximizing peak demand reductions. The monitoring of conservation success will lay the foundation for the long-term plan by evaluating the performance of specific conservation measures in the sub-region and assessing potential for additional conservation.

Provincial programs that encourage the development of DG can also contribute to reducing peak demand in the sub-region; these will, in part, depend on local interest and opportunities for development. The LDCs and the IESO will continue their activities to support these initiatives and monitor their impacts.

2. Barrie TS Local Achievable Potential Study

Due to the long-term capacity need forecast for the south Barrie and Innisfil areas, PowerStream and InnPower, with support from the IESO's conservation fund, will be undertaking a Local Achievable Potential ("LAP") study for the Barrie TS service area. This study aims to determine demand savings potential through conservation and demand management ("CDM" or "conservation") for the Barrie TS area, above and beyond what is attributed to the LTEP targets already accounted for in the planning demand forecast. The study will also help determine options for acquiring this potential (e.g., incentives and adders to existing CDM programs, new programs, behind-the-meter generation, energy storage, etc.). The study will provide a better understanding of the costs and feasibility of conservation and demand management measures to address capacity needs in the area to better inform options for the next planning cycle. The study may also examine options to manage new demand from increased electrification that may result from Ontario's Climate Change Action Plan.

[3] Conservation First: A Renewed Vision for Energy Conservation in Ontario: http://www.energy.gov.on.ca/en/conservation-first/

3. Undertake Community Engagement

Broad community and public engagement, including discussions with local Indigenous communities, is essential to develop the long-term plan. It is recommended that engagement involve several phases addressing: public education/awareness of electricity issues, planning, technologies, and regulatory requirements; fostering an understanding of community growth and its relationship to electricity needs; understanding the pros and cons of various alternatives to meeting long-term needs; and obtaining input on community preferences for various approaches to meeting longer-term needs.

To obtain input and advice on the engagement plans for the Barrie/Innisfil Sub-region, the Working Group will establish a Local Advisory Committee ("LAC") consisting of community representatives and stakeholders.

4. Increase the Limited Time Rating of Everett TS

The existing ratios of the current transformers[4] ("CT") at Everett TS are causing a limitation beyond the limited time rating[5] ("LTR") of the station transformers. Since the minimum station load has increased sufficiently, Hydro One can update the CT ratios, allowing the full LTR of the existing transformers to be utilized. Everett TS is forecast to exceed its existing de-rated LTR in 2027; the Working Group will monitor the station load and request that Hydro One take action to change the CT ratios if necessary before the next regional planning cycle.

5. Explore Conversion of the 13M3 115 kV Corridor to 230 kV

Metrolinx has applied for connection to the transmission system in the Barrie area. They will connect to the new 230 kV transmission lines created as part of the Barrie Area Transmission Reinforcement project. It is recommended that Hydro One works to ensure the development work for the Metrolinx connection project will allow for future expansion of the transmission system south toward Innisfil. The Working Group will monitor the need for additional development work for the corridor between planning cycles.

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[4] Current transformers are instrument transformers used for measurements for metering/loading data or for generating signals for protective devices. Since the current on the actual system is usually too high to be either economically or practically measured or to supply a signal to a protective device, the current transformer lowers the current to an acceptable level. The ratio between these two current values is the "CT ratio".

[5] The limited time rating is a property of an individual transformer, representing its ability to withstand the thermal stress of short duration use (10 days) at the given capacity, above its standard rating, without experiencing any degradation in asset condition as a result.

6. Develop Community-Based Solutions

There is the potential for emerging technologies and innovative solutions to address the long-term needs in the Barrie/Innisfil Sub-region. These could include combinations of conservation, district heating, local generation, storage, off-grid solutions, and other emerging technologies. However, before such technologies can be relied upon to address regional capacity needs, it is necessary to identify the opportunities available in the Barrie area, test the performance of these technologies, and demonstrate how these technologies can be "bundled" to provide firm capacity resources at the local level. In addition, the cost responsibility and payment mechanisms for these options still need to be assessed.

PowerStream has implemented a pilot project in their southern service territory to study the benefits and economics of aggregated customer-side generation and storage. The results of this study can be used to inform future discussion and the development of non-wires solutions for the long-term needs in the sub-region for the next planning cycle.

7. Monitor Demand Growth, Conservation Achievement and Distributed Generation Uptake

On an annual basis, the IESO, with the Working Group, will review CDM achievement, the uptake of provincial distributed generation projects, and actual demand growth in the Barrie/Innisfil Sub-region. This information will be used to determine when decisions on the long-term plan are required, and to inform the next cycle of regional planning for the area. Information on conservation and DG is also a useful input into the ongoing development of non-wires options as potential long-term solutions.

8. Initiate the Next Regional Planning Cycle Early, if Needed

Along with the indices outlined in point 7 above, the Working Group will monitor changes in growth targets, progress in servicing greenfield lands, transit electrification in the area, results of the LAP study for Barrie TS, and any significant changes in the area's forecast growth. If monitoring activities determine that area growth is on pace with the high forecast scenario, it may be necessary to initiate the next iteration of the regional planning process earlier than 2020 given the lead time for the long-term supply options.

3. Development of the IRRP

3.1 The Regional Planning Process

In Ontario, planning to meet the electricity needs of customers at a regional level is done through regional planning. Regional planning assesses the interrelated needs of a region—defined by common electricity supply infrastructure—over the near, medium, and long term and develops a plan to ensure cost-effective, reliable electricity supply. Regional plans consider the existing electricity infrastructure in an area, forecast growth and customer reliability, evaluate options for addressing needs, and recommend actions.

Regional planning has been conducted on an as needed basis in Ontario for many years. Most recently, the former Ontario Power Authority ("OPA") carried out planning activities to address regional electricity supply needs. The OPA conducted joint regional planning studies with distributors, transmitters, the IESO and other stakeholders in regions where a need for coordinated regional planning had been identified.

In the fall of 2012, the Board convened a Planning Process Working Group ("PPWG") to develop a more structured, transparent, and systematic regional planning process. This group was composed of industry stakeholders including electricity agencies, utilities, and stakeholders, and in May 2013, the PPWG released its report to the Board[6] ("PPWG Report"), setting out the new regional planning process. Twenty-one electricity planning regions were identified in the PPWG Report, and a phased schedule for completion was outlined. The Board endorsed the PPWG Report and formalized the process timelines through changes to the Transmission System Code and Distribution System Code in August 2013, as well as through changes to the OPA's licence in October 2013. The OPA's licence changes required it to lead a number of aspects of regional planning. After the merger of the IESO and the OPA on January 1, 2015, the regional planning roles identified in the OPA's licence were to become the responsibility of the new IESO

The regional planning process begins with a Needs Assessment process performed by the transmitter, which determines whether there are needs requiring regional coordination. If regional planning is required, the IESO then conducts a Scoping Assessment to determine what type of planning is required for each region. A Scoping Assessment explored whether a

[6] http://www.ontarioenergyboard.ca/OEB/_Documents/EB-2011-0043/PPWG_Regional_Planning_Report_to_the_Board_App.pdf

comprehensive IRRP is required, which considers conservation, generation, transmission, and distribution solutions, or whether a more limited "wires" solution is the preferable option, in which case a transmission and distribution focused Regional Infrastructure Plan ("RIP") can be undertaken instead. There may also be regions where infrastructure investments do not require regional coordination and so can be planned directly by the distributor and transmitter outside of the regional planning process. At the conclusion of the Scoping Assessment, the IESO produces a report that includes the results of the Needs Screening process and a preliminary Terms of Reference. If an IRRP is the identified outcome, the IESO is required to complete the IRRP within 18 months. If an RIP is the identified outcome, the transmitter takes the lead and has six months to complete it. Both RIPs and IRRPs are to be updated at least every five years. The draft Scoping Assessment Outcome Report is posted to the IESO's website for a two week public comment period prior to finalization.

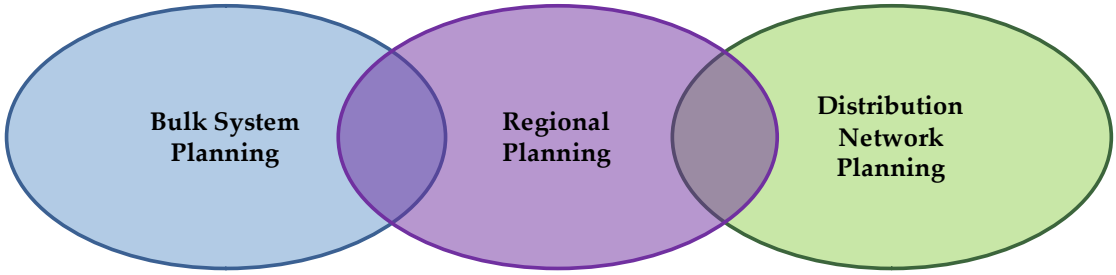
The final IRRPs and RIPs are posted on the IESO's and the relevant transmitter's websites, and may be referenced and submitted to the Board as supporting evidence in rate or "Leave to Construct" applications for specific infrastructure investments. These documents are also useful for municipalities, First Nation communities and Métis community councils for planning, and for conservation and energy management purposes. They are also a useful source of information for individual large customers that may be involved in the region, and for other parties seeking an understanding of local electricity growth, CDM and infrastructure requirements. Regional planning is not the only type of electricity planning that is undertaken in Ontario. As shown in Figure 3-1, there are three levels of planning that are carried out for the electricity system in Ontario:

- Bulk system planning
- Regional system planning
- Distribution system planning

Planning at the bulk system level typically considers the 230 kV and 500 kV network and examines province-wide system issues. Bulk system planning considers not only the major transmission facilities or "wires", but it also assesses the resources needed to adequately supply the province. This type of planning is typically carried out by the IESO pursuant to government policy. Distribution planning, which is carried out by LDCs, considers specific investments in an LDC's territory at distribution level voltages.

Regional planning can overlap with bulk system planning. For example, overlaps can occur at interface points where there may be regional resource options to address a bulk system issue. Similarly, regional planning can overlap with the distribution planning of LDCs. For example, overlaps can occur when a distribution solution addresses the needs of the broader local area or region. Therefore, it is important for regional planning to be coordinated with both bulk and distribution system planning, as it is the link between all levels of planning.

Figure 3-1: Levels of Electricity System Planning



Bulk System Planning

- 500 kV & 230 kV transmission
- Interconnections
- Inter-area network transfer capabilities
- System reliability (security and adequacy) to meet NERC, NPCC, ORTAC
- Congestion and system efficiency
- System supply and demand forecasts
- Incorporation of large generation
- Typically medium- and long-term focused

Regional Planning

- 230 kV & 115 kV transmission
- 115/230 kV autotransformers and associated switchyard facilities
- Customer connections
- Load supply stations
- Regional reliability (security and adequacy) to meet NERC, NPCC & ORTAC
- ORTAC local area reliability criteria
- Regional/local area generation & CDM resources
- Typically near- and medium-term focused

Distribution Network Planning

- Transformer stations to connect to the transmission system
- Distribution network planning (e.g. new & modified DX facilities)
- Distribution system reliability (capacity and security)
- Distribution connected generation and CDM resources
- LDC demand forecasts
- Near- and medium-term focused

By recognizing the linkages with bulk and distribution system planning, and coordinating the multiple needs identified within a region over the long term, the regional planning process provides a comprehensive assessment of a region's electricity needs. Regional planning aligns near- and long-term solutions and puts specific investments and recommendations coming out of the plan into perspective. Furthermore, regional planning optimizes ratepayer interests by avoiding piecemeal planning and asset duplication, and allows Ontario ratepayer interests to be represented along with the interests of LDC ratepayers, and individual large customers. IRRPs evaluate the multiple options that are available to meet the needs, including conservation, generation, and "wires" solutions. Regional plans also provide greater transparency through engagement in the planning process, and by making plans available to the public.

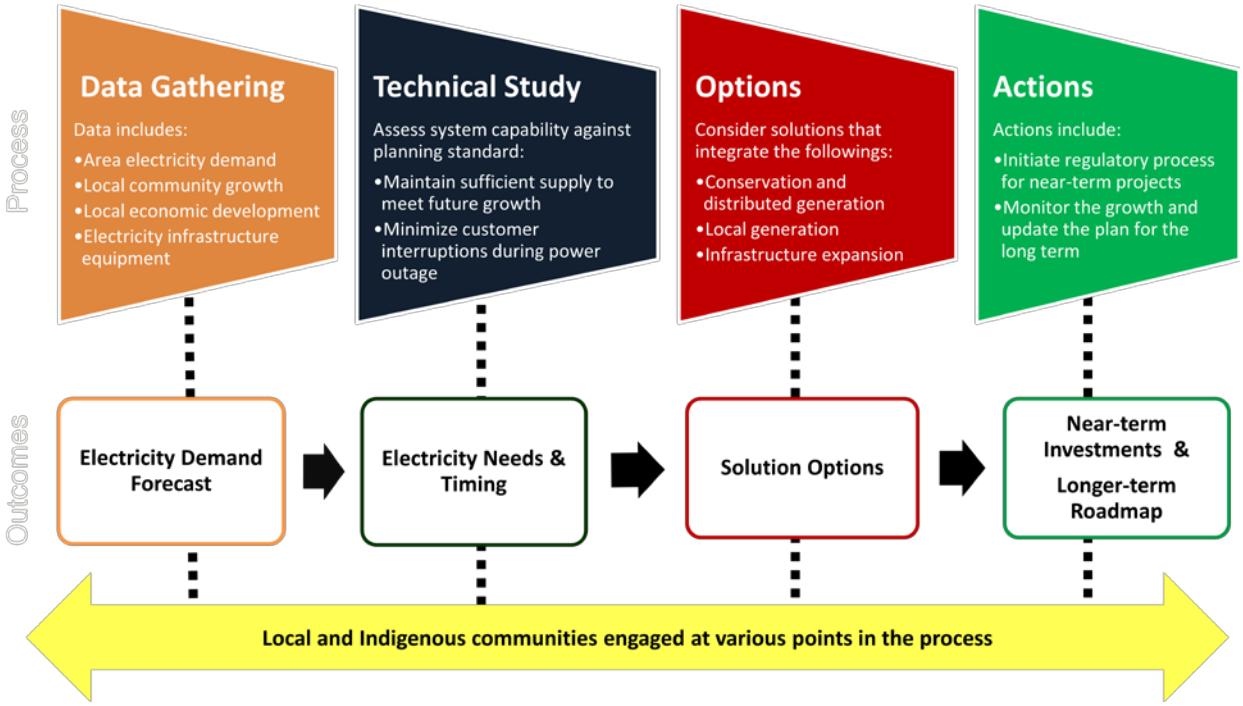
3.2 The IESO's Approach to Regional Planning

IRRPs assess electricity system needs for a region over a 20-year period. The 20-year outlook anticipates long-term trends so that near-term actions are developed within the context of a longer-term view. This enables coordination and consistency with the long-term plan, rather than simply reacting to immediate needs.

In developing an IRRP, a different approach is taken to developing the plan for the first 10 years of the plan—the near and medium term—as compared to the longer-term period of 10-20 years. The plan for the first 10 years is developed based on best available information on demand, conservation, and other local developments. Given the long lead-time to develop electricity infrastructure, near-term electricity needs require prompt action to implement the specified solutions. By contrast, the long-term plan is characterized by greater forecast uncertainty and longer development lead-time; as such solutions do not need to be committed to immediately. Given the potential for changing conditions and technological development, the IRRP for the long term is more directional, focusing on developing and maintaining the viability of options for the future, and continuing to monitor demand forecast scenarios.

In developing an IRRP, the IESO and the Working Group carry out a number of steps. These steps include electricity demand forecasts; technical studies to determine electricity needs and the timing of these needs; the development of potential options; and a recommended plan including actions for the near and long term. Throughout this process, engagement is carried out with stakeholders and Indigenous communities who may have an interest in the area. The steps of an IRRP are illustrated in Figure 3-2, below.

Figure 3-2: Steps in the IRRP Process



The IRRP report documents the inputs, findings and recommendations developed through the process described above, and provides recommended actions for the various entities responsible for plan implementation. Where "wires" solutions are included in the plan recommendations, the completion of the IRRP triggers the initiation of the transmitter's RIP process to develop those options. Other recommendations in the IRRP may include: development of conservation, local generation, community engagement, or information gathering to support future iterations of the regional planning process in the region or sub-region.

3.3 Barrie / Innisfil Sub-region Working Group and IRRP Development

The process to develop the Barrie/Innisfil IRRP was initiated in 2015 with the release of the Needs Assessment report for the South Georgian Bay/Muskoka Region. This product was prepared by Hydro One Transmission with participation from the IESO, PowerSteam, Innisfil Hydro Distribution Inc. ("Innisfil Hydro"),[7] Orangeville Hydro Ltd., Veridian Connections Inc. and Hydro One Distribution. The Needs Screening process was carried out to identify needs

[7] Innisfil Hydro Distribution Inc. became InnPower Corporation on November 4, 2014. This was reflected the OEB's amendment to the licensee name on their electricity distribution licence on December 4, 2014 (EB-2014-0297).

that may require coordinated regional planning in the South Georgian Bay/Muskoka Region. The subsequent Scoping Assessment Report produced by the IESO recommended that the needs identified for the Barrie/Innisfil Sub-region should be further pursued through an IRRP owing to the potential for coordinated solutions and significant assets reaching end-of-life.

In 2015 the Working Group was formed to develop Terms of Reference for this IRRP, gather data, identify near- to long-term needs in the sub-region, and recommend the near- and medium-term actions.

4. Background and Study Scope

Two planning studies have been conducted in the South Simcoe area – now referred to as the Barrie/Innisfil Sub-region – in the last 12 years.

First, in November 2003, a joint utility planning study was initiated by six LDCs in Simcoe County, one large industrial customer, and Hydro One Transmission, to assess the supply and reliability needs of Simcoe County. The study recommended the implementation of two transmission projects to supply forecast growth in the Meaford/Collingwood and South Simcoe areas: the addition of Everett TS, which came into service in 2007 and the Southern Georgian Bay Transmission Reinforcement, which involved upgrading the 115 kV Essa-to-Stayner line to 230 kV and installing a 230/115 kV autotransformer at Stayner TS, which came into service in 2009.

Second, in 2010, Hydro One Transmission initiated a regional supply planning study of the South Simcoe area. Together with the OPA (now merged with the IESO), PowerStream, Innisfil Hydro, and Hydro One Distribution, Hydro One Transmission prepared a study report in 2011 that recommended the installation of low voltage capacitors at Midhurst TS and Orillia TS, completed in 2012, and recommended that Innisfil Hydro (now InnPower) make a formal request to Hydro One for additional transformation capacity.

Building on these past regional studies and taking into account updates to activities in the region and LDCs' load forecasts, this report presents an IRRP for the Barrie/Innisfil Sub-region for the 20-year period from 2015 to 2034. To set the context for this IRRP, the scope of the planning study and the sub-region's existing electricity system are described in Section 4.1.

4.1 Study Scope

This IRRP develops and recommends options to meet the supply needs of the Barrie/Innisfil Sub-region in the near, medium, and long term. The plan was prepared by the IESO on behalf of the Working Group. The plan includes consideration of forecast electricity demand growth, CDM, transmission and distribution system capability, relevant community plans, developments on the bulk transmission system, and generation uptake through the Feed-in Tariff ("FIT") and other province-wide programs.

This IRRP addresses regional needs in the Barrie/Innisfil Sub-region, including adequacy, security, and relevant end-of-life asset considerations.

The following transmission facilities were included in the scope of this study:

- 230/115 kV autotransformers at Essa TS
- Stations—Barrie TS, Midhurst TS, Alliston TS, and Everett TS
- Transmission circuits—E8/9V, E3/4B, M6/7E (Essa to Midhurst section)

The Barrie/Innisfil Sub-region is supplied from the two 500/230 kV autotransformers at Essa TS. These transformers form part of the bulk transmission system, as they are impacted by changes in the broader Ontario electricity system, rather than the local system. Specifically, the autotransformers are impacted by bulk power system flows on the north-south transmission interface, driven by changing generation and load patterns in northern and southern Ontario. Accordingly, the Essa autotransformers were assessed through a separate bulk planning study by the IESO. However, results of the bulk study that have regional implication are discussed in this IRRP.

The Barrie/Innisfil Sub-region and its supply infrastructure are shown in Figure 4-1 and Figure 4-2.

Figure 4-1: Regional Transmission Facilities

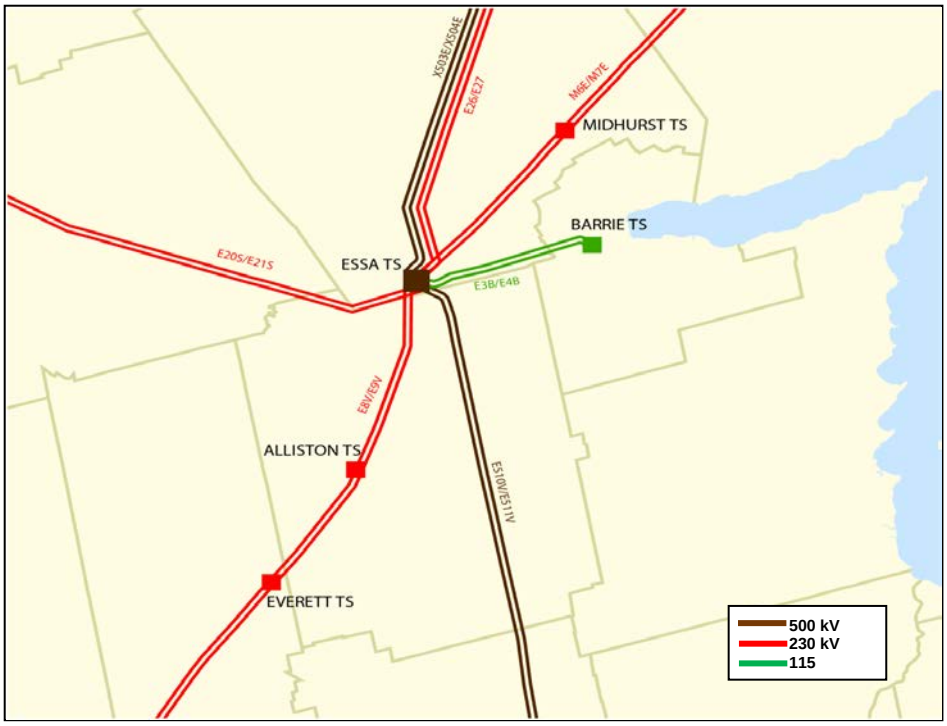
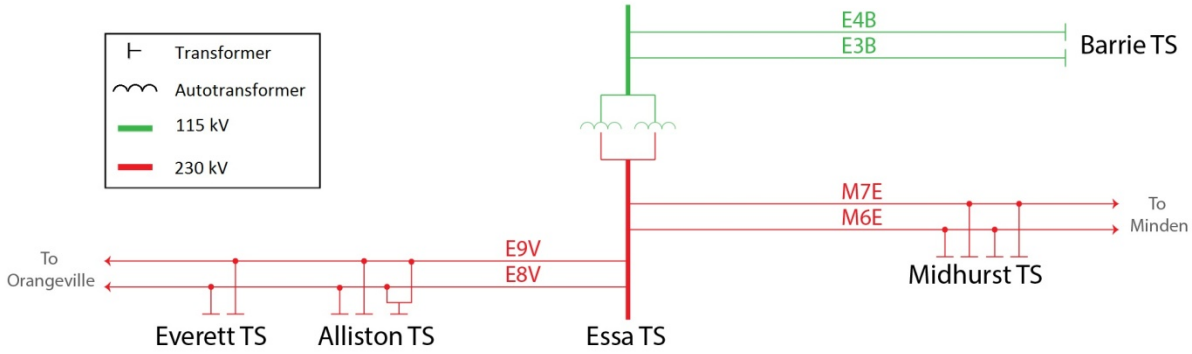


Figure 4-2: Barrie/Innisfil Sub-region Electrical Sub-systems



The Barrie/Innisfil IRRP was developed by completing the following steps:

- Preparing a 20-year electricity demand forecast and establishing needs over this timeframe.
- Examining the load meeting capability ("LMC") and reliability of the existing transmission system supplying the Barrie/Innisfil Sub-region, taking into account facility ratings and performance of transmission elements, transformers, local generation, and other facilities such as reactive power devices. Needs were established by applying ORTAC.
- Establishing feasible integrated alternatives to address needs, including a mix of CDM, generation, transmission and distribution facilities, and other electricity system initiatives.
- Evaluating options using decision-making criteria that include: technical feasibility, cost, reliability performance, flexibility, environmental and social factors.
- Developing and communicating findings, conclusions and recommendations.

5. Demand Forecast

This section outlines the forecast of electricity demand within the Barrie/Innisfil Sub-region. It highlights the assumptions made for peak demand load forecasts, and the contribution of conservation and DG to reducing peak demand. The resulting net demand forecast is used in assessing the electricity needs of the area over the planning horizon.

To evaluate the adequacy of the electric system, the regional planning process involves measuring the demand observed at each station for the hour of the year when overall demand in the study area is at a maximum. This is referred to as "coincident peak demand". Typically this represents the time when assets are most stressed and resources most constrained. This differs from a non-coincident peak, which is measured by summing each station's individual peak, regardless of whether each station's peaks occur at a different time than the area's overall peak.

Within the Barrie/Innisfil Sub-region, the peak loading hour for each year typically occurs in mid-afternoon of the hottest weekday during summer, driven by the air conditioning loads of residential and commercial customers. The Working Group determined the co-incident and non-coincident area peaks for the sub-region are fairly equivalent since they correspond with this weather-related peak. Hence, the non-coincident peak for each station was used as the basis of the load forecast starting point.

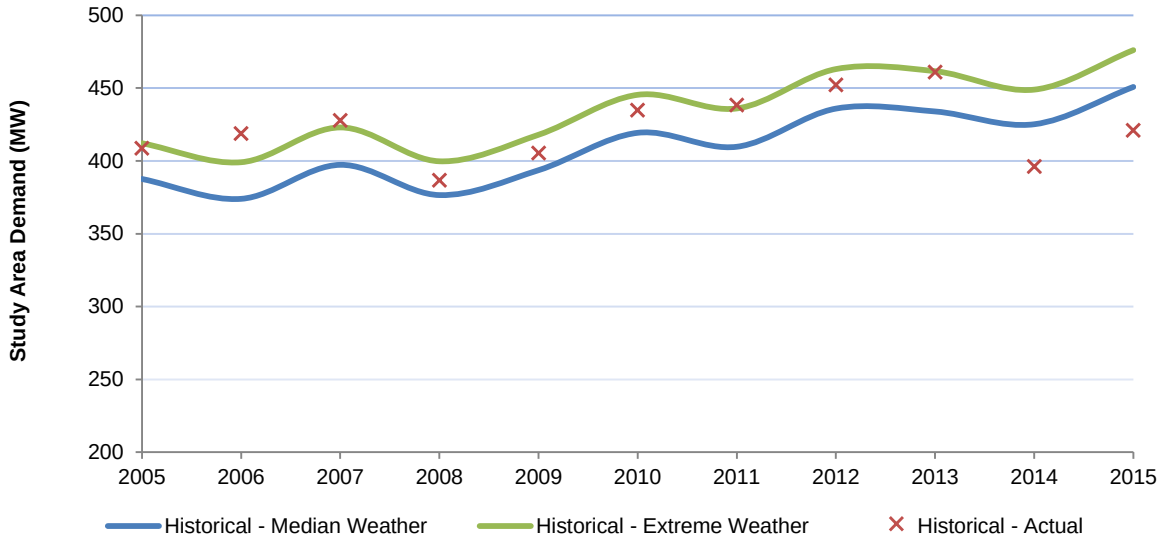
Section 5.1 begins by describing the historic electricity demand trends in the sub-region from 2005 to 2015. Section 5.2 describes the demand forecast used in this study and the methodology used to develop it.

5.1 Historical Demand

The coincident peak electrical demand for the Barrie/Innisfil Sub-region is shown in Figure 5-1. The historical data (in red) shows the coincident peak demand for the year.

The historical demand adjusted for extreme and median weather (in green and blue, respectively) shows the demand at the same hour, but adjusted to reflect the expected behaviour under the applicable weather conditions. Correction factors between historical, median and extreme conditions are produced on a zonal basis by Hydro One, the transmitter in this area.

Figure 5-1: Historical Peak Demand in the Barrie/Innisfil Sub-region



The weather corrected peak shows that demand has been generally increasing since 2005. However, the data for the summer of 2014 and 2015 should be regarded as less reliable due to abnormally cool summer conditions. Although weather correction has been applied in all cases, these methodologies are generally not designed to make such extreme adjustments (i.e., as required for the summers of 2014 and 2015).

5.2 Demand Forecast Methodology

For the purpose of the IRRP, a 20-year planning forecast was developed to assess electricity supply and reliability needs at the regional level.

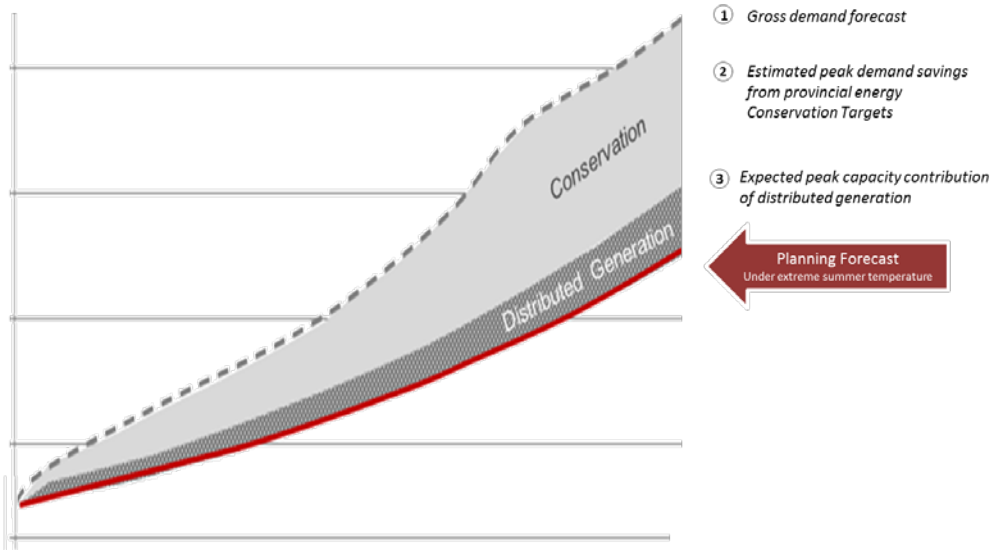
Regional electricity needs are driven by the limits of the transmission infrastructure supplying an area, which is sized to meet peak demand requirements. Regional planning therefore typically focuses on the growth in regional-coincident peak demand.

The 20-year planning forecast is divided notionally into three timeframes. The near term (0-5 years) has the highest degree of certainty; any near-term needs are typically met using regional transmission or distribution solutions as other methods (i.e., DG or CDM) are still being tested to determine if their lead-times will be suitable to meet near-term timelines. The medium term (5-10 years), however, provides more lead time to develop and incorporate DG and CDM options.

The long-term forecast covers the 10-20 year period and has the lowest degree of certainty. It is used for the identification of potential longer-term needs, and for the consideration and development of integrated solutions (including CDM, DG, and major transmission upgrades). To address the relative uncertainty of long-term needs, a high and a low forecast scenario were created. Early identification of potential long-term needs and potential solutions makes it possible to begin engagement with the local community and all levels of government long before the need is triggered. This provides the greatest opportunity to gain input on decision making, and to ensure local planning can account for new infrastructure.

The regional peak demand forecast was developed as shown in Figure 5-2. Gross demand forecasts, assuming normal-year weather conditions, were provided by the LDCs and the transmission-connected customers in each LDC's service territory. The LDC forecasts are based on growth projections included in regional and municipal plans, which in turn reflect the province's Growth Plan for the Greater Golden Horseshoe, 2006, as amended. These forecasts were then modified to produce a planning forecast (i.e., they were adjusted to reflect the peak demand impacts of provincial conservation targets, DG contracted through provincial programs such as FIT and microFIT, and to reflect extreme weather conditions). The planning forecast was then used to assess any growth-related electricity needs in the region.

Figure 5-2: Development of Demand Forecast



Using a planning forecast that is net of provincial conservation targets is consistent with the province's Conservation First policy. However, it also assumes that the targets will be met and that the targets, which are energy-based, will produce corresponding local peak demand

reductions. An important aspect of plan implementation will be monitoring the actual peak demand impacts of conservation programs delivered by the area LDCs and, as necessary, adapting the plan. Additional details related to the development of the demand forecast are provided in Appendix A.

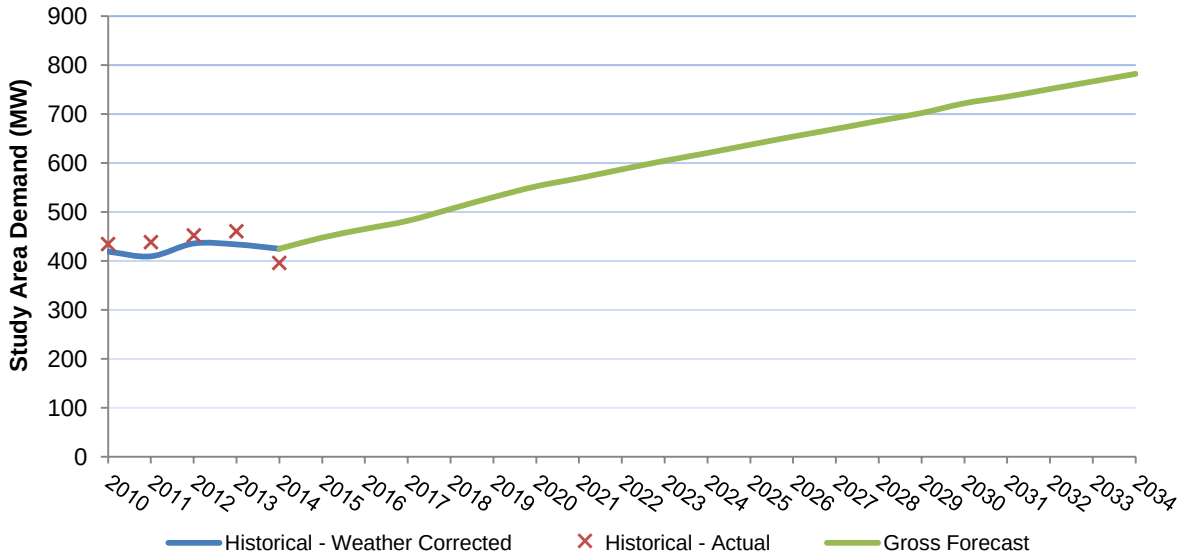
5.3 Gross Demand Forecast

Each participating LDC in the Barrie/Innisfil Sub-region prepared gross demand forecasts at the transformer station level, or at the bus level for multi-bus stations. Gross demand forecasts account for increases in demand from new or intensified development, but they do not account for the impact of new conservation measures such as codes and standards or demand response ("DR") programs. However, LDCs are expected to account for changes in consumer demand resulting from typical efficiency improvements and response to increasing electricity prices, which is termed "natural conservation".

LDCs have the best information on customer and regional growth expectations in the near and medium term since they have the most direct involvement with their customers. Most LDCs cited alignment with municipal and regional official plans as a primary source for input data. Other common considerations included known connection applications and typical electrical demand for similar customer types. More details on the LDCs' load forecast assumptions can be found in Appendix A.

The graph below shows the gross demand forecast information provided by LDCs for the Barrie/Innisfil Sub-region, with historical data points provided for comparison. The gross forecast provided by the LDCs, shown in Figure 5-3, is for median weather conditions.

Figure 5-3: Barrie/Innisfil Sub-region Gross Forecast



Total annual growth averages 3% per year for the study area over the 20-year planning horizon. Growth is highest in the first 10 years at an average of 3.7% per year, before reducing to an average of 2.3% per year for the following 10 years. Although the forecast is shown for the entire study area, individual stations are forecast to experience different growth rates.

To address development uncertainty in the area, the LDCs also produced a forecast for both a high and a low growth scenario. While the needs assessment was conducted based on the reference load growth scenario, the high and low forecasts were used for evaluating the robustness of different medium- and long-term options. The regional gross growth rate ranges from 2.2% per year in the low scenario to 3.9% per year in the high.

The forecasts were provided based on best available information and, as appropriate, will be updated going forward. The gross demand forecasts by station for the reference, high and low scenarios are provided in Appendix A.

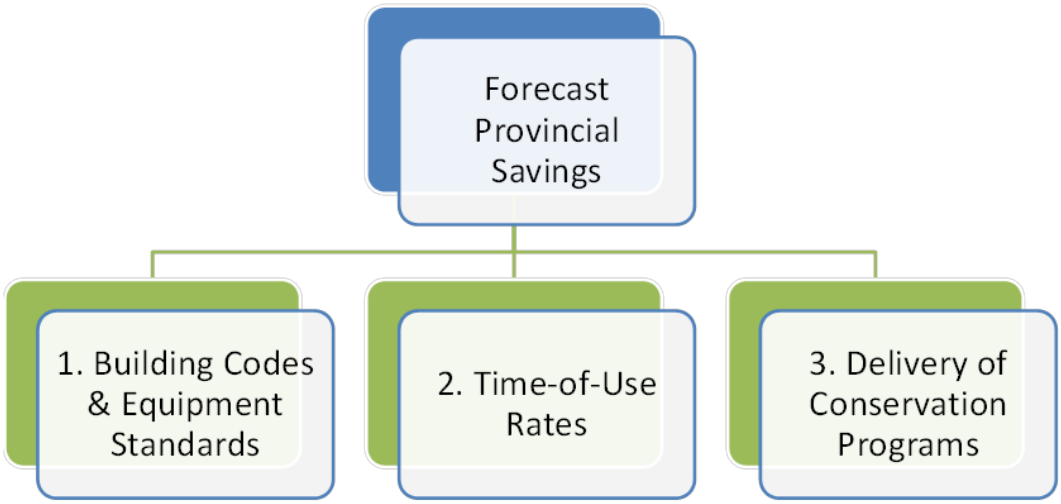
5.4 Conservation Assumed in the Forecast

Conservation is achieved through a mix of program-related activities, rate structures, and mandated efficiencies from building codes and equipment standards. It plays a key role in maximizing the use of existing assets and maintaining reliable supply by offsetting a portion of a region's growth, helping to keep demand within equipment capability. The conservation savings forecast for the Barrie/Innisfil Sub-region have been applied to the gross peak demand

forecast for median weather, along with DG resources (described in Section 5.5), to determine the net peak demand for the sub-region.

In December 2013 the Ministry of Energy released a revised LTEP that outlined a provincial conservation target of 30 terawatt-hours ("TWh") of energy savings by 2032. To estimate the impact of the conservation savings in the sub-region, in terms of impact to peak demand, the forecast provincial savings were divided into three main categories:

Figure 5-4: Categories of Conservation Savings



1. *Savings due to Building Codes & Equipment Standards*
2. *Savings due to Time-of-Use Rate Structures*
3. *Savings due to the delivery of Conservation Programs*

For the Barrie/Innisfil Sub-region, the impacts of the estimated savings for each category were further broken down by the residential, commercial and industrial customer sectors. The IESO worked together with the LDCs to establish a methodology to estimate the electrical demand impacts of the energy targets by these three customer sectors. This provides a better resolution for the forecast conservation, as conservation potential estimates vary by sector due to different energy consumption characteristics and applicable measures.

For the Barrie/Innisfil Sub-region, LDCs were requested to provide both their gross demand forecast and a breakdown of electrical demand by sector for each TS. Once sectoral gross

demand at each TS was estimated, the next step was to estimate peak demand savings for each conservation category: codes and standards, time-of-use rates, and conservation programs. The estimate for each of the three savings groups was done separately due to their unique characteristics and the available data. The final estimated conservation peak demand reduction, 82 MW by 2034, was applied to the gross demand to create the planning forecast. Table 5-1 provides the conservation peak demand savings for a selection of the forecast years.

Table 5-1: Peak Demand MW Savings from 2013 LTEP Conservation Targets, Select Years

Year	2016	2018	2020	2022	2024	2026	2028	2030	2032
Savings (MW)	5	12	19	28	37	48	60	73	80

Additional conservation forecast details are provided in Appendix A.

5.5 Distributed Generation Assumed in the Forecast

In addition to conservation resources, DG in the Barrie/Innisfil Sub-region is also forecast to offset peak demand requirements. The introduction of the *Green Energy and Green Economy Act, 2009*, and the associated development of Ontario's FIT program, has increased the significance of distributed renewable generation in Ontario. This renewable generation, while intermittent in nature, contributes to meeting the electricity demands of the province.

After applying the conservation savings to the demand forecast as described above, the forecast is further reduced by the expected peak contribution from contracted, but not yet in-service, DG in the sub-region. The effects of projects that were already in-service prior to the base year of the forecast were not included as they are already embedded in the actual demand, which is the starting point for the forecast. Potential future (but uncontracted) DG uptake was not included and is instead considered as an option for meeting identified needs.

Based on the IESO contract list as of June 2015, new DG projects are expected to offset an incremental 3.2 MW of peak demand within the Barrie/Innisfil Sub-region by 2018. Most distribution connected contracted generators included in the forecast are small-scale solar projects (< 500 kW); however, there are some larger FIT (< 10 MW) solar projects connecting at Midhurst TS. A capacity contribution of 22%, to the regional peak, has been assumed to account for the expected output of the local solar resources during summer peak conditions.

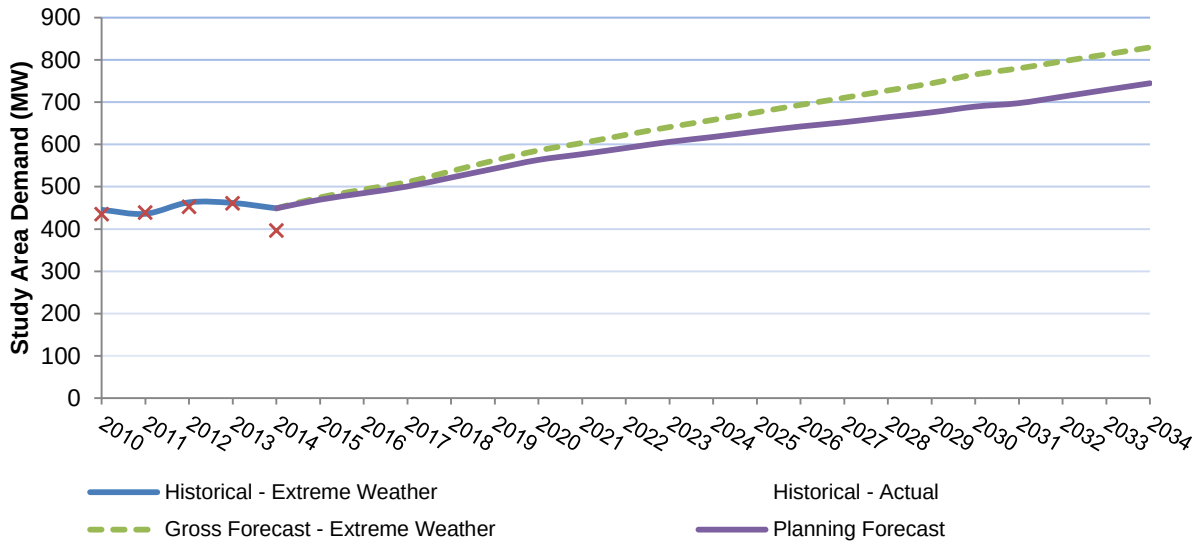
Additional details of the regional demand reductions from province-wide DG programs are provided in Appendix A.

5.6 Planning Forecasts

After taking into consideration the combined impacts of conservation and DG, a 20-year planning forecast was produced.

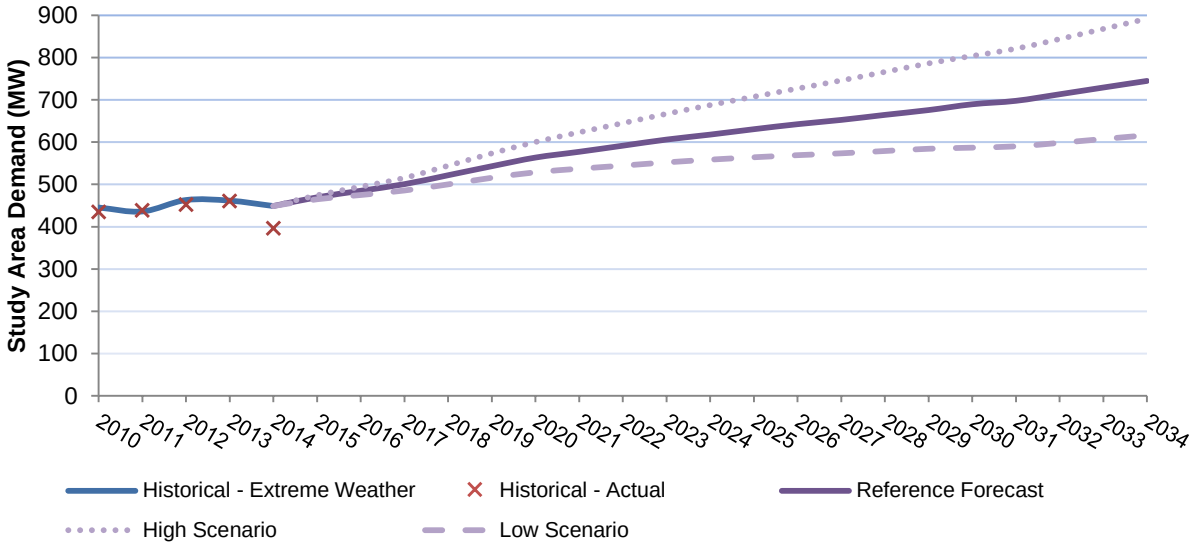
Figure 5-5 below illustrates the planning forecast, along with historic demand in the area. Note that the planning forecast has been adjusted for extreme weather conditions. For comparison in Figure 5-5 the gross forecast has also been adjusted for extreme weather conditions. Further details of the planning forecast scenarios are provided in Appendix A.

Figure 5-5: Barrie/Innisfil Sub-region Planning Forecast



The net forecast for the high, low and reference scenarios are shown in Figure 5-6. Further information on the high and low scenarios and each of the LDC's load forecast assumptions can be found in Appendix A.

Figure 5-6: Barrie/Innisfil Sub-region High and Low Demand Forecast Scenarios



6. Needs

Based on the planning forecasts, system capability, and application of provincial planning criteria, the Barrie/Innisfil Sub-region Working Group identified electricity needs in the near, medium, and long term. This section describes the identified needs for these three time horizons in the Barrie/Innisfil Sub-region.

6.1 Needs Assessment Methodology

ORTAC,[8] the provincial standard for assessing the reliability of the transmission system, was applied to assess supply capacity and reliability needs. ORTAC includes criteria related to the assessment of the bulk transmission system, as well as the assessment of local or regional reliability requirements (see Appendix B for more details).

By applying these criteria, two broad categories of needs have been identified for the Barrie/Innisfil Sub-region IRRP:

- **Transformer Station Capacity** describes the electricity system's ability to deliver power to the local distribution network through the regional step-down transformer stations. The capacity rating of a transformer station is the maximum demand that can be supplied by the station and is limited by the station equipment. Station ratings are often determined based on the 10-day LTR of a station's smallest transformer(s) under the assumption that the largest transformer is out of service.[9]
- **Supply Capacity** is the electricity system's ability to provide continuous supply to a local area. This is limited by the LMC of the transmission supply to the area. The LMC is determined by evaluating the maximum demand that can be supplied to an area accounting for limitations of the transmission element(s) (e.g., a transmission line, group of lines, or autotransformer), when subjected to contingencies and criteria prescribed by ORTAC. LMC studies are conducted using power system simulations analysis (see Appendix B for more details). Supply capacity needs are identified when the peak demand for the area exceeds the LMC.

The needs assessment also identifies requirements related to equipment end-of-life and planned sustainment activities. Equipment reaching end-of-life and planned sustainment activities have

[8] http://www.ieso.ca/imoweb/pubs/marketadmin/imo_req_0041_transmissionassessmentcriteria.pdf

[9] A transformer station can also be limited when downstream or upstream equipment (e.g., breakers, disconnect switches, low voltage bus, high voltage circuits, etc.) are undersized relative to the transformer rating. LTR is further defined on page 8.

a significant impact on the needs assessment and option development for the Barrie/Innisfil Sub-region.

6.2 Local Electricity Supply and Reliability Needs

The needs assessment for the Barrie/Innisfil IRRP focused on identifying needs for local transformer stations and related supply infrastructure. The impact of all three demand forecast scenarios (reference, high, and low – see Section 5.6) on the local transmission infrastructure was evaluated. Near-, medium-, and long-term capacity needs were identified for the south Barrie and Innisfil areas for the reference scenario, along with a long-term capacity need at Everett TS. End-of-life infrastructure needs were also identified in the area.

6.2.1 Near- and Medium-Term Needs

The near- and medium-term needs identified for the Barrie TS service area were considered together since the infrastructure impacted is common to all identified needs. The near- and medium-term needs are summarized in Table 6-1.

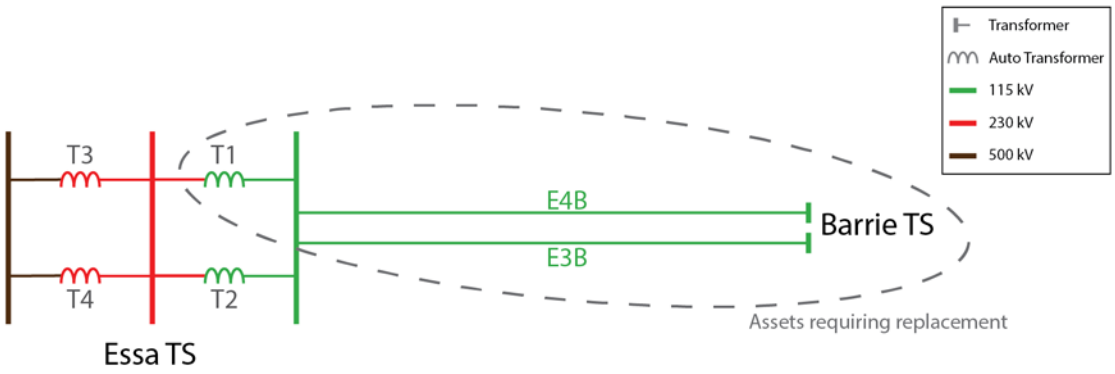
Table 6-1: Barrie/Innisfil Sub-region Near- and Medium-Term Electricity Needs

Need	Description	Timing
End-of-Life	Hydro One has identified Barrie TS and components of its 115 kV supply infrastructure to be nearing their end-of-life.	2020
Transformer Station Capacity	Net demand growth in the southern portion of the City of Barrie and in the Town of Innisfil is forecast to exacerbate the existing transformer station capacity need at Barrie TS. Barrie TS also lacks additional feeder positions to accommodate future growth in Innisfil.	Today
Supply Capacity	The net demand growth is forecast to exceed the LMC of the 115 kV supply to Barrie TS (E3/4B).	2019

Hydro One Transmission identified existing sustainment initiatives at Barrie TS driven by the 115/44 kV station transformers reaching end-of-life, along with the 44 kV switchgear, circuit breakers, disconnect switches and other station equipment.

Barrie TS was placed in-service in 1962. The 44 kV switchyard assets at Barrie TS have been identified by Hydro One as being in need of replacement in the near term. Barrie TS is currently supplied by the 230/115 kV autotransformers at Essa TS via the Essa 115 kV switchyard and 115 kV circuits E3/4B. These assets were built in the 1950s, with many of them already exceeding their expected life and in need of replacement in the near and medium term. Figure 6-1 depicts the significant assets that Hydro One has identified as requiring replacement in the near term.

Figure 6-1: Single Line Diagram Detailing Existing Supply of Barrie TS and Assets Requiring Replacement



The timing and replacement options for Barrie TS were discussed among the Working Group members. It was agreed that based on the existing and forecast station demand, that Barrie TS and E3/4B should be rebuilt to 230 kV, with 75/125 Mega Volt Amp ("MVA") 44/230 kV transformers. This means that the end-of-life replacement of Barrie TS will add approximately 50 MW of incremental supply capacity in the south Barrie and Innisfil area. Details of the alternatives considered by the Working Group can be found in Appendix B.

Barrie TS is forecast to experience the highest average yearly growth rate of any TS in the study area over the 20 year planning period, for all load growth scenarios. This is driven by the large amount of growth set out in the local municipal plans and in the province's Growth Plan for the Greater Golden Horseshoe, 2006, as amended, which identify the City of Barrie as an urban growth centre.

Effective January 1, 2010, the City of Barrie annexed approximately 5,700 acres of land from the Town of Innisfil to accommodate its forecast growth. These annexed lands are within the Barrie TS service area, and their development contributes to a large portion of the station's forecast growth. Barrie TS growth is also influenced by the recent and continued development of data centres in the City of Barrie, and forecast growth in the Town of Innisfil, including the proposed industrial and commercial development of Innisfil Heights near Highway 400.

Barrie TS is currently utilized by two LDCs, PowerStream and InnPower.

Figure 6-2: Forecast Summer Demand for Barrie TS - Reference Scenario

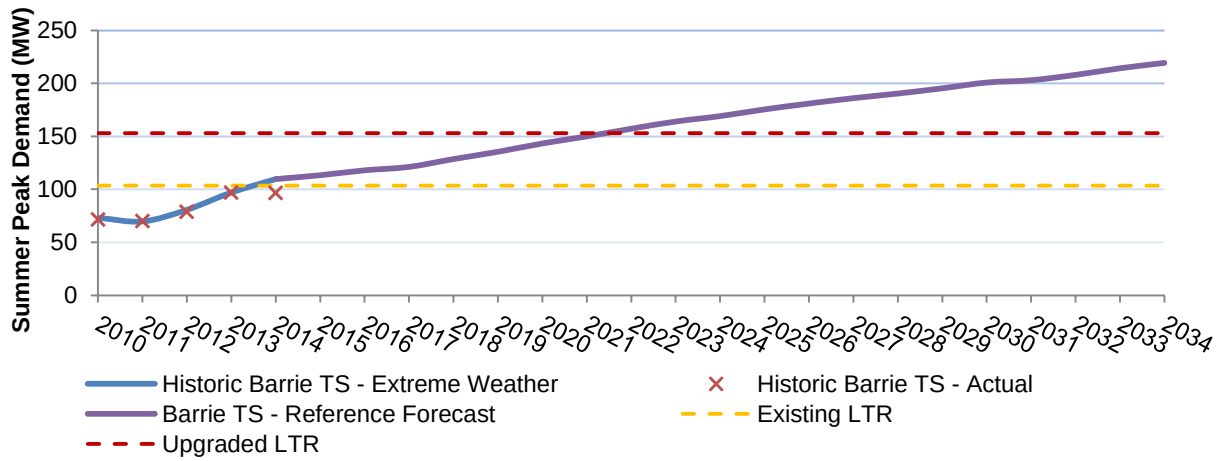


Figure 6-2 shows the forecast load growth for Barrie TS under the assumptions from the reference scenario, along with the existing LTR of Barrie TS and the future LTR of the uprated Barrie TS. Based on the forecast provided by the LDCs, Barrie TS would have exceeded its existing LTR by 2015 and will exceed the uprated LTR by 2022. By the end of the study period, there is approximately 66 MW of forecast capacity need that cannot be supplied by the uprated Barrie TS.

Currently all seven existing 44 kV feeder positions available at Barrie TS have been allocated to an LDC. Six of these feeders are used to supply PowerStream customers and one to supply InnPower. Based on the normal operating rating of the 44 kV feeder supplying InnPower, there will be a need for additional feeder capacity and a new feeder position by 2020 for the reference forecast scenario. The uprated Barrie TS will have a total of eight feeder positions, meaning there will be an additional position available as an option to supply future load growth in both south Barrie and Innisfil.

In addition to the limitation posed by the transformers at Barrie TS, the existing upstream 115 kV transmission supply is forecast to exceed its limit. The 115 kV circuits that supply Barrie TS are E3/4B. E3B is expected to exceed its LMC in 2019. These 115 kV circuits are supplied by two 230/115 kV autotransformers at Essa TS. The most limiting of these transformers is expected to exceed its LTR in 2020. By upgrading the Barrie TS supply to 230 kV, it ensures that future load growth at Barrie TS, up to its new LTR, can be accommodated, and there will be remaining line capacity to accommodate future load customers in the area at 230 kV.

6.2.2 Long-Term Capacity Needs

Long-term capacity needs were identified at both the transformer station level and the sub-area/sub-region level. Two different sub-system levels were defined based on both the ability to transfer load on the distribution system, and on the overall electrical supply to the area. The two areas defined for the purpose of the needs assessment are the "Barrie Sub-area" – defined below – as well as the established "Barrie/Innisfil Sub-region".

In the long term, transformer capacity needs arise for Everett TS and for the broader Barrie Sub-area. At the end of the study period, both a transformer capacity need and a supply capacity need arise for the broader Barrie/Innisfil Sub-region. These needs, along with their timing and influencing factors, are discussed in more detail below.

Everett TS

The transformer station capacity need at Everett TS is a long-term need. Everett TS is a relatively new transformer station, which came into service in late 2007 to address capacity needs in the South Simcoe area, relieving Alliston TS. Everett TS is forecast to supply load growth in the Town of New Tecumseth, primarily Alliston and the surrounding area.

Figure 6-3: Forecast Summer Demand for Everett TS - Reference Scenario

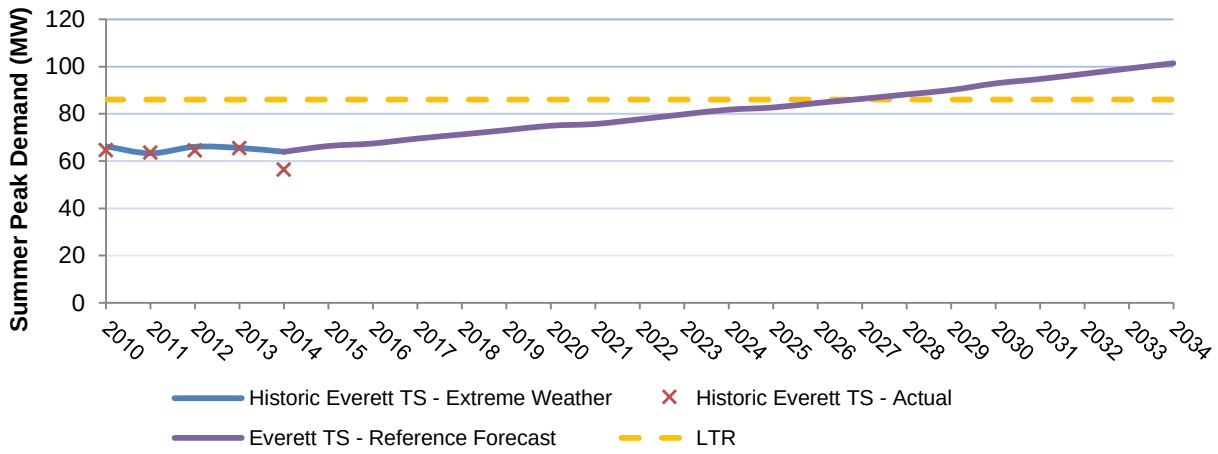


Figure 6-3 shows the forecast load growth for Everett TS under assumptions from the reference scenario. Based on the forecast provided by the LDCs, Everett TS will exceed its current LTR in 2027. By the end of the study period, there is approximately 15 MW of forecast capacity need that cannot be supplied by Everett TS.

A capacity need at Everett TS was identified in both the 2011 South Simcoe study and in the latest Needs Assessment completed by Hydro One for this regional planning cycle. Both studies outlined that this capacity need can be addressed by changing the CT ratios, which are currently limiting the station LTR, once the station's minimum load exceeds 8 MVA. Since 2011, the minimum load at Everett TS has surpassed 8 MVA meaning the CT ratios can now be changed whenever the additional capacity is required. This would defer the capacity need at Everett TS beyond the study period.

Barrie Sub-area

The Barrie Sub-area is defined as the area serviced by both Midhurst TS and Barrie TS, recognizing geographical overlap in their service areas. Ties exist between the stations for emergency load transfers, and there is potential for permanent load transfers or for a choice between the two stations when servicing new load.

The LMC of the Barrie Sub-area is defined as the combined LTRs of Midhurst TS and Barrie TS. The ability to fully utilize this firm capacity, however, is constrained by the feasibility or cost effectiveness of any load transfers or optimization of the distribution system. The available capacity in the Barrie Sub-area is also increased by the uprating of Barrie TS discussed in Section 6.2.1.

Figure 6-4: Summer Demand Forecast for the Barrie Sub-area - Reference Scenario

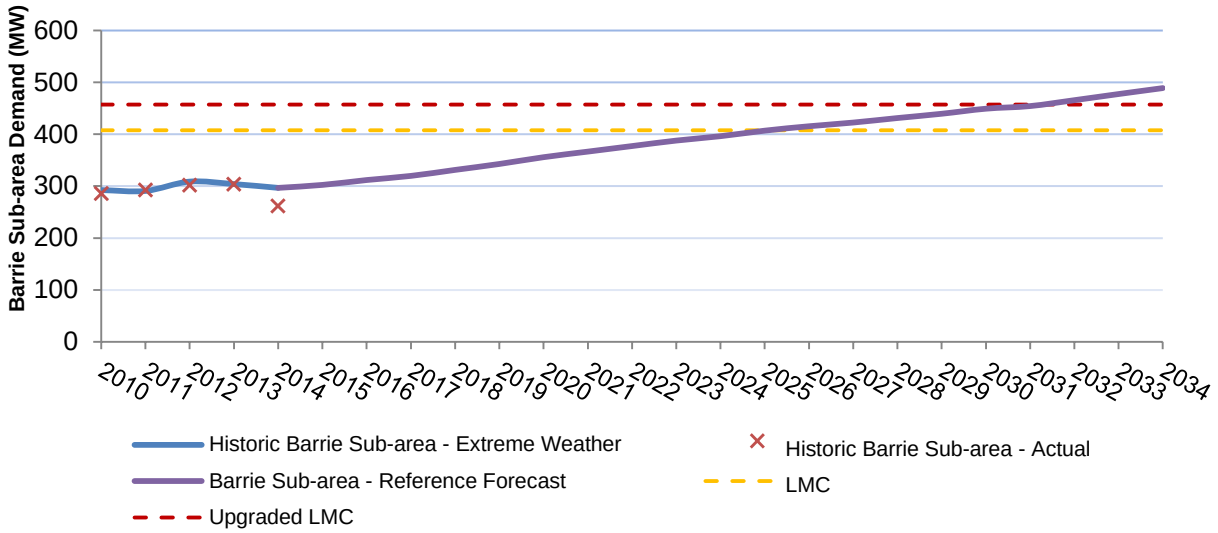


Figure 6-4 shows the forecast load growth in the Barrie Sub-area under assumptions for the reference scenario. Based on the forecasts provided by the LDCs, the Barrie Sub-area will exceed the combined capacity of Midhurst TS and uprated Barrie TS by 2031. By the end of the study period there is approximately 32 MW of forecast capacity need that cannot be supplied in the Barrie Sub-area assuming optimum load sharing between Midhurst TS and Barrie TS.

Barrie / Innisfil Sub-region

The Barrie/Innisfil Sub-region is defined in Section 4.1 as the area supplied by Midhurst TS, Barrie TS, Alliston TS and Everett TS. This area is supplied primarily by the bulk system, via the 500/230 kV autotransformers at Essa TS. Based on the forecast load growth, the region is primarily limited by the combined transformer capacity of Midhurst TS, Barrie TS, Everett TS and Alliston TS. This recognizes the existing ties used for emergency load transfers and the potential to implement permanent load transfers throughout the area.

Figure 6-5: Summer Demand Forecast Barrie/Innisfil Sub-region - Reference Scenario

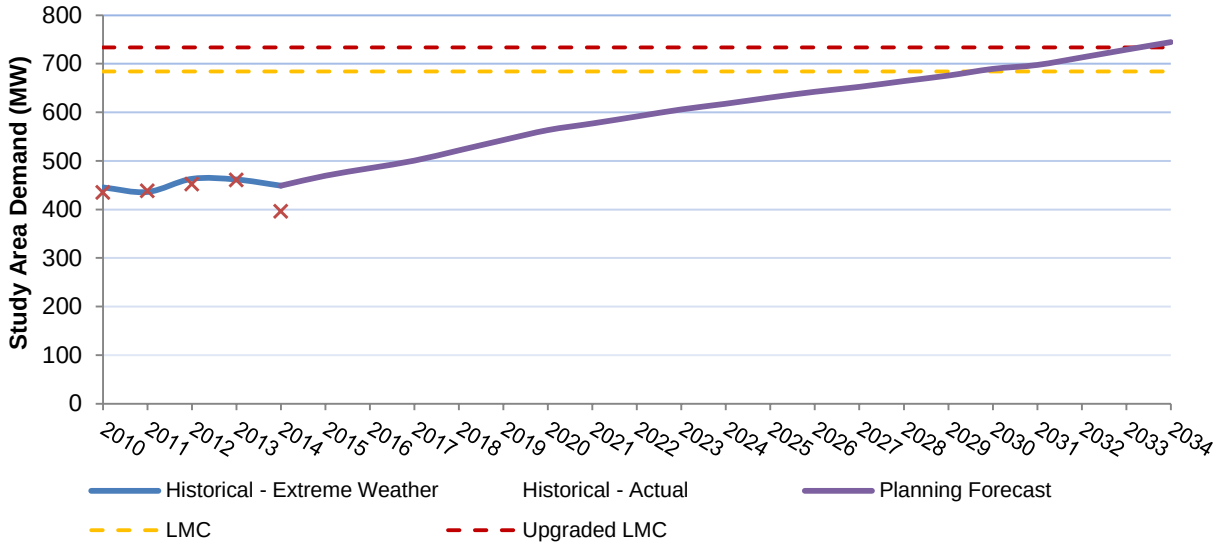


Figure 6-5 shows the forecast load growth in the Barrie/Innisfil Sub-region under assumptions for the reference scenario. Based on the forecasts provided by the LDCs, the Barrie Sub-region will exceed the combined capacity of the transformer stations in the region (accounting for the uprated Barrie TS) by 2034. By the end of the study period there is approximately 14 MW of forecast capacity need that cannot be supplied in the Barrie/Innisfil Sub-region, assuming optimum load sharing between all transformer stations.

The upstream transmission limitation for the sub-region is the 500/230 kV autotransformers at Essa TS. The loading of the autotransformers is also impacted by the load in the Parry Sound/Muskoka Sub-region and, to a certain degree, by the bulk system flow on Ontario's north-south transmission interface. The IESO has studied the impact on the Essa TS autotransformers under different bulk flow conditions and the load forecasts from both the Barrie/Innisfil IRRP and the Parry Sound/Muskoka IRRP. Based on these assumptions, a forecast capacity need, based on the loss of one autotransformer, does not arise until 2034.

In addition to the growth included in the planning demand forecast, the Metrolinx most recent electrification plan has indicated a preference for connecting to the new 230 kV supply extension via the uprated Barrie TS for their traction power station for the Barrie line. This connection could advance the need date for the supply capacity due to the Essa autotransformer limitations. Therefore, this project should be monitored closely by both the IESO (since it has implications for the bulk system) and the Working Group.

6.3 Needs Summary

The majority of needs in the Barrie/Innisfil Sub-region concern various loading limits on Barrie TS, along with the need to address the risk posed by the end-of-life infrastructure at the station.

With the Barrie Area Transmission Reinforcement project, which Hydro One has begun development work for at the request of the IESO and the Working Group, the near-term end-of-life need and the existing capacity need at the station can be addressed. Over the medium and long term, additional capacity needs arise in the area, including InnPower's need for additional 44 kV feeder capacity, additional transformer capacity needs at Everett TS and in the Barrie area, and a need for additional transformer and supply capacity for the sub-region by the end of the study period.

The table below provides a brief summary of needs that will be considered during the development of options for the plan.

Table 6-2: Summary of Needs in Barrie/Innisfil Sub-region

Area	Need	Description	Need Date
Barrie TS	Barrie TS transformer capacity need	There is an existing transformer capacity need at Barrie TS. The incremental capacity provided by the Barrie Area Transmission Reinforcement project should address a large portion of the near- and medium-term capacity need at Barrie TS.	Today
	Barrie TS supply capacity need	The 115 kV circuits currently supplying Barrie TS are forecast to exceed their LMC. By uprating these circuits to 230 kV, the Barrie Area Transmission Reinforcement project addresses this need.	2019

Area	Need	Description	Need Date
	End-of-life for Barrie TS 115/44 kV transformers and station equipment	Significant station components, both at and supplying Barrie TS are nearing end-of-life and require replacement by 2020. The Barrie Area Transmission Reinforcement project should address this need.	2020
	InnPower distribution/feeder supply capacity	Currently InnPower is only allocated one feeder from Barrie TS which is forecast to exceed its normal operating rating in the near to medium term.	2020
	Medium-term transformer capacity need	The uprated Barrie TS is forecast to exceed its new LTR in the medium term, based on the expected load growth in south Barrie and Innisfil.	2022
Everett TS	Everett TS transformer capacity need	Everett TS is forecast to exceed its limited LTR in the long term.	2027
Barrie Sub-area	Transformer capacity need	Load in the Barrie area is forecast to exceed the combined transformer capacity of Midhurst TS and the uprated Barrie TS in the long term, primarily driven by load growth at Barrie TS.	2031

Area	Need	Description	Need Date
Barrie/Innisfil Sub-region	Transformer and supply capacity need	In the long term, the load in the Barrie/Innisfil Sub-region is forecast to exceed both the combined transformer capacity of Barrie TS, Everett TS, Midhurst TS and Alliston TS, and the LMC of the Essa autotransformers.	2034

7. Near- and Medium-Term Plan

The plan to address the near- and medium-term needs identified for the Barrie TS service area is already underway. As described in Section 6.2.1, there are end-of-life and existing station capacity needs at Barrie TS that need to be addressed today. The near-term plan has been developed by the Working Group, with a project to rebuild and uprate Barrie TS (the Barrie Area Transmission Reinforcement project) formally handed off to Hydro One in December 2015. The hand-off letter was issued to ensure that facilities could be in-service in time to meet the identified needs, given the typical lead-time of five to seven years for a transmission project. The rebuild of Barrie TS and E3/4B is currently undergoing the development work (e.g., EA process, Leave to Construct).

This section describes the alternatives considered by the Working Group in developing the near- and medium-term plan for the Barrie/Innisfil Sub-region; provides details of, and rationale for, the recommended plan; and outlines the implementation plan.

7.1 Alternatives for Meeting Near- and Medium-Term Needs

In developing the near- and medium-term plan, the Working Group considered a range of integrated options. The Working Group further considered technical feasibility, cost and consistency with long-term needs and options in the Barrie/Innisfil Sub-region when evaluating alternatives. Solutions that maximize the use of existing infrastructure were given priority.

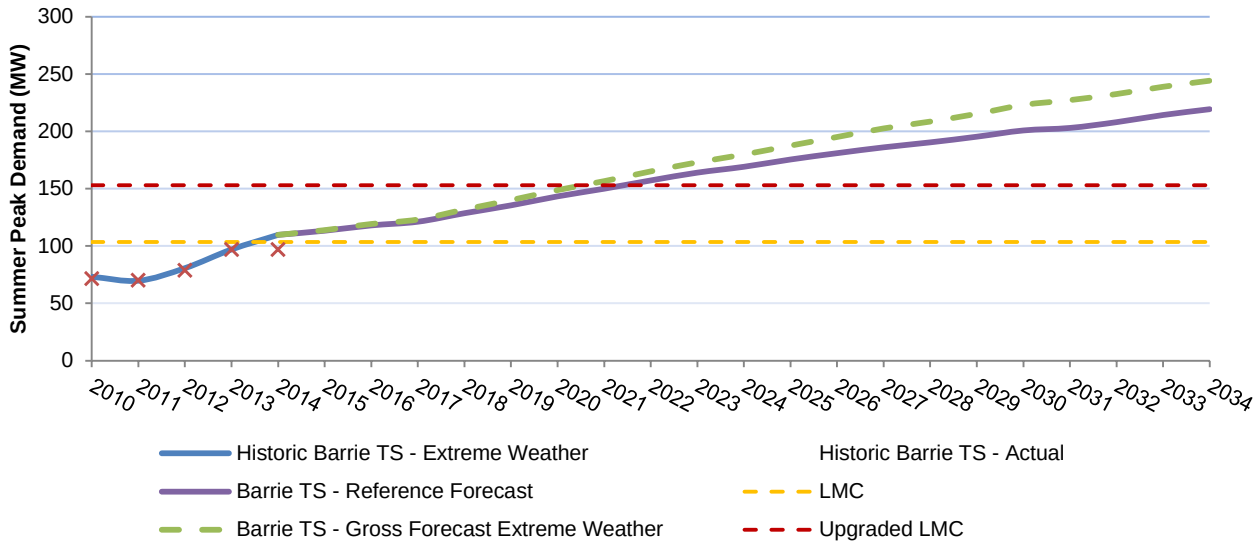
The following sections detail the alternatives considered and evaluates them against the criteria described above. The alternatives are grouped according to three major solution categories: (1) conservation, (2) local generation and (3) transmission and distribution.

7.1.1 Conservation

Conservation was considered as part of the planning forecast, which includes the local peak demand impact of the provincial conservation targets as described in Section 5.4. In the Barrie TS area, the LTEP energy reduction targets account for approximately 10 MW, or 17% of the forecast demand growth during the first 10 years of the study. This is forecast to defer the Barrie TS capacity need by one year from 2021 to 2022.

In Figure 7-1, Barrie TS load is shown under both the gross and net planning (accounts for expected conservation and contracted DG) forecasts. Both forecasts are adjusted for extreme weather conditions.

Figure 7-1: Effect of Conservation Targets on Barrie TS Peak Load



Most conservation targets are energy targets (measured over an entire year). Transmission needs, on the other hand, are triggered based on peak demand (single highest observation of hourly demand in a year). As a result, in order to reduce, defer, or otherwise address needs, conservation programs must have an impact during the hour of peak demand. In the case of the Barrie/Innisfil Sub-region, this typically means late afternoon on the hottest weekdays of summer.

The net planning forecast includes an estimate of how meeting the mostly energy based conservation targets translates into peak demand reductions. There is, however, uncertainty in both meeting energy conservation targets and determining how meeting those targets will translate into peak demand savings. As such, there is a wide range of potential demand impacts that could be experienced (both higher and lower than forecast), while still achieving full conservation targets. Therefore, LDCs are encouraged to focus their Conservation First Framework ("CFF") funding towards measures and programs that can also reduce peak and overall demand–particularly in areas where needs have been identified through regional planning.

As part of the implementation of this plan, the Working Group will annually review actual peak demand, including the impact of conservation. The IESO will support the LDCs in exploring the full potential of conservation for addressing long-term needs, discussed further in the long-term plan in Section 8.

7.1.2 Local Generation

Large transmission-connected generation and small-scale distribution-connected DG options were ruled out as viable alternatives for meeting near-term needs in the Barrie/Innisfil Sub-region. This was primarily due to the end-of-life issues at Barrie TS, which must be addressed now and could not be solved using local generation, since approximately 100 MW of existing customer load would be left without supply if the infrastructure was not replaced at end-of-life.

In addition, because local generation contributes to the overall generation capacity for the province, the generation capacity situation at the provincial level must be considered when assessing options for near- and medium-term needs. Currently, Ontario has a surplus of generation capacity and no new capacity is forecast to be needed until the mid-2020s at the earliest. This was an additional consideration in ruling out local generation for meeting the near-term needs.

7.1.3 Transmission and Distribution

A number of transmission and distribution, or "wires," solutions were considered by the Working Group to meet the near-term needs. "Wires" infrastructure solutions can refer to new or upgraded transmission or distribution system assets, including lines, stations, or related equipment. These solutions are often characterized by high upfront capital costs, but have high reliability over the lifetime of the asset.

7.1.3.1 Transmission-based Solution to Address Near-Term Need

To address the end-of-life need at Barrie TS, the Working Group investigated different transmission-based solutions. Based on the assessment of these options along with the system needs, the rebuild and uprating of Barrie TS and E3/4B to 230 kV, with 75/125 MVA transformers was chosen as the preferred option. A description of the alternatives considered by the Working Group can be found in Appendix B.

7.1.3.2 Distribution-based Solutions to Address Medium-Term Need

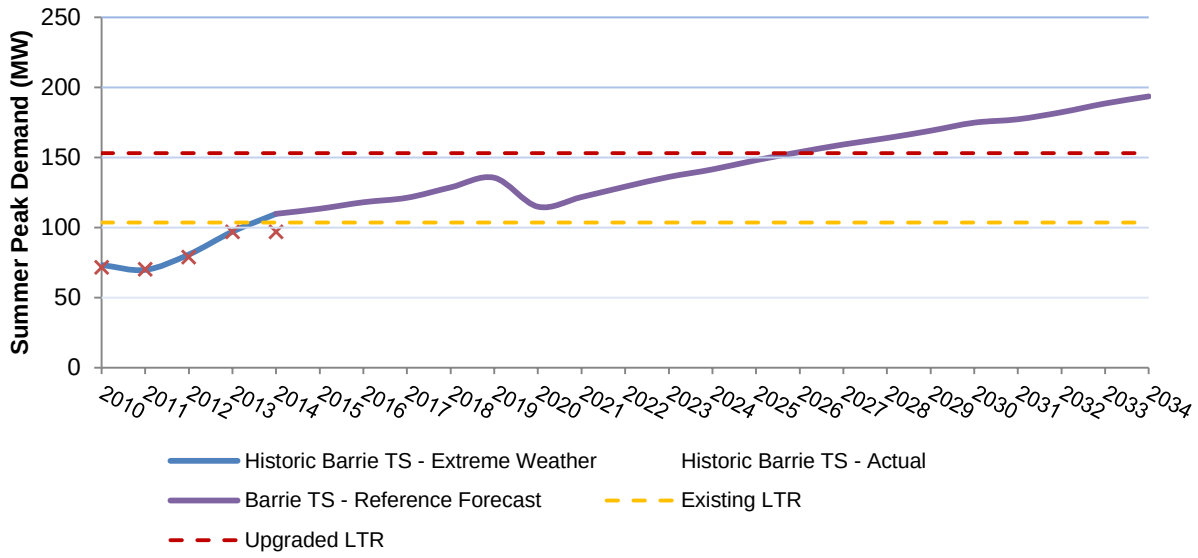
To address the medium-term transformer station and feeder capacity needs at Barrie TS, different distribution-based solutions were investigated. These included load transfers from Barrie TS to Midhurst TS, and new 44 kV feeders from the rebuilt Barrie TS to InnPower's service territory. These are described in more detail below.

Load Transfers

Due to the proximity of Barrie TS and Midhurst TS, and since PowerStream has an existing supply from both stations, load transfers are a feasible option to relieve Barrie TS. By building additional supply feeders from Midhurst TS, PowerStream can transfer up to 27 MW of load from Barrie TS assuming full data center load growth. This load transfer makes use of new feeders PowerStream already planned to construct, primarily due to data center expansion in the area. The available load transfer capacity is based upon normal operating conditions; during feeder outage situations the transfer amount may vary based on the redundancy needs of key customers.

The load transfer defers the capacity need at the uprated Barrie TS from 2022 to 2026 and also provides PowerStream with additional transfer capability between Barrie TS and Midhurst TS during emergency conditions. Figure 7-2 shows the reference scenario demand forecast for Barrie TS accounting for PowerStream's load transfer.

Figure 7-2: Barrie TS Reference Demand Forecast Load with PowerStream 2020 Load Transfer



With PowerStream's load transfer in place, by the end of the study period there is approximately 40 MW of forecast capacity need that cannot be supplied by the uprated Barrie TS.

PowerStream's existing ability to perform temporary load transfers for emergency purposes will also help manage the Barrie TS current capacity need both leading up to the completion of the Barrie Area Reinforcement project and throughout its construction staging. However, depending on Hydro One's contingency plan for the period of construction PowerStream may need to install additional distribution switches to meet their load security requirements during the rebuild of Barrie TS.

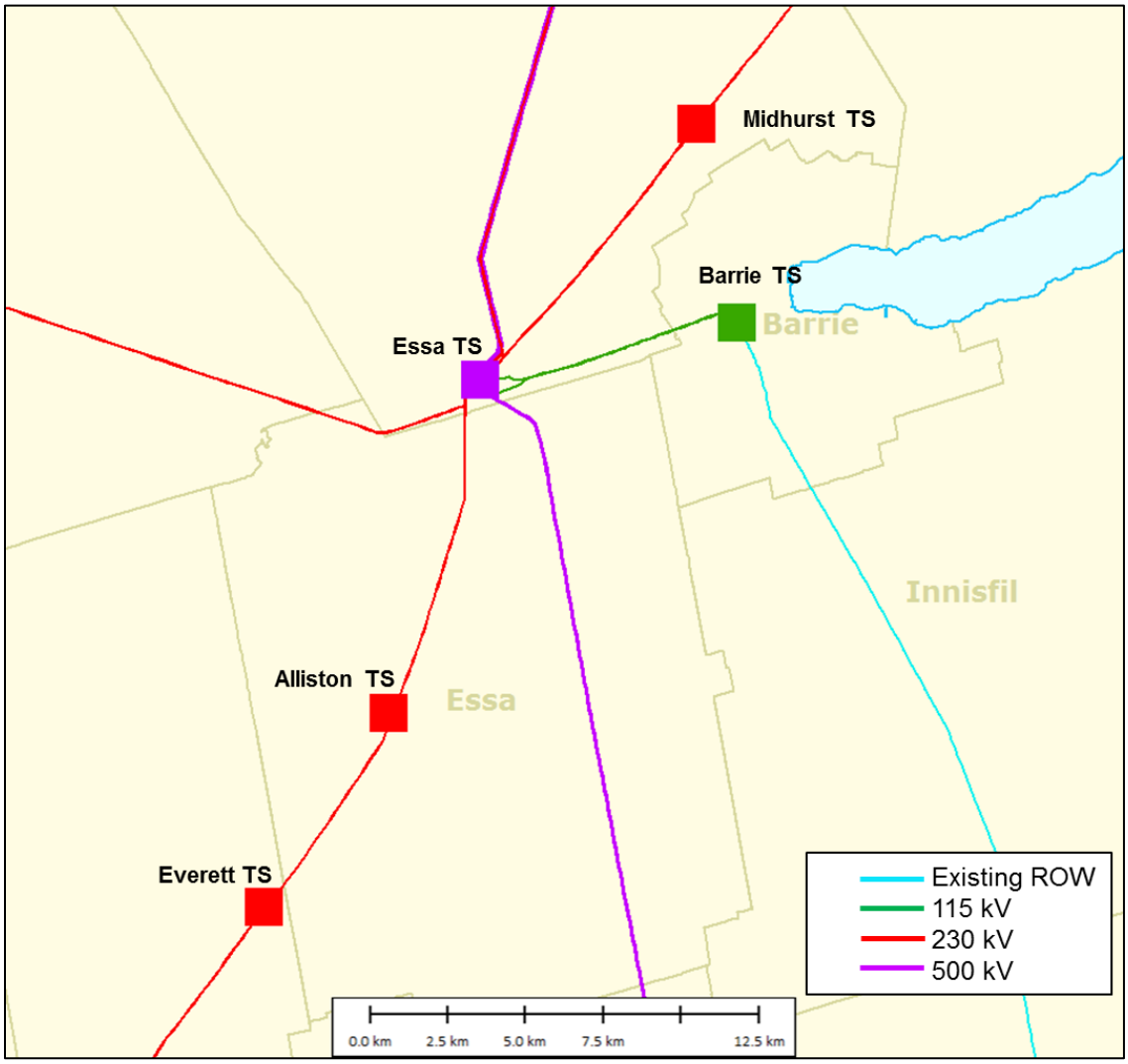
44 kV Feeder Expansion & Relocation

Currently, InnPower is supplied with one feeder from Barrie TS, operated at 44 kV and is considered an embedded customer to Hydro One Distribution. Up until the demarcation point in the Town of Innisfil, the feeder that supplies InnPower, 13M3, is an idle 115 kV line owned by Hydro One Transmission and operated at 44 kV to supply InnPower. The ROW for this 115 kV line extends south, past the existing supply points to InnPower.

This existing feeder can supply approximately 25 MW of capacity, which InnPower is forecast to exceed in 2020. The new Barrie TS will accommodate one additional 44 kV feeder, which can be used by InnPower when their capacity need arises. The additional feeder will require a new route south to Innisfil to service InnPower load.

It is recommended that, when building the new feeder, the line be built as a two circuit 44 kV feeder line and that the 13M3 feeder be relocated to this new line. This will leave the 115 kV ROW idle and will maintain a future option for addressing the long-term capacity needs in the south Barrie and Innisfil areas.

Figure 7-3: Map of the Barrie Area Including the 13M3 115 kV Corridor



Currently, Metrolinx has indicated an interest in utilizing this corridor to extend the 230 kV supply from the uprated Barrie TS to their proposed traction power station site, which sits just south of Barrie TS, adjacent to the ROW. InnPower is also interested in future use of the ROW, recognizing that long-term capacity needs in their service territory may require additional transformer station capacity in the long term.

7.1.3.3 Alternative Transmission Solution to Address Medium-Term Need

To address the need for new transformer station capacity at Barrie TS in 2022 – assuming no PowerStream load transfer – a new station supplied at 230 kV via the 13M3 corridor to south Barrie or Innisfil could provide approximately 150 MW of additional transformer station

capacity to the area. This additional capacity would also service the long-term transformer station capacity needs for the Barrie Sub-area and overall Barrie/Innisfil Sub-region.

In this case, the distribution solution (the PowerStream load transfer) is the more cost-effective option and maximizes the use of existing infrastructure, deferring the capacity need to 2026. The lead-time for a new transformer station is five to seven years, so no commitment is needed today to begin development work. The need for new transformer station capacity will be monitored while all options for additional long-term capacity are further explored, as outlined in the long-term plan in Section 8.

7.2 Recommended Near- and Medium-Term Plan

The Working Group recommends the actions described below to meet the near- and medium-term electricity needs of the Barrie/Innisfil Sub-region. Successful implementation of these actions, in addition to achievement of targeted conservation measures, is expected to address the sub-region's electricity needs until the late 2020s /early 2030s.

Rebuild and Uprate Barrie TS and E3/4B to 230 kV

To mitigate challenges posed by both Barrie TS and its 115 kV supply infrastructure reaching end-of-life, and to address the near-term capacity needs at Barrie TS, Hydro One is developing the Barrie Area Transmission Reinforcement project. The project will rebuild the existing Barrie TS and uprate its existing supply from 115 kV to 230 kV, increasing the supply capacity to the area. The existing Barrie TS site is well situated for supplying the near- and medium-term forecast load growth in the south Barrie and Innisfil areas. A Class EA process is currently underway. The targeted in-service date for the project is the end of 2020.

PowerStream Load Transfer – From Barrie TS to Midhurst TS

PowerStream is planning to transfer up to 27 MW of load from Barrie TS to Midhurst TS by 2020 assuming full data centre load growth. This increases the incremental capacity available at Barrie TS, addressing near- and medium-term needs, while providing the reliability benefit of additional transfer points between Barrie TS and Midhurst TS for emergency situations. The PowerStream load transfer allows the need for additional capacity at the uprated Barrie TS to be deferred from 2022 to 2026 under reference case assumptions.

Relocate and Expand InnPower Feeder Supply from Barrie TS

Currently Hydro One Distribution is allocated one feeder from the existing Barrie TS which is used to service InnPower. The capacity of this feeder is forecast to be exceeded in 2020. The rebuilt Barrie TS will include one additional feeder position, which can be used to address this need. Additionally, the existing InnPower supply uses an idle Hydro One Transmission ROW. The use of this ROW for sub-transmission purposes limits future long-term options for additional transmission facilities in the south Barrie and Innisfil areas. It is recommended that Hydro One Distribution and InnPower develop a plan to build a new two circuit 44 kV feeder line to support InnPower's forecast growth and to relocate the InnPower supply to outside of the Hydro One Transmission corridor. The proposed in-service date for these feeders is the end of 2020. The two feeder supply from Barrie TS is forecast to supply InnPower's forecast demand at Barrie TS until 2026 under reference case assumptions.

7.3 Implementation of Near- and Medium-Term Plan

To ensure that the near-term electricity needs of the Barrie/Innisfil Sub-region are addressed, it is important that the plan recommendations be implemented as soon as possible. The specific actions and deliverables are outlined in Table 7-1, along with the recommended timing.

Table 7-1: Summary of Needs and Recommended Actions in Barrie/Innisfil Sub-region

Need	Recommended Action(s)/Deliverable(s)	Lead Responsibility	Timeframe/ Need Date
- Barrie TS is at end-of-life and requires replacement - Barrie TS has reached its firm capacity	Rebuild and upgrade Barrie TS and E3/4B to 230 kV, with 75/125 MVA transformers	Hydro One	In-service by end of 2020
- The uprated Barrie TS has a medium-term capacity need	Transfer up to 27 MW of load from Barrie TS to Midhurst TS assuming full data centre load growth	PowerStream	In-service by 2020 at the latest[10]

[10] PowerStream's 2016-2020 Custom Incentive Rate filing states a proposed in-service date of 2018 based on additional distribution needs their project addresses in the Barrie area. If the project is in-service prior to 2020 it will provide additional ability to mitigate the near-term Barrie TS capacity need until the Barrie Area Transmission Reinforcement project comes in-service.

Need	Recommended Action(s)/Deliverable(s)	Lead Responsibility	Timeframe/ Need Date
- Load growth in south Barrie will require additional feeder capacity for InnPower from Barrie TS - The existing corridor used to supply InnPower is required for future infrastructure development	InnPower will work with Hydro One to relocate out of the 115 kV corridor, constructing two new 44 kV feeders from Barrie TS to Innisfil	InnPower & Hydro One Distribution	Proposed in-service for end of 2020

To implement the recommended near-term actions in a timely manner, a RIP should be initiated for the broader South Georgian Bay/Muskoka planning region upon IRRP completion. This process will allow for detailed design and study of the transmission and distribution infrastructure expansion required to complete the recommended actions. The outcome of the RIP will be a more detailed development plan, including a refined estimate of expected costs and benefits to customers.

8. Long-Term Plan

In the long term, the outlook for the Barrie/Innisfil Sub-region depends on assumptions made in the forecast. Under the low growth scenario, the sub-region has no need for additional transformer station capacity until the end of the study period. Under the reference scenario, the need for new transformer station capacity arises in the mid to late 2020s. With the aggressive load growth assumptions in the high scenario, any new transformer station constructed in the area to address needs throughout the study period would be reaching its LTR by the end of the study period. These three scenarios represent the uncertainty associated with long-term forecasts and are an example of why a different approach is required for long-term versus near- and medium-term planning.

For needs appearing in the long term, there is an opportunity to develop and explore a broader set of options, as specific projects do not need to be committed immediately. This approach is designed to: maintain flexibility; avoid committing ratepayers to investments before they are needed; provide adequate time to assess the success of current and future potential conservation measures in the study area; test emerging technologies; engage with communities and stakeholders; and lay the foundation for informed decisions in the future.

Due to the long-term capacity need forecast for the Barrie and Innisfil areas, PowerStream and InnPower will be undertaking a LAP study for the Barrie TS service area, with support from the IESO's Conservation Fund. This study will help determine the conservation potential, specifically for the Barrie TS area, beyond the LTEP targets already accounted for in the planning demand forecast (e.g., additional incentives and adders to refocus existing CDM programs, new programs, behind-the-meter generation, energy storage, etc.). The study will provide a better understanding of the associated costs and feasibility of CDM measures to address the identified capacity needs in the area, better informing options for the next planning cycle.

PowerStream has also implemented a pilot project in their southern service territory to study the benefits and economics of aggregated customer side generation and storage. The results of this study can be used to inform further discussion and development of non-wires solutions for the long-term needs in the Barrie/Innisfil Sub-region for the next planning cycle.

Broad community and public engagement, including with local Indigenous communities, is essential to develop the long-term plan. It is recommended that engagement involve several

phases: addressing public education/awareness of electricity issues, planning, technologies, and regulatory requirements; fostering an understanding of community growth and its relationship to electricity needs; understanding the pros and cons of various alternatives to meeting long-term needs; and obtaining input on community preferences for various approaches to meeting needs.

To provide input and advice on engagement plans for the Barrie/Innisfil Sub-region, the Working Group will establish a LAC consisting of community representatives and stakeholders.

8.1 Recommended Actions and Implementation

A number of alternatives are possible to meet the sub-region's long-term needs. While specific solutions do not need to be committed to today, it is appropriate to begin work now to gather information, monitor developments, engage the community, and develop alternatives to support decision making in the next iteration of the IRRP. The long-term plan sets out the near-term actions required to ensure that options remain available to address future needs if and when they arise.

For some needs, such as the transformer station capacity need at Everett TS, the solution is straightforward (changing the CT ratios) and can be easily implemented by the transmitter when required. For other needs, such as the transformer station capacity needs in the south Barrie and Innisfil areas, the recommended actions focus on monitoring and information gathering, community engagement, and more detailed options development for non-wires solutions prior to the next planning cycle.

The recommended actions and deliverables for the long-term plan are outlined in Table 8-1, along with their recommended timing, and the parties with lead responsibility for implementation.

Table 8-1: Recommended Near-Term Actions for Addressing Long-Term Needs

Recommended Action(s)/Deliverable(s)	Lead Responsibility	Timeframe/ Need Date
Formation of a LAC.	IESO	To be formed early 2017

Recommended Action(s)/Deliverable(s)	Lead Responsibility	Timeframe/ Need Date
Conduct a LAP study to determine cost and feasibility of CDM measures to address capacity needs in the Barrie TS service area.	PowerStream & InnPower	Study to be completed by end of 2017
Coordinate the development work for the Metrolinx traction power station supply to maintain the future supply option for south Barrie and Innisfil utilizing the same corridor.	Hydro One	To be monitored
Change the CT ratios at Everett TS when required.	Hydro One	To be monitored – pre 2027
Monitor, and prepare an annual update to the Working Group, on demand, conservation and DG trends and achievement in the area.	IESO	Annually

The Working Group will work with the local communities to monitor leading indicators for growth in the Barrie/Innisfil Sub-region. This includes monitoring changes to growth targets, the composition and location of specific customer segments (residential, commercial, industrial), and electricity impacts from implementation of community energy plans. If these or other factors affect service reliability or the capacity of the local electricity delivery systems a new IRRP process may be initiated ahead of the five year planning cycle. Examples of developments that could trigger revisiting the plan prior to the next cycle include:

- Critical PowerStream customers reaching 95% of their projected load
- InnPower's expanded feeder supply from Barrie TS reaching 95% of its firm capacity
- Innisfil completing the servicing of their development lands
- Detailed design and development work proceeds for the Metrolinx electrification plans and requires further coordination with the Working Group
- Significant changes to the study area's forecast growth

The Working Group will continue to meet at regular intervals during the implementation phase of this IRRP to monitor developments in the sub-region, progress towards the deliverables in Table 8-1, and developments that would trigger an early return to the IRRP process.

9. Community and Stakeholder Engagement

Community engagement is an important aspect of the regional planning process. Providing opportunities for input in the regional planning process enables the views and preferences of the community to be considered in the development of the plan and helps lay the foundation for successful implementation. This section outlines the engagement principles as well as the engagement activities undertaken to date and next steps for the Barrie/Innisfil IRRP.

A phased community engagement approach is being undertaken for the Barrie/Innisfil IRRP based on the core principles of creating transparency, engaging early and often, and bringing communities to the table. These principles were established as a result of the IESO's outreach with Ontarians in 2013 to determine how to improve the regional planning and siting process, and they now guide IRRP outreach with communities and will ensure this dialogue continues as the plan moves forward.

Figure 9-1: Summary of Barrie/Innisfil Community Engagement Process

9.1 Creating Transparency

To start the dialogue on the Barrie/Innisfil IRRP and build transparency in the planning process, a number of information resources were created for the plan. A dedicated Barrie/Innisfil web

page[11] was created on the IESO website including information on why an IRRP was being developed for the Barrie/Innisfil Sub-region, the IRRP Terms of Reference and a listing of the organizations involved. A dedicated email subscription service was also established for the broader South Georgian Bay/Muskoka planning region where communities and stakeholders could subscribe to receive email updates about the IRRP.

9.2 Engage Early and Often

Early communication and engagement activities for the Barrie/Innisfil IRRP included posting the South Georgian Bay/Muskoka Region Scoping Assessment document for comment and undertaking meetings with communities in the planning area to discuss the development of the plan and obtain early input and feedback.

9.3 South Georgian Bay/Muskoka Region Scoping Assessment Outcome Report

The draft South Georgian Bay/Muskoka Region Scoping Assessment Outcome Report was posted to the IESO website in May 2015 for comment, and a final version was posted on June 22, 2015. The Scoping Report identified the need for an IRRP for the Barrie/Innisfil Sub-region and presented the Terms of Reference for the development of the plan.

9.4 Municipal Meetings

Meetings with area municipalities are one of the first steps in engagement for all regional plans. In August through November 2015, the Working Group held individual and group municipal meetings in Barrie, Innisfil, Simcoe County, and Springwater to initiate discussions on the IRRP. Key discussion topics included: the regional planning process and findings in the South Georgian Bay/Muskoka Scoping Report, the need for an IRRP for the Barrie/Innisfil area, municipal growth plans and electricity growth forecasts, the identified electricity needs in the area and future engagement activities. Attendees provided insight on updated municipal growth plans, reinforced the importance of community engagement for project/infrastructure siting, and expressed an interest in having a LAC as a forum to bring local municipalities to the table and engage in a singular dialogue.

[11] http://www.ieso.ca/Pages/Ontario%27s-Power-System/Regional-Planning/South-Georgian-Bay-Muskoka/Barrie/Innisfil.aspx

9.5 Bringing Communities to the Table

To continue the dialogue on regional planning, a LAC[12] will be established for the Barrie/Innisfil Sub-region in early 2017. The role of the LAC will be to provide advice and recommendations on the development of options to meet the longer-term electricity needs in the area, as well as to provide input on broader community engagement. LACs are comprised of municipal, Indigenous, environmental, business, sustainability and community representatives. All LAC meetings are open to the public and meeting information and materials will be posted on the Barrie/Innisfil engagement webpage.

Development of the Barrie/Innisfil LAC will be carried out through a request for nominations process promoted by the following activities: advertisements in local newspapers and digital (website) advertising in communities throughout the planning area; emails sent to municipal representatives across the region; meetings with Indigenous communities for the broader region; and an e-blast sent to the IESO's South Georgian Bay/Muskoka subscribers list. Information will also be posted to the dedicated Barrie/Innisfil IRRP webpage.[13]

Meetings were also held with the area municipalities in November 2016 prior to the posting of the IRRP to discuss the recommendations included in the plan as well as future engagement activities such as the development of a LAC.

[12] http://www.ieso.ca/Pages/Participate/Regional-Planning/Local-Advisory-Committees.aspx

[13] http://www.ieso.ca/Pages/Ontario%27s-Power-System/Regional-Planning/South-Georgian-Bay-Muskoka/Barrie/Innisfil.aspx

10. Conclusion

This report documents an IRRP that has been carried out for the Barrie/Innisfil area, a sub-region of the OEB's South Georgian Bay/Muskoka planning region. The IRRP identifies electricity needs in the Barrie/Innisfil Sub-region over the 20-year period from 2015-2034, identifies preferred "wires" solutions to address near-term needs, and lays out actions to monitor, defer, and address needs that may arise in the long term.

Implementation of the near-term plan is already underway. Hydro One is developing the Barrie Area Transmission Reinforcement project, and LDCs are continuing to implement their existing CDM plans. PowerStream and InnPower have also initiated a LAP study for the Barrie TS, which will be used to inform the long-term options discussion for the next planning cycle and discussion with the future LAC.

To further refine and implement the preferred near-term "wires" solutions, it is recommended that an RIP be initiated. The RIP for the broader South Georgian Bay/Muskoka Region is to be led by Hydro One Transmission. For recommendations relating to Barrie/Innisfil, the RIP process should include PowerStream and InnPower as working group members. The IESO will continue to provide support throughout the RIP process, and assist with any regulatory matters that may arise during plan implementation.

To support the development of the long-term plan, a number of actions have been identified to develop alternatives, engage with the community, and monitor load growth in the sub-region. Responsibility for these actions has been assigned to the appropriate members of the Working Group. Information gathered and lessons learned as a result of these activities will inform development of the next iteration of the IRRP for the Barrie/Innisfil Sub-region.

The Barrie/Innisfil Sub-region Working Group will continue to meet at regular intervals to monitor developments in the sub-region and track progress toward the plan deliverables. In particular, the actions and deliverables associated with peak demand reducing initiatives will require annual review of system demand and program achievement to determine whether new initiatives are required. In the event that underlying assumptions change significantly, local plans may be revisited through an amendment, or by initiating a new regional planning cycle sooner than the OEB-mandated 5-year schedule.