OTTAWA AREA
INTEGRATED REGIONAL RESOURCE PLAN

Part of the Greater Ottawa Planning Region | April 28, 2015

ieso
Independent Electricity System Operator

Integrated Regional Resource Plan

Ottawa Region

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

This IRRP was prepared on behalf of the Ottawa Region Working Group, which included the following members:

- Independent Electricity System Operator
- Hydro Ottawa Limited
- Hydro One Networks Inc. (Distribution) and
- Hydro One Networks Inc. (Transmission)

The Ottawa Region Working Group assessed the adequacy of electricity supply to customers in the Ottawa 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 Ottawa Region; and developed an implementation plan for the recommended options, while maintaining flexibility in order to accommodate changes in key assumptions over time.

Ottawa Region Working Group members agree with the IRRP's recommendations and support implementation of the plan through the recommended actions. Ottawa Region Working Group members do not commit to any capital expenditures and must still obtain all necessary regulatory and other approvals to implement recommended actions.

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List of Abbreviations

Abbreviation	Description
C&S	Codes and Standards
CDM	Conservation Demand Management
CEP	Corporate Energy Plan
CHPSOP	Combined Heat and Power Standard Offer Program
DE	District Energy
DESN	Dual Element Spot Network
DG	Distributed Generation
DR	Demand Response
EA	Environmental Assessment
EE	Energy Efficiency
EM&V	Evaluation, Measurement and Verification
FIT	Feed-in Tariff
GEA	Green Energy Act, 2009
GTA	Greater Toronto Area
HVDC	High-Voltage Direct Current
HVDS	High-Voltage Distribution Station
ICI	Industrial Conservation Initiative
IESO	Independent Electricity System Operator
IPSP	(2007) Integrated Power System Plan
IRRP	Integrated Regional Resource Planning
L/R	Load Rejection
LRT	Light Rail Transit
LAC	Local Advisory Committee
LDC	Local Distribution Company
LMC	Load Meeting Capability
LTEP	(2013) Long-Term Energy Plan
LTR	Limited Time Rating
MEP	Municipal Energy Plan
MEP/CEP	Municipal or Community Energy Planning
MTS	Municipal Transfer Station
OEB or Board	Ontario Energy Board
OPA	Ontario Power Authority
ORTAC	Ontario Resource and Transmission Assessment Criteria
PPWG	Planning Process Working Group
Region	Ottawa Region
RIP	Regional Infrastructure Plan
SPS	Special Protection System
TOR	Terms of Reference
TOU	Time-of-Use
TS	Transformer Station
Working Group	Technical Working Group for Ottawa Region IRRP

1. Introduction

This Integrated Regional Resource Plan ("IRRP") addresses the electricity needs for the Ottawa Region ("Region") over the next 20 years. This report was prepared by the Independent Electricity System Operator ("IESO") on behalf of a technical working group ("Working Group") composed of the IESO, Hydro Ottawa Limited ("Hydro Ottawa"), Hydro One Distribution and Hydro One Transmission.

This Region encompasses the City of Ottawa ("City"), including the Greenbelt, Kanata, Nepean and Orléans. Ottawa is the nation's capital and has a population of just under 900,000 people, an increase of 7.9% since 2001.[1] With a peak demand of about 1,500 MW, it is one of the largest electricity planning regions in Ontario. Electricity distribution and conservation initiatives are carried out by two local distribution companies: Hydro Ottawa, a municipally owned utility which operates in the City and in the Village of Casselman, and Hydro One, which provides service to customers both in the City and in surrounding areas. Hydro One is the transmission asset owner in the Region.

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 regional planning process, transmitters, distributers and the IESO are required to carry out regional planning activities for the 21 electricity planning regions at least once every five years .

The Region has experienced a reduction in peak electricity demand in recent years due to a variety of factors, including cooler summers, the impact of distributed generation ("DG"), and the impact of provincial conservation and peak shifting initiatives. However this overall trend does not reflect localized developments in the Region. Electricity demand in the downtown core of Ottawa is expected to grow over the coming years due to intensification and significant development has also been occurring in recent years outside of the Greenbelt. The electricity demand requirements in the Ottawa Region are expected to continue to increase over the forecast horizon, driven by growth in residential and commercial sectors as indicated by the City's growth plans, as well as the development of transportation infrastructure including a new Light Rail Transit ("LRT") line. As a result, there is a need for integrated regional electricity planning to ensure adequate and reliable electricity supply is maintained.

[1] http://ottawa.ca/en/long-range-financial-plans/economy-and-demographics/population

The Ottawa Region covered by this IRRP constitutes a sub-region of the "Greater Ottawa" Region established through the OEB's regional planning process. Hence, this report contributes to fulfilling the requirements for the Greater Ottawa Region as mandated by the OEB. Because economic, demographic and technological conditions will inevitably change, the regional planning process will be carried out on a 5-year cycle for each region so that plans can be updated as the electricity outlook changes over time.

This IRRP for Ottawa identifies and coordinates the many different options to meet customer needs in the Region over the next 20 years. Specifically, this IRRP identifies investments for immediate implementation necessary to meet near-term needs in the Region. The plan for the medium and long term identifies near-term actions to develop alternatives and engage with the community.

This report is organized as follows:

- A summary of the recommended plan for the 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 Region and the study scope are discussed in Section 4;
- Demand forecast scenarios, and conservation and DG assumptions, are described in Section 5;
- The near- and medium-term plan is presented in Section 6;
- The long-term plan is presented in Section 7;
- A summary of community, aboriginal and stakeholder engagement to date and moving forward in developing this IRRP is provided in Section 8; and
- A conclusion is provided in Section 9.

2. The Integrated Regional Resource Plan

The Ottawa IRRP addresses the Region's electricity needs over the next two decades, based on application of the IESO's Ontario Resource and Transmission Assessment Criteria ("ORTAC").[2] The IRRP was developed based on consideration of planning criteria including feasibility, cost, reliability, and, in the near term, seeking to maximize the use of existing electricity infrastructure.

The 20-year outlook used for regional planning allows the long-term trends in a region to be considered while implementing near-term actions. The plan for the first 10 years is described as the near- and medium-term plan and has been developed based on demand trends, conservation targets and other local developments that can be forecast with relative certainty. A single reference planning forecast is used as a basis for this period. This forecast can be found in Appendix A. Within the first 10 years, a further distinction is made between the first five years ("the near term") and the following five years ("the medium term") based on different approaches to addressing needs for these two periods. Electricity supply needs that are identified for the near term typically require that specific solutions be recommended immediately, given the lead time to develop electricity infrastructure. For medium-term needs there is more time available for planning and consideration of alternatives. Nevertheless, development work for longer lead-time options must be initiated early in order to maintain their feasibility.

The plan for the subsequent 10 years is described as the long-term plan and is characterized by greater forecast uncertainty. In addition to the reference planning forecast mentioned above, a second forecast scenario, based on the long term forecast contained in Ontario's 2013 Long-Term Energy Plan ("LTEP") is introduced for this period. The IRRP for the long-term focuses on near-term actions that are required to develop and maintain the viability of long-term electricity supply options, with a particular emphasis on identifying the potential for integrating conservation, DG, or other localized solutions. Community engagement during the 5-year regional planning cycle will gather input on community preferences for long-term options so that these can be reflected in future regional plans.

The needs and recommended actions comprising the near- and medium-term plan, as well as the long-term plan are summarized below.

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[2] http://www.ieso.ca/Documents/marketAdmin/IMO_REQ_0041_TransmissionAssessmentCriteria.pdf

2.1 The Near- and Medium-Term Plan

The first component of the near-term plan is the implementation of planned conservation. While this planned conservation is expected to make a significant contribution to addressing growth in the Region, residual demand growth, as well as other reliability needs which are not growth related give rise to a number of near- and medium-term needs in the Region (see sidebar). Due to the nature and timing of these needs, transmission and distribution reinforcements are recommended as the preferred near-term options to address these needs. These projects are described below and their location is indicated in Figure 2-1.

Near- and Medium-Term Needs

1) Additional 230/115 kV transformer capacity at Hawthorne TS – **Today**

2) Improved reliability of supply to Terry Fox MTS – **Today**

3) Additional supply capacity for a section of circuit S7M – **2019**

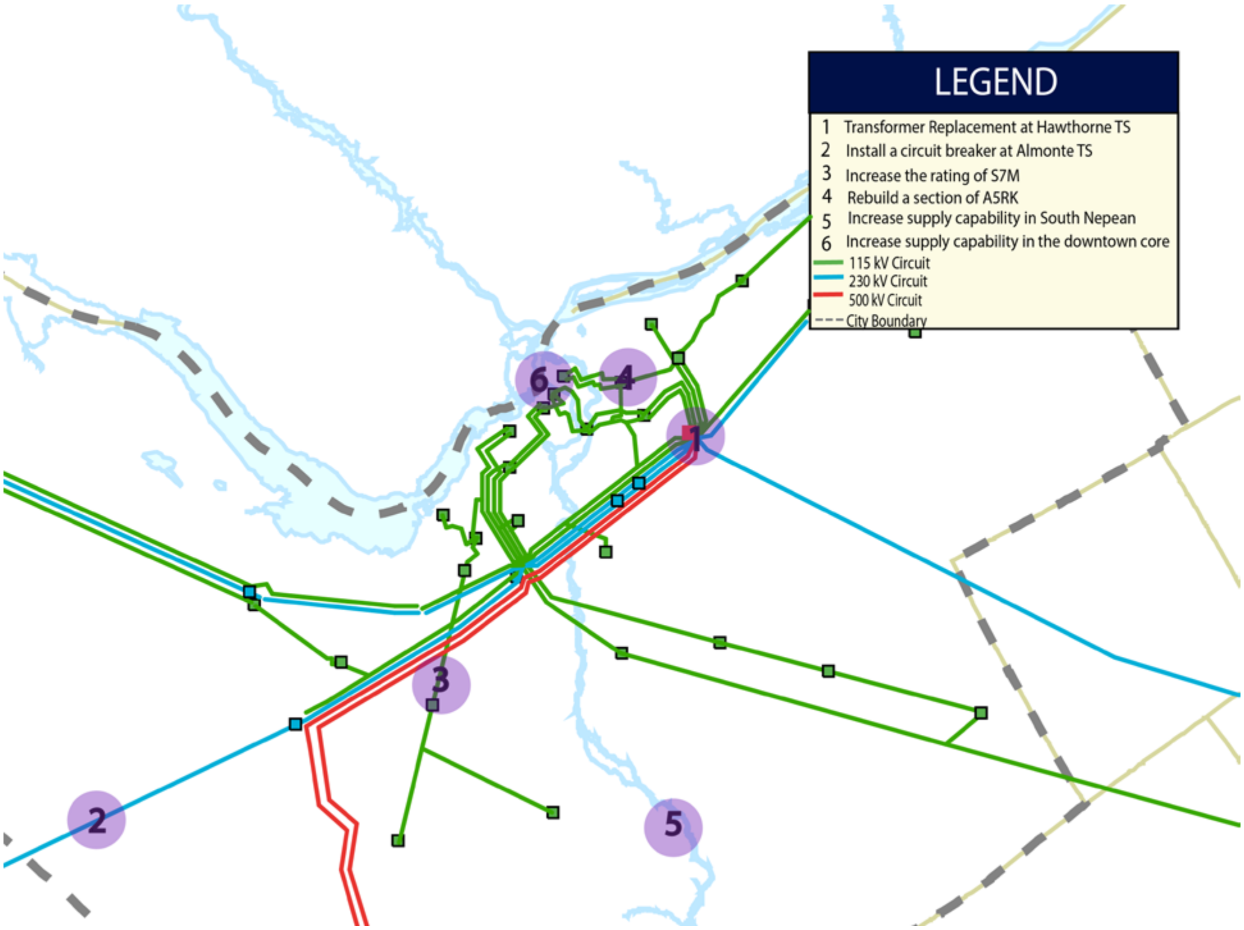
4) Additional supply capacity for circuit A4K – **around 2017**

5) Additional supply capacity in the South Nepean area – **around 2020**

6) Additional capacity at some stations in the downtown core and improved reliability of supply – **around 2018**

7) Additional 230/115 kV transformer capacity at Merivale TS.

Figure 2-1: Projects Included in the Ottawa Near-Term Plan



Recommended Actions

1. Implement conservation and distributed generation

The implementation of provincial conservation targets established in the 2013 LTEP is a key component of the near- and medium-term plan for the Region. In developing the demand forecast, peak-demand impacts associated with the provincial targets established in the 2013 LTEP were assumed before identifying any residual needs, consistent with the provincial Conservation First Framework. Conservation resources are expected to offset nearly 50% of the growth in the area between 2015 and 2032.

The achievement of these demand reductions will partially depend on the extent to which local distribution companies ("LDCs") conservation programs provide peak-demand reductions. Monitoring of conservation success, including measurement of peak demand savings, will be an important element of the near- and medium-term plan, and will also provide input for long-term planning by reviewing the performance of specific conservation measures in the Region, and assessing the potential for future conservation initiatives.

Provincial programs that encourage the development of DG, such as the Feed-in Tariff ("FIT"), microFIT, and Combined Heat and Power Standard Offer ("CHPSOP") programs, can also contribute to reducing peak demands on the transmission system in the Region, depending 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. Transmission projects initiated as a result of the regional planning process

In June 2014 the former Ontario Power Authority ("OPA") provided a letter ("June 2014 letter")[3] to Hydro One, the transmission asset owner in the area, to initiate development work on four transmission reinforcement projects, addressing near-term needs that were identified as a result of the regional planning process. Alternative means, such as reducing demand through conservation or DG, were not feasible options given the nature and timing of these needs. The four projects, which were initiated in 2014, are:

i. Replacing two lower rated 230/115 kV transformers at Hawthorne TS, which are approaching their end-of-life, with higher rated transformers. These two transformers are limiting the supply capability at Hawthorne TS, one of the two main supply points for the Region (addresses need number 1 in the above sidebar).
ii. Installing a circuit breaker on circuit M29C at Almonte TS to reduce interruptions to loads connected to M29C, including Terry Fox MTS (addresses need number 2 in the above sidebar).
iii. Increasing the rating of the section of circuit S7M supplying Fallowfield DS, Manotick DS and Richmond DS in order to increase supply capacity for these three stations (addresses need number 3 in the above sidebar).
iv. Rebuilding the section of circuit A5RK between Overbrook TS and the junction with circuit A6R near Riverdale TS into a double-circuit line in order to provide additional supply capacity for circuit A4K, reinforcing transmission supply to the downtown area. As part of this project, supply to Overbrook TS will be reconfigured from being supplied

[3] http://www.ieso.ca/Documents/Regional-Planning/Greater_Ottawa/Letter-to-H1-Ottawa.pdf

by A4K/A5RK to being supplied by A5RK/A6R (addresses need number 4 in the above sidebar).

3. Further recommended actions

In addition, the Working Group has identified further actions that are required to address near- and medium-term needs:

i. Need for additional supply capacity in the South Nepean area has been identified (number 5 in the above sidebar). The next step in the regional planning process is to engage the community on the options for supplying forecast medium-term demand growth in the South Nepean area. Based on the timing of the need for additional supply capacity (around the end of the decade), it would be beneficial for Hydro Ottawa to initiate early planning work for a new transformer station ("TS") in the South Nepean area, with a targeted in-service date in 2020, in parallel with the community engagement. Hydro One would work in conjunction with Hydro Ottawa to carry out detailed investigation of transmission supply options for this station.
ii. Increasing distribution system transfer capability between downtown stations, and increasing station capacity at King Edward TS (addresses need number 6 in the above sidebar).
iii. Monitoring of demand growth on the Merivale 115 kV system in conjunction with the development of a plan to supply growth in South Nepean (item 5 above), to confirm whether the need for additional transformer capacity at Merivale TS will be addressed (number 7 in the above sidebar).

2.2 The Long-Term Plan

The long-term forecast for the Region projects steady demand growth for the second half of the planning period (2025 to 2032), however specific long-term needs are not evident at this time. The recommended long-term planning actions for the next few years therefore focus on preparing for the next regional planning cycle. The next cycle may be initiated in advance of the 5-year minimum review timeline if significant changes occur relative to the current outlook.

Recommended Actions

1. Undertake community engagement

Engaging local communities to receive input on preferences for long-term electricity supply alternatives, including conservation and DG, will provide input for planning decisions. The IESO will establish a Local Advisory Committee ("LAC") consisting of community representatives and stakeholders. Advice from the LAC will be reflected in future planning activities for the Region.

2. Monitor demand growth, conservation achievement and distributed generation uptake

On an annual basis, the IESO will coordinate a review of conservation achievement, DG program uptake, and actual demand growth in the Region. This information will be used to track the near- and medium-term needs that have already been identified in this IRRP and to anticipate additional needs to be addressed in the next planning cycle.

3. Initiate the next regional planning cycle early, if required

Based on current forecasts and conservation assumptions, no specific long-term needs for the Region have been identified in this IRRP. If monitoring activities indicate that actual net load growth is exceeding the current planning forecast, then the next regional planning cycle may be initiated earlier than the minimum 5-year timeline.

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 OPA carried out regional 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 2012, the OEB convened the 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. In May 2013, the PPWG released the Working Group Report to the Board, setting out the new regional planning process. Twenty-one electricity planning regions in the province were identified in the Working Group Report and a phased schedule for completion was outlined. The Board endorsed the Working Group 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 license changes required it to lead a number of aspects of regional planning, including the completion of comprehensive IRRPs. Following the merger of the IESO and the OPA on January 1, 2015, the regional planning responsibilities identified in the OPA's licence were transferred to the IESO.

The regional planning process begins with a Needs Screening 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 whether a comprehensive IRRP is required, which considers conservation, generation, transmission, and distribution solutions, or whether a straightforward "wires" solution is the only option. If the latter applies, then a transmission and distribution focused Regional

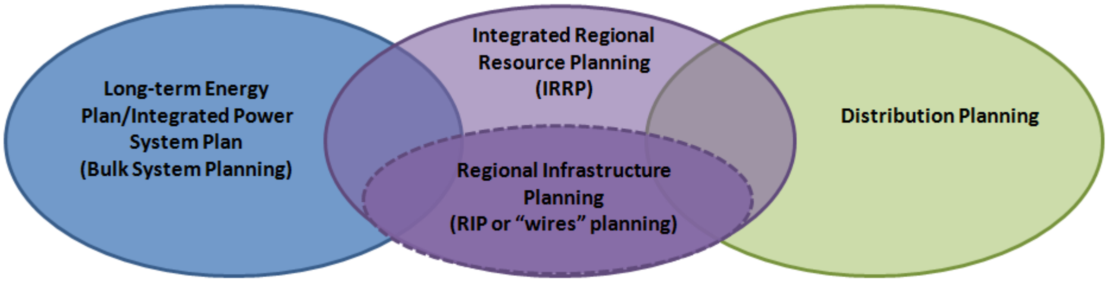
Infrastructure Plan ("RIP") is required. The Scoping Assessment process also identifies any sub-regions that require assessment. There may also be regions where infrastructure investments do not require regional coordination and can be planned directly by the distributor and transmitter, outside of the regional planning process. At the conclusion of the Scoping Assessment, the IESO produces a report that includes the results of the Needs Screening process – identifying whether an IRRP, RIP or no regional coordination is required - and a preliminary Terms of Reference ("TOR"). If an IRRP is the identified outcome, then the IESO is required to complete the IRRP within 18 months. If a RIP is required, 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 final IRRPs and RIPs are to be posted on the IESO and relevant transmitter websites, and can be used as supporting evidence in a rate hearing or Leave to Construct application for specific infrastructure investments. These documents may also be used by municipalities for planning purposes and by other parties to better understand local electricity growth and infrastructure requirements.

Regional planning, as shown in Figure 3-1, is just one form of electricity planning that is undertaken in Ontario. There are three types of electricity planning in Ontario:

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

Figure 3-1: Levels of Electricity System Planning



Bulk System Planning

- 500 kV & 230 kV transmission
- Interconnections
- Inter-area network transfer capability
- 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- & 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 & security)
- Distribution connected generation & CDM resources
- LDC demand forecasts
- Near- & medium-term focused

Planning at the bulk system level typically considers the 230 kV and 500 kV network. Bulk system planning considers the major transmission facilities and assesses the resources needed to adequately supply the province. Bulk system planning is typically carried out by the IESO. Distribution planning, which is carried out by LDCs, looks at specific investments on the low voltage, distribution system.

Regional planning can overlap with bulk system planning. For example, overlap can occur at interface points where regional resource options may also address a bulk system issue. Similarly, regional planning can overlap with the distribution planning of LDCs. An example of this is when a distribution solution addresses the needs of the broader local area or region. Therefore, to ensure efficiency and cost-effectiveness, it is important for regional planning to be coordinated with both bulk and distribution system planning.

By recognizing the linkages with bulk and distribution system planning, and coordinating multiple needs identified within a given region over the long term, the regional planning process provides an integrated assessment of needs. Regional planning aligns near- and long-term solutions and allows specific investments recommended in the plan to be understood as part of a larger context. Furthermore, regional planning optimizes ratepayer interests by avoiding piecemeal planning and asset duplication, and allows Ontario ratepayers' interests to be represented along with the interests of LDC ratepayers. Where IRRPs are undertaken, they allow an evaluation of the multiple options available to meet 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

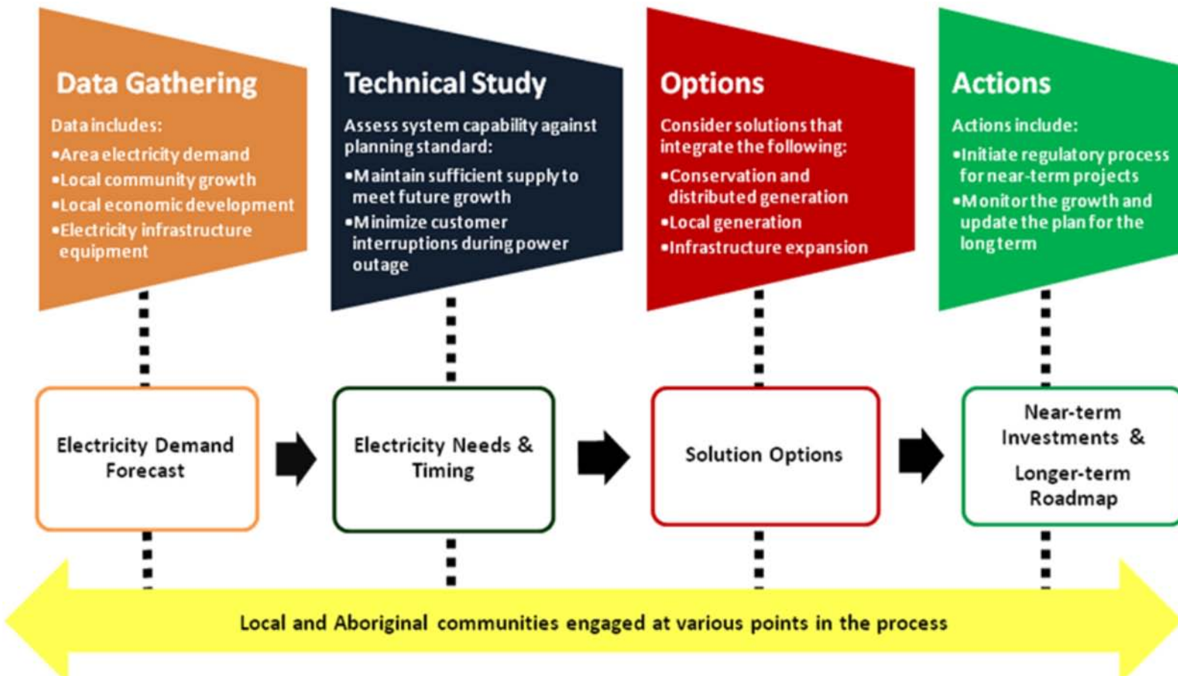
IRRPs assess electricity system needs for a region over a 20-year period. The 20-year outlook anticipates long-term trends so that near-term actions are developed within the context of a longer-term view. This enables coordination and consistency with the long-term plan, rather than simply reacting to 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—than for 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 enable the specified solutions in a timely manner. 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 Regional Working Group (see Figure 3-2 below) 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 First Nations and Métis communities. The steps of an IRRP are illustrated in Figure 3-2 below.

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 report is the trigger for the transmitter to initiate an RIP process to develop those options. Other actions may involve: development of conservation, local generation, or other solutions; community engagement; or information gathering to support future iterations of the regional planning process in the Region.

Figure 3-2: Steps in the IRRP Process



3.3 Ottawa Region Working Group and IRRP Development

Regional planning in the Ottawa Region was underway prior to the OEB's formalization of the regional planning process. In 2002, Hydro One and Hydro Ottawa assessed the transmission system supplying the Region over a 10-year planning horizon. The study recommended several major system upgrades, which have since been completed. These include:

1. Adding a new 230/115 kV auto-transformer at Hawthorne TS;
2. Building 2.7 km of new double-circuit 115 kV transmission line between Hawthorne TS and Blackburn Junction, and adding a second circuit on the existing Blackburn Junction x Russell TS 115 kV tower line;
3. Increasing the ampacity rating of 115 kV circuit H9A (as part of the Ontario-Quebec HVDC interconnection project); and
4. Replacing 115 kV breakers at Merivale TS and closing the 115 kV bus tie.

Between 2003 and 2010, a number of developments also impacted the electricity supply in the area. These included a new high voltage direct current ("HVDC") connection to Hydro Quebec at Outaouais, near Hawthorne TS; the *Green Energy Act, 2009* ("GEA"), which led to development of renewable energy generation in the area; and continued load growth in the Region.

In 2011, a regional planning process was initiated and the Working Group was established. Over the subsequent two years, the Working Group made significant progress in identifying the Region's electricity requirements and alternatives to address those needs.

When the regional planning process was formalized in 2013 by the OEB, the Working Group revised the TOR[4] to reflect the new process and updated study information, including the planning forecast. The Working Group identified near- and medium-term needs in the Region and recommended actions included in this IRRP. Implementation began in 2014 with the former OPA providing a letter to Hydro One supporting the immediate development of "wires" solutions to address four near-term needs. These four projects were initiated in advance of completing this IRRP so that they may be put into service by the time the needs they are addressing are expected to materialize.

This IRRP is therefore a "transitional" IRRP in that it began prior to development of the OEB's regional planning process and much of the work was completed before the new process and its requirements were known.

[4] http://www.ieso.ca/Documents/Regional-Planning/Greater_Ottawa/Ottawa-TOR-w-Explanatory-Note.pdf

4. Background and Study Scope

This report presents an IRRP for the Ottawa Region for the period from 2015 to 2032. To set the context, the scope of this IRRP and the Region's existing electricity system are described in Section 4.1. As well, the regional planning sub-systems, which are used later in this report, are described.

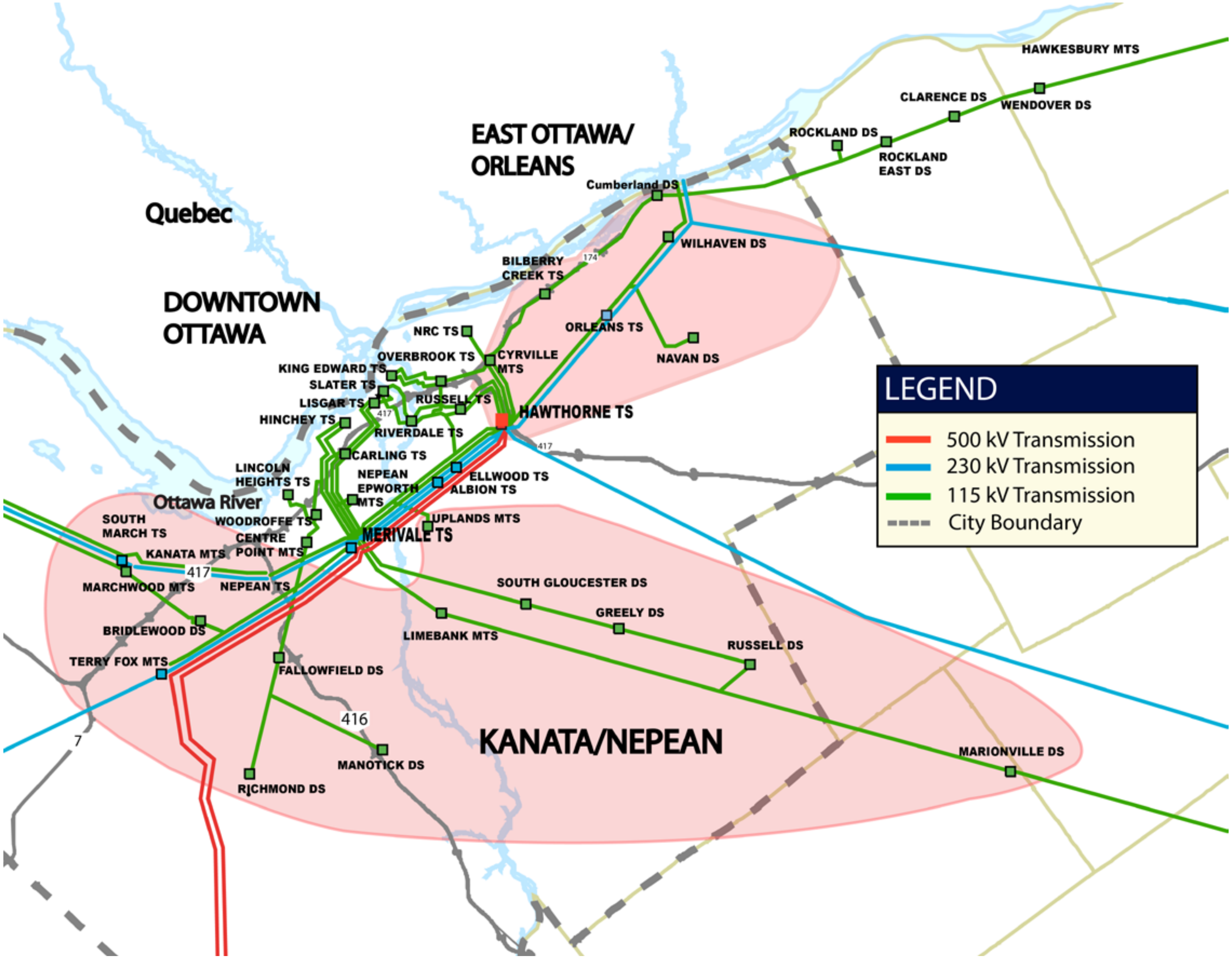
4.1 Study Scope

The scope of this IRRP encompasses the City of Ottawa, including the Greenbelt, Kanata, Nepean and Orléans. The electricity infrastructure supplying the area is shown in Figure 4-1. The Region is supplied by a combination of transmission connection to the Ontario grid and electricity generation facilities located in the Region, including hydroelectric generating stations on the Madawaska and Ottawa Rivers, behind-the-meter generators, and renewable generation procured through the FIT and microFIT programs. Hawthorne TS and Merivale TS are the two main supply points for the Region.

For the purposes of this IRRP, the transmission system in the Region is divided into the following three sub-systems, depicted in Figure 4-1, below:

1. The Nepean-Kanata sub-system, located beyond the Greenbelt in the southwest part of the Ottawa Region, includes loads supplied by both the 230 kV and 115 kV systems;
2. The Downtown Ottawa sub-system is geographically bounded to the north by the south bank of Ottawa River and to the south by the Hawthorne-Merivale transmission corridor. Load in this sub-system is supplied mainly by the 115 kV system while the southeast portion of this system is supplied by the 230 kV system;
3. The East Ottawa-Orléans sub-system is supplied by Bilberry Creek TS and Orléans TS via the 115 kV and 230 kV systems

Figure 4-1: Three Sub-systems in the Ottawa Region



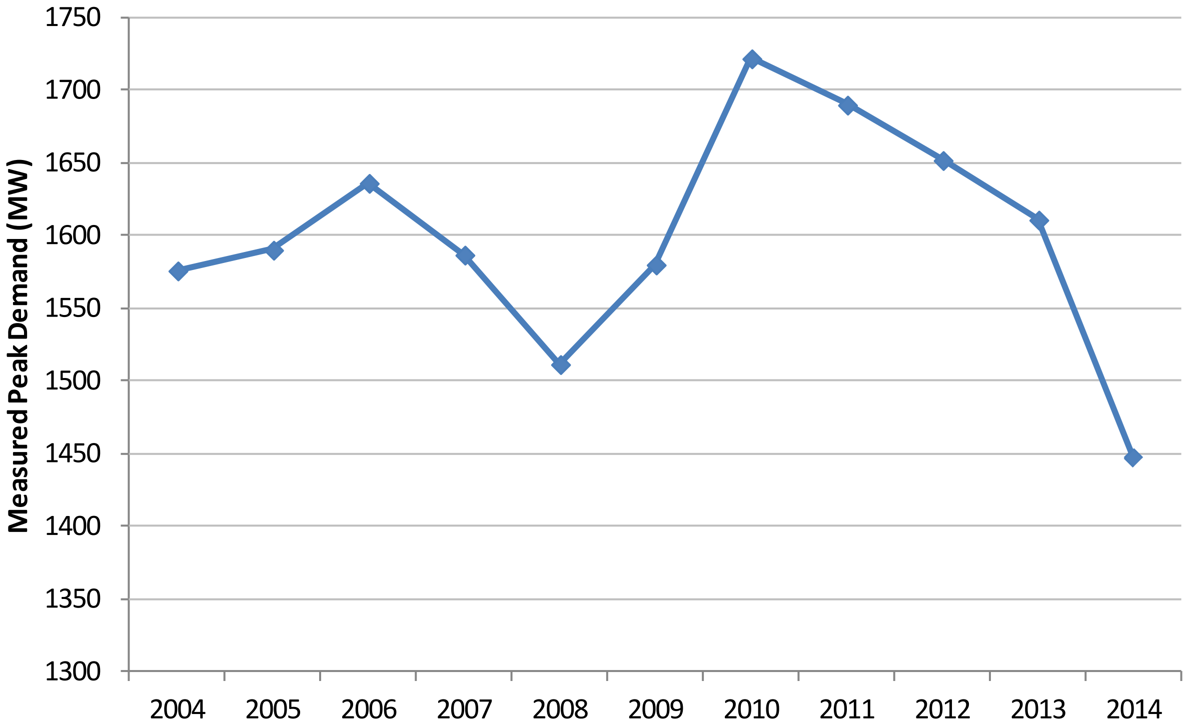
5. Electricity Demand Forecast

This section details the development of the demand forecast for the Ottawa Region. Section 5.1 begins by describing the historic electricity demand trends in the Region from 2004 to 2014. Section 5.2 describes the demand forecast used in this study and the methodology used to develop it.

5.1 Historical Demand

Figure 5-1 shows the summer peak net electricity demand recorded for the Region from 2004 to 2014. While this data shows the net electricity demand for Region to be declining, it is important to note other trends that are reflected in this data. First, this measured demand includes the impact of summer weather conditions, which, for example, were unusually cool across the province in 2014. Second, demand on the distribution system that was met by DG resources, which were operating at the time of the annual peak, are not reflected in the demand supplied from the transmission system, which is what is measured by this historical demand data. Finally, the data also reflects the achievements of provincial conservation and peak-shifting initiatives, including the Industrial Conservation Initiative ("ICI") for large customers.

Figure 5-1: Ottawa Region Historical Electricity Demand[5]



5.2 Demand Forecast Methodology

Regional electricity needs are driven by the limits of the infrastructure supplying the area, which is sized to meet peak demand requirements. Therefore, regional planning typically focuses on growth in coincident peak demand, which is the electricity demand of individual stations that coincides with the annual peak demand of the Region. It is likely that each station will reach its individual peak demand at a slightly different point in time. From the perspective of ensuring sufficient transmission supply to the entire area though, it is important to consider the coincident peak, the point in time when the total demand from the stations in the area peaks. Aggregating the coincident station peak forecasts identifies the peak electricity demand that must be served by the area's transmission system and represents the electricity demand when the transmission assets in the overall area are most stressed and resources are most constrained.

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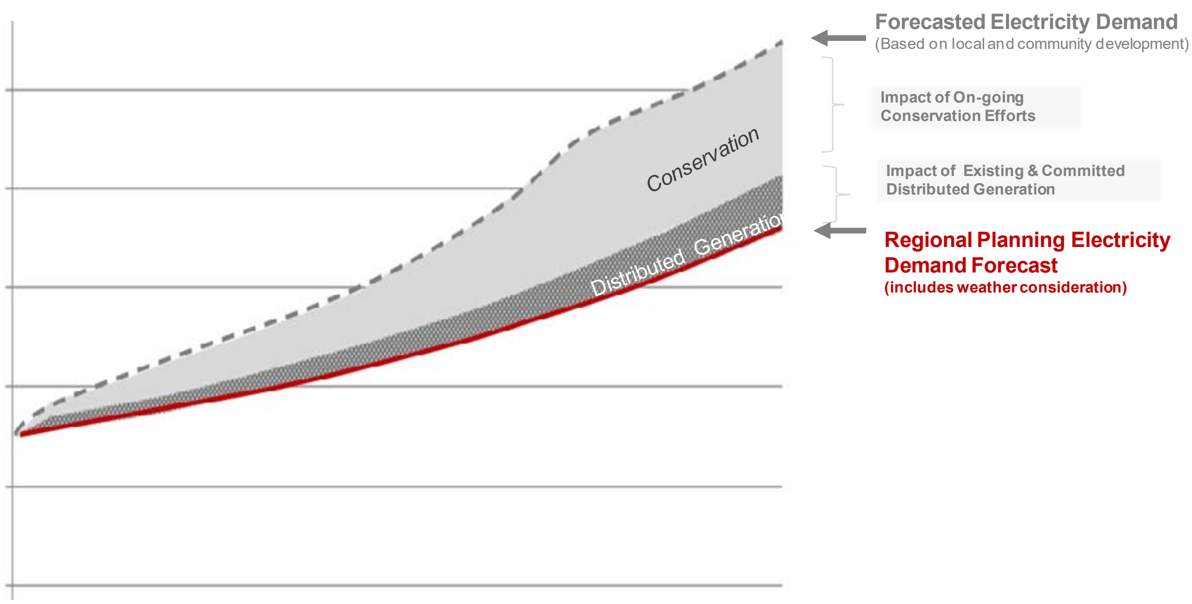
[5] Historical electricity demand includes the impact of weather experienced at the time of system peak demand.

Energy adequacy is usually not a concern in regional planning, as the Region can generally draw upon energy available from the provincial electricity grid, with energy adequacy for the Province being planned through a separate process.

A regional peak demand forecast was developed for the forecast period. The steps taken to develop the planning forecast are depicted in Figure 5-2. Gross demand forecasts, which assume the weather conditions of an average year based on historical weather conditions and referred to as 'normal weather', were developed by Hydro Ottawa and Hydro One. These forecasts were then modified to reflect the peak demand impacts of provincial conservation targets and DG contracted through provincial programs such as FIT and microFIT, and adjusted to reflect extreme weather conditions in order to produce a reference planning forecast. The reference forecast was then used to assess electricity supply needs in the Region.

Figure 5-2: Development of Demand Forecasts



Using a planning forecast that is net of provincial conservation targets provides consistency with the province's Conservation First Framework by reducing demand requirements before assessing any growth-related needs. The planning forecast assumes that the targets will be met, and will produce the expected local peak demand impacts. Therefore, an important aspect of plan implementation will be monitoring the actual peak demand impacts of conservation programs delivered by the local LDCs and, as necessary, adapting the plan.

For the long term outlook, from 2023 to 2032, an additional forecast scenario, consistent with the growth assumptions embodied in the government's 2013 LTEP was added. This Ottawa provincial derived scenario represents a future with lower electricity demand growth, due to high electricity prices, increased electricity conservation, and lower energy intensity of the economy.

5.3 Reference Forecast

5.3.1 Gross Demand Forecast

The summer peak gross demand forecasts provided by Hydro Ottawa and Hydro One for each of the transformer stations in the Region can be found in Appendix A. These forecasts reflect the expected demand at each station at the time of the area's coincident peak under normal weather conditions, based on factors such as population, household and economic growth, and are consistent with known developments in the Region and the City of Ottawa's official plans.

Strong growth is expected to continue throughout the City of Ottawa. Based on the LDC's gross demand forecasts, the entire study area is expected to grow by nearly 700 MW of peak demand over the forecast period, with an average annual growth rate of about 2%, not including impacts of conservation or DG.

5.3.2 Conservation Assumed in the Reference Forecast

Conservation plays a key role in maximizing the useful life of existing infrastructure, and maintaining reliable supply. The 2013 LTEP established a long-term conservation target for the province of 30 TWh by 2032. These targets include all three components of conservation: codes and standards ("C&S"), customer response to time-of-use pricing, and efficiency programs implemented by LDCs. In order to represent the effect of these targets within regional planning, the IESO developed an annual forecast for peak demand savings resulting from the provincial energy savings target, which was then expressed as a percentage of demand in each year. These percentages were applied to the LDCs' demand forecasts to develop an estimate of the peak demand impacts in Ottawa from the provincial targets. The resulting conservation assumed in the reference forecast is shown in Table 5-1 below.

Table 5-1: Conservation Assumed in the Reference Forecast

Year	2014	2016	2018	2020	2022	2024	2026	2028	2030	2032
Savings (MW)	29	52	74	134	163	206	240	287	321	366

It is assumed that existing demand response ("DR") in the base year will continue through the entire Study Period. Savings from potential future DR resources are not included in the forecast and are instead considered as possible solutions to identified needs.

The above conservation forecast methodology was not applied in developing the longer-term Ottawa provincial derived scenario. This is because the Ottawa provincial derived scenario already accounts for the anticipated impact of the 2032 conservation targets in its overall growth rate assumptions.

5.3.3 Distributed Generation Assumed in the Reference Forecast

In addition to conservation resources, DG in the Region is also anticipated to offset peak demand requirements. The introduction of the GEA, and the associated development of the FIT program, has increased the significance of distributed renewable generation in Ontario. This generation, while intermittent in nature, contributes to meeting the electricity demands of the province.

In developing the planning forecast, after applying the conservation savings to the demand forecast, as described above, the forecast is further reduced with the expected peak contribution from existing and contracted DG in the area.

5.4 Planning Forecasts

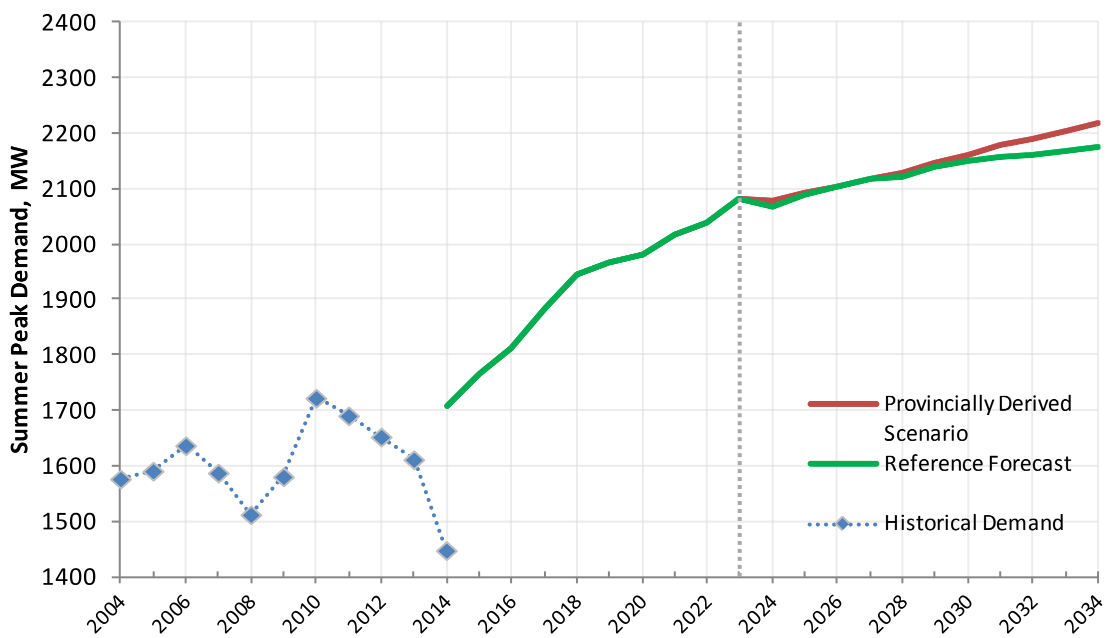
After taking into consideration the combined impacts of conservation and DG, a 20-year planning forecast was produced based on the LDC's demand forecasts. Beyond the first 10 years of the planning horizon (i.e. beginning in 2023) a second scenario referencing population projections and other electricity demand drivers as laid out in the 2013 LTEP is applied to account for long-term planning uncertainty. This scenario was developed by applying the average annual growth rate assumed for the Ottawa zone in the LTEP demand forecast, about 1% per year, to the Ottawa Region forecast, starting from 2023.

Figure 5-3 shows the reference forecast and the Ottawa provincial derived scenario, along with historic demand in the Region.

In the short term, the reference planning forecast for the entire Region grows at an average rate of approximately 2.1% per year, from 1,765 MW in 2015 to 2,080 MW in 2023; then starting in 2024, two planning scenarios are considered and two different growth scenarios can be observed: the LDC forecast scenario grows at 0.4% per year to 2,161 MW in 2032; and, the Ottawa provincial derived scenario grows at 0.9% per year to 2,246 MW in 2032. In the long term, both forecast scenarios are consistent in indicating that the Region will experience electricity demand growth.

In Figure 5-3 below, a significant difference between the 2014 actual historical load level and the forecast starting point can be observed. This is due to the fact that historical demand includes the impact of actual weather at the time of peak, while forecast demand includes the expected impact of extreme weather at time of peak.

Figure 5-3: Ottawa Region Historical Demand and Forecast Scenarios



6. Near- and Medium-Term Plan

This section describes the near- and medium-term needs for the Ottawa Region, as well as the options to address these needs. The near- and medium-term needs are based on the forecast provided by the Region's LDCs, reflecting known developments in the area, including the impact of planned conservation initiatives and DG. Regional planning involves comparing expectations for future electricity demand, as projected in a planning forecast, with the capability of the existing system, based on provincial assessment criteria, which are described in Section 6.1. This IRRP also included consideration of planning criteria, including reliability, cost, feasibility and maximizing the existing electricity system where economic to do so.

Supply needs for the Ottawa Region have been considered in two stages. First, the near- and medium-term plan for the overall Ottawa area is described in Section 6.2. This covers needs which affect supply to large portions of the Region. Further, the near- and medium-term plan for each of the three sub-systems: Nepean/Kanata, Downtown Ottawa, and East Ottawa/Orléans are covered in Sections 6.3, 6.4, and 6.5, respectively. This IRRP does not include assessment of the bulk supply to the Region, such the 500 kV supply.

Conservation was implicitly considered as the first alternative to meet the needs through the development of a planning forecast that includes the peak-demand effects of the provincial conservation targets, along with contracted DG. While additional conservation beyond the established targets was not considered as an alternative to meet the Region's near-term needs, the success of the near-term plan is dependent on the achievement of the peak-demand savings associated with meeting the LTEP conservation target. Efforts in the near term should be focused on ensuring that these savings materialize. Therefore, monitoring conservation efforts to ensure that this goal is met are included as a recommendation in the plan.

Due to the timing of the near-term needs, as well as the lead time required to develop and implement transmission solutions, the former OPA recommended in its June 2014 letter that development work be initiated on four transmission projects (see Section 2.1 above). The considerations around these recommendations are detailed below.

6.1 Ontario Resource and Transmission Assessment Criteria

The IESO's ORTAC,[6] the provincial standard for assessing the reliability of the transmission system, was applied to assess supply capacity and reliability needs.

The ORTAC includes criteria related to assessment of the bulk transmission system, as well as the assessment of local or Regional reliability requirements. The latter criteria are of relevance to this study and guided the technical studies performed in assessing the electricity system needs in the Ottawa Region. They can be broadly categorized as addressing two distinct aspects of reliability: (1) providing supply capacity, and (2) limiting the impact of supply interruptions.

With respect to supply capability, ORTAC specifies that the transmission system must be able to provide continuous supply to a local area, under specific transmission and generation outage scenarios. The performance of the system in meeting these conditions is used to determine the load meeting capability ("LMC") of an area for the purpose of regional planning. The LMC is the maximum load that can be supplied in the local area with no interruptions in supply or, under certain permissible conditions, with limited controlled interruptions as specified by ORTAC.

With respect to supply interruptions, ORTAC requires that the transmission system be designed to minimize the impact to customers of major outages, such as a contingency on a double-circuit tower line resulting in the loss of both circuits, in two ways: by limiting the amount of customer load affected; and by restoring power to those affected within a reasonable timeframe. Specifically, ORTAC requires that no more than 600 MW of load be interrupted in the event of a major outage involving two elements. Further, load lost during a major outage is to be restored within the following timeframes:

- All load lost in excess of 250 MW must be restored within 30 minutes;
- All load lost in excess of 150 MW must be restored within four hours; and
- All load lost must be restored within eight hours.

For the load loss and restoration criteria, ORTAC includes provisions whereby a request for exemption may be made to the IESO.

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

6.2 Overall Regional Supply

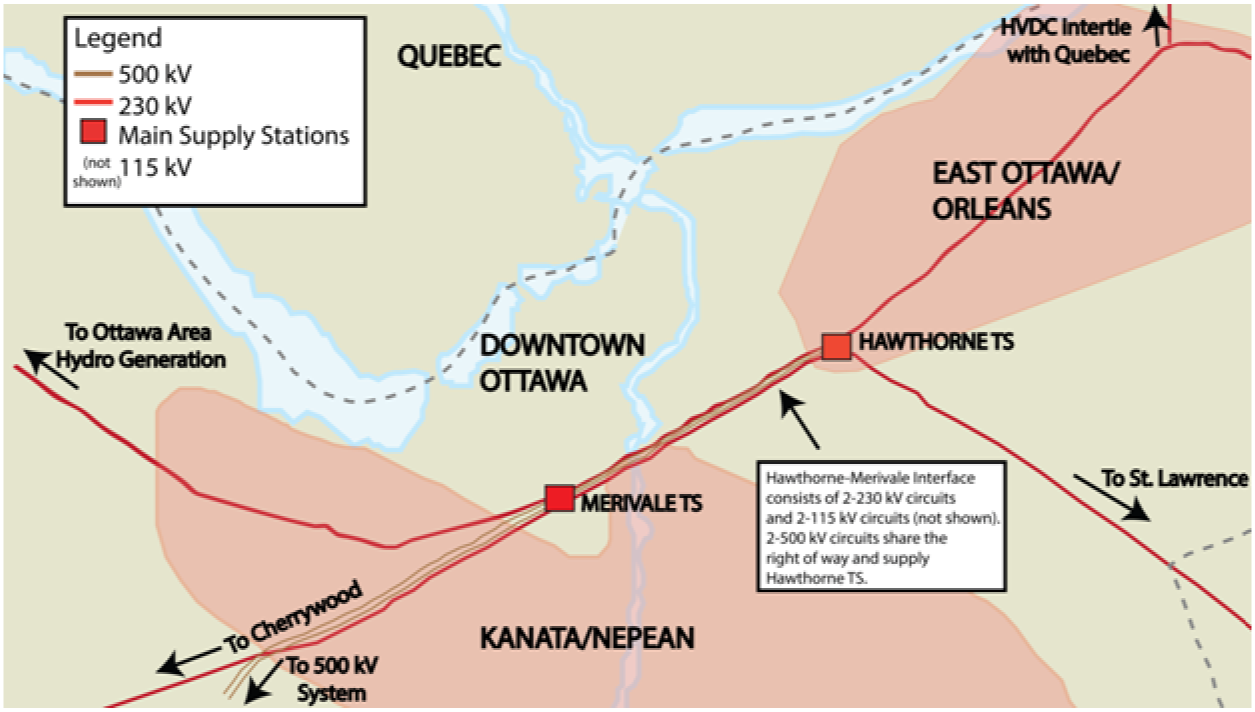
6.2.1 230/115 kV System Description

Transmission supply to the Region is provided through a 500 kV double circuit bulk system transmission line connecting to Hawthorne TS, a major TS on the eastern side of the city, and an expansive network of 230 kV and 115 kV transmission lines. Hawthorne TS and a second major TS on the west side of the City, Merivale TS, are the two main supply points for the Region. These stations have a total of six 230/115 kV transformers providing supply to the 115 kV system: four at Hawthorne and two at Merivale. Hawthorne and Merivale are connected by two 230 kV circuits in parallel with two 115 kV circuits. Together these circuits make up the Hawthorne-Merivale transmission interface, the major transmission supply path across the City. Merivale TS is the primary supply point for the western half of the Region and receives the majority of its supply through the Hawthorne-Merivale interface.

There are three transmission connected hydroelectric generating stations on the Madawaska River (Stewartville, Barrett Chute and Arnprior) and one on the Ottawa River (Chats Falls) which, due to their connectivity in the western part of the Ottawa area system, have the potential to reduce the need for supply from the transmission system. However, it is important to note that these hydroelectric plants are run-of-river type generators, which do not have the ability to store water for controlled use at specific times. This type of generation typically produces peak output during the spring due to melting snow and ice. Therefore, despite their combined nameplate capacity of 422 MW, these generators produce very low output at the time of peak system demand (which typically occurs during the summer) and do not contribute to offsetting the supply requirements from the transmission system. According to ORTAC, a planning study shall assume a level of output for run-of-river hydroelectric generation that is available 98% of the time. This results in an output level of approximately 12 MW for these generators.

Ontario's electricity system is connected to the Hydro Quebec system through an HVDC interconnection east of Hawthorne TS. Approximately 20% of power that is imported into Ontario through the HVDC interconnection flows toward Merivale TS via the Hawthorne-Merivale interface. The remainder is distributed towards other load centres in the province via the 500 kV connection at Hawthorne. The 500 kV and 230 kV transmission lines providing supply to the Region are show in Figure 6-1, below.

Figure 6-1: The Region's Major Transmission Lines and Stations



As shown in Figure 6-1, bulk system planning is generally distinct from regional planning, however there are important overlaps. In the case of Ottawa, ongoing bulk system studies are reviewing bulk supply issues that impact the Region, including use of the HVDC intertie for transactions with Quebec, as well as voltage support and 500 kV supply to the Region.

The existing transmission system in downtown Ottawa was built to meet urban electricity needs, with stations connected to double-circuit 115 kV and 230 kV lines providing redundant supply. The loads in the surrounding suburban (previously rural) and rural areas were primarily supplied by long, single-circuit 115 kV and 230 kV lines that provide limited supply diversity. With urban development now occurring across large parts of the Region, the existing system presents challenges for meeting the reliability of these broader and denser urban loads.

6.2.2 Near- and Medium-Term Forecast

Over the next 10 years, the peak demand across the entire Ottawa Region is forecast to grow by nearly 400 MW, or 22%. This growth is spread more or less proportionately over the three sub-systems, as described in more detail in subsequent sections.

6.2.3 Near- and Medium-Term Needs

Two near and medium-term needs have been identified that impact the overall Ottawa system:

1. the need for additional 230/115 kV transformer capacity at Hawthorne TS, and
2. the need for additional 230/115 kV transformer capacity at Merivale TS.

Need for Additional 230/115 kV Transformer Capacity at Hawthorne TS

The 230/115 kV transformer capability at Hawthorne TS is limited by two of the four transformers, T5 and T6. These two transformers have less transformation capability (225 MVA continuous rating) compared to the other two (250 MVA continuous rating). An outage under today's demand level at one of the larger transformers at Hawthorne TS, T5 or T6 would cause an overload under peak demand conditions in violation of the ORTAC supply adequacy criteria.[7] The forecast demand growth on the Ottawa 115 kV system will worsen the overload in future. In addition, these two transformers are about 60-years-old and approaching their end-of-life.

Need for Additional 230/115 kV Transformer Capacity at Merivale TS

There are two 230/115 kV transformers at Merivale TS that have different ratings: T21 is rated at 393 MVA and T22 is rated at 312 MVA (both LTR). Two key variables impact the utilization of these transformers: the demand in the area supplied by the Merivale 115 kV system, and the level of output from the three hydroelectric generators connected to that system (Stewartville and Barrett Chute and part of the Chats Falls Generating Station). As the demand on the two transformers increases under the current load forecast, the loss of T21 will result in T22 overloading in violation of the ORTAC supply adequacy criteria. At this point, additional transformer capacity will be required. The timing of this need for additional capacity will depend on the rate of demand growth; the level of generator output will also impact the net demand. These two variables are discussed further below.

Forecast demand growth that is impacting Merivale TS is also driving a more localized need for additional supply capability in the South Nepean area. This need is detailed in Section 6.3.3. A plan to supply this growth has not yet been finalized, but may consist of supplying future demand growth from a new 230 kV supply station southwest of Merivale, instead of continuing to add load to the 115 kV system as indicated in the current demand forecast. This option

[7] Limited-time ratings ("LTR") apply during outage conditions.

would reduce the loading on the transformers at Merivale compared to the current forecast and defer the need for increased transformer capacity.

Two of the hydroelectric generators on the Madawaska River, Stewartville and Barrett Chute, are connected to the Merivale 115 kV system. The output from these generators reduces the need for supply from the Merivale transformers. Based on the ORTAC, as described in Section 6.2.1, these two generators can be relied upon to supply about 12 MW of output for the two plants combined, or less than 5% of their combined nameplate capacity, a very low level of output. In combination with the demand forecast, this assumption suggests that additional transformer capacity would be required as early as 2019. However, if, for example, a level of 50 MW of output were available from these two generators, additional transformer capacity would not be required at Merivale until 2021. These results show the sensitivity of the transformer requirement to the dependable water output level.

6.2.4 Near- and Medium-Term Options

Need for Additional 230/115 kV Transformer Capacity at Hawthorne TS

Given the age of transformers, along with the immediate timing of the need, the Working Group recommends that Hydro One upgrade T5 and T6 with standard-sized 250 MVA units, at an estimated cost of $14 million and with a proposed in-service date of late 2017. This project was included in the June 2014 letter to Hydro One.

Need for Additional 230/115 kV Transformer Capacity at Merivale TS

The South Nepean area is currently supplied by stations connected to the Merivale 115 kV system. Based on the current demand forecast, additional supply will be needed in the South Nepean area around the end of the decade. One of the alternatives under consideration for South Nepean consists of transferring load from the existing 115 kV system to a new 230 kV supply point. Reducing demand on the 115 kV system in the South Nepean area would reduce the loading on the Merivale transformers, mitigating the need for increased Merivale transformer capability. Considering the lead-time required to implement a new 230 kV supply point a plan for the area must be confirmed in the near future. With this planning timeline in mind, it is reasonable to hold-off on committing to upgrade the two Merivale transformers until the plan for South Nepean, which may reduce the need for Merivale transformer capacity, has been finalized. A detailed discussion about the South Nepean supply issue can be found in Section 6.3, below.

Nevertheless, if no changes are made to the existing system and the current demand forecast materializes, there is a risk that low hydroelectric output during peak hours may impact supply reliability beyond 2019. If the situation arises where there is a need for additional transformer capacity before a planned solution is in place, a special protection system ("SPS") may be implemented for an interim period to enable the required amount of post-contingency load rejection ("L/R").

A community engagement process is the next step to confirming the preferred alternative for supply to South Nepean. In the near term, the focus will be on monitoring the load growth on the Merivale 115 kV system and the development of a supply plan for South Nepean. Following the release of this IRRP, the Working Group plans to meet at least once annually to review demand trends in the area and review the near-term forecast. As part of this monitoring plan, the timing for the thermal overload on the Merivale transformers can be updated, as this need is largely driven by the forecast demand in the area.

6.3 Nepean/Kanata

6.3.1 Sub-system Description

Located to the west and southwest of the Greenbelt, the Nepean/Kanata area has experienced extensive urbanization in recent years, a trend that is forecast to continue. The transmission system supplying this part of the Region was originally built to supply low density rural loads and consists of step-down transformer stations connected to long, single-circuit transmission lines with limited supply diversity. The configuration of this system presents challenges to meeting reliability criteria under extensive development and load growth. The situation is further complicated by geographical constraints, as any new transmission corridors to supply this part of the Region would have to cross the National Capital Commission Greenbelt and/or one of several rivers or developed communities in the area. A key focus of this IRRP, in addition to planning for supply capacity to meet forecast load growth, is to address these reliability challenges in a manner that minimizes costs and environmental impacts.

Figure 6-2: Nepean/Kanata Sub-system

The Nepean/Kanata sub-system as defined in this study is shown in Figure 6-2. The area encompasses the loads and future load growth supplied from the stations listed in Table 6-1

The majority of the step-down transformer stations in the area are supplied from the 115 kV circuits S7M, C7BM, L2M, A8M and M1R. These are single-circuit transmission lines that provide limited supply diversity. The northwestern part of the Nepean/Kanata sub-system is supplied by the 230 kV circuits C3S and M32S.

A new 230 kV station, Terry Fox MTS, owned by Hydro Ottawa, located at the western edge of Kanata, and supplied by the 230 kV circuit M29C came into service in November 2013, providing additional supply diversity in the area.

Table 6-1: Nepean/Kanata Step-down Transformer Stations

Supply Circuits	Transformer Station	Voltage (kV)	10 day LTR[8] (MW)	2014 Peak (MW)
S7M	Bridlewood MTS	115	36.9	34.2
S7M	Marchwood MTS	115	34.0	40.8
S7M	Fallowfield DS	115	26.0	36.1
S7M	Manotick DS	115	16.9	7.4
S7M	Richmond DS	115	5.4	4.9
C7BM	Manordale MTS	115	21.6	11.8
L2M	Limebank MTS	115	68.0	38.0
L2M	Marionville DS	115	15.0	13.0
A8M	Uplands MTS	115	29.7	29.4
M1R	South Gloucester DS	115	7.5	4.0
M1R	Greely DS	115	40.0	17.5
M1R	Russell DS	115	7.5	3.5
C3S/M32S	Kanata MTS	230	54.5	72.0
C3S/M32S	South March TS - H.O.	230	108.9	42.7
C3S/M32S	South March TS - H1	230	108.9	55.7
M32S	Nepean TS	230	144.0	142.7
M29C	Terry Fox MTS	230	90.0	0.0
N/A	National Aeronautical CTS	N/A	N/A	0.6

6.3.2 Near- and Medium-Term Forecast

Over the next 10 years, the peak demand in the Nepean/Kanata sub-system is forecast to increase by 134 MW or 23%. This increase includes the future connection of a new 20 MW load

[8] LTR apply during outage conditions.

customer at Richmond DS, as well as significant residential development in the South Nepean area. This localized demand growth is discussed in more detail below.

6.3.3 Near- and Medium-Term Needs

Three near term needs have been identified in the Nepean/Kanata sub-system:

1. the need for improved reliability of supply to Terry Fox MTS;
2. the need for additional supply capacity for a section of circuit S7M; and
3. the need for additional supply capacity in the South Nepean area.

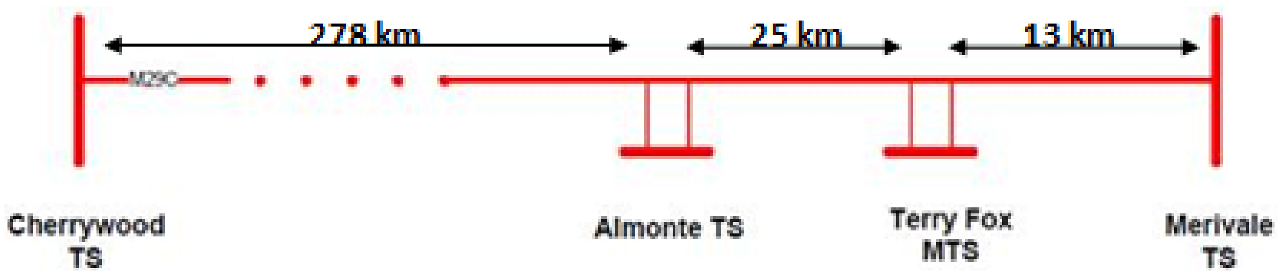
Need for Improved Reliability of Supply to Terry Fox MTS

Terry Fox MTS is a dual element spot network ("DESN") type station, a design which is typically supplied by two circuits, however the initial configuration of Terry Fox consists of two transformers, both connecting onto 230 kV circuit M29C, the only 230 kV supply in the vicinity. M29C is a 316 km circuit connecting Merivale TS in Ottawa to Cherrywood TS in east Greater Toronto Area ("GTA"). Another station - Almonte TS - is located west of Terry Fox, and is also solely supplied by this circuit.

Without a second supply circuit, any outage on M29C – usually occurring about 7-10 times per year - means an interruption of supply to load customers at these two stations. Generally these interruptions are momentary, however due to the configuration described above, there are currently limited options for restoring a sustained outage through distribution system transfers.

The addition of a new supply point benefits customers in the Nepean/Kanata area. Load that was previously supplied by stations connected to the 115 kV circuit S7M, which is nearing its supply capacity limit, has been transferred to Terry Fox, relieving the 115 kV system. An additional supply source in the area also provides improved reliability for some of the customers that continue to be supplied by S7M in the event of an outage on that circuit. The demand at Terry Fox is forecast to grow to a level of nearly 70 MW by 2020. Based on this forecast there is a need to improve the ability to restore interruptions at Terry Fox MTS.

Figure 6-3: 230 kV Circuit M29C



Need for Additional Supply Capacity for a Section of Circuit S7M

Circuit S7M is a 115 kV single circuit transmission line originating from Merivale TS and supplying the Nepean/Kanata area. With forecast demand growth in South Nepean, a section of the S7M circuit, the tap to Fallowfield DS (shown in the Figure 6-4 below), is expected to exceed its thermal capacity by 2019 under pre-contingency conditions. This section of the S7M circuit has the capability of supplying roughly 77 MW of load, based on its thermal rating. Three stations are supplied by this section: Fallowfield DS, Richmond DS and Manotick DS. Fallowfield DS and Richmond DS are both owned by Hydro Ottawa and Manotick DS is owned by Hydro One. By 2019 the demand for these three stations is forecast to reach 87 MW. This forecast includes a large Hydro Ottawa customer that has requested connection for a new 20 MW load at Richmond DS in 2019. Once the bulk load customer is connected, along with other growth that will be supplied by these stations, the capability of this section of S7M will be exceeded.

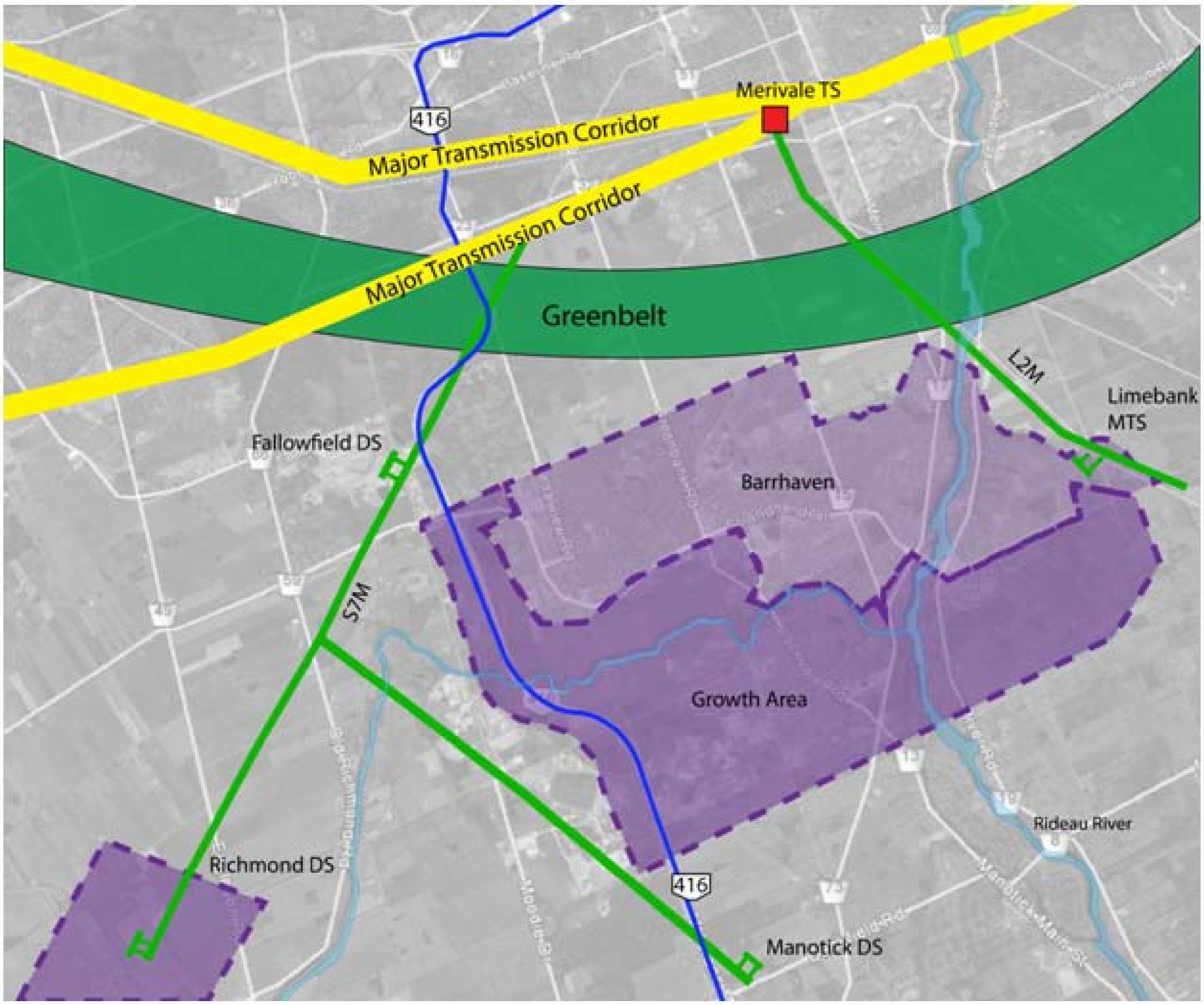
Figure 6-4: Limiting Section of Circuit S7M

Need for Additional Supply Capacity in the South Nepean Area

While growth is forecast throughout the Nepean/Kanata area, over the next five years the most intense growth is forecast to be located in the South Nepean area, south of Barrhaven, as depicted in Figure 6-5 below. This area is divided by the Rideau River and is currently supplied by four surrounding stations which already supply Barrhaven: Fallowfield DS, Richmond DS, Manotick DS and Limebank MTS. Fallowfield, Richmond and Manotick are supplied by S7M, a single 115 kV circuit on the west side of the river, while Limebank is supplied by L2M, a single

115 kV circuit on the east side of the river. Fallowfield DS and Limebank MTS have already reached their station capacities.

Figure 6-5: South Nepean Growth Area



In addition to the thermal capacity need on the S7M section, transformer capacity is also needed in the South Nepean area. In the near term, Richmond DS will exceed its station capacity once the large industrial customer noted above is connected. In 2013, Hydro Ottawa increased the reliability of Fallowfield DS by adding a second supply transformer to the station; however this did not increase the station capacity, which is based on one element being out-of-service. Due to increasing demand from residential and commercial development in the area, Fallowfield DS will exceed its station capacity around the end of the decade.

6.3.4 Near- and Medium-Term Options

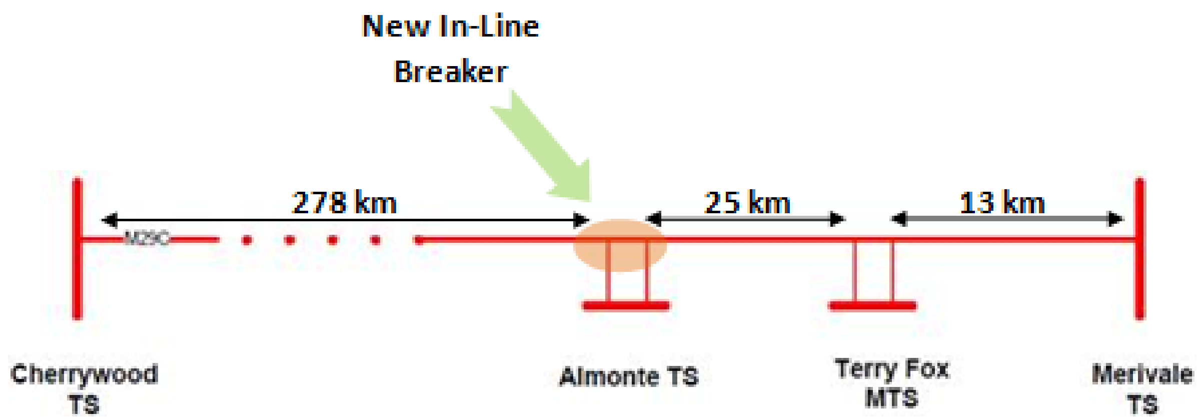
Need to Improve Reliability of Supply to Terry Fox MTS

The poor supply reliability at Terry Fox MTS is due to the system configuration in this area and is not triggered by load growth. Therefore, additional conservation and DG were not considered as viable options to meet this need. The Working Group has recommended proceeding with a near-term project of installing an in-line circuit breaker on M29C, west of Terry Fox MTS at Almonte TS, dividing this long circuit into two sections. This project will improve the reliability performance of the section of M29C supplying Terry Fox because following an outage affecting the long section of M29C west of the in-line breaker, the section east of the breaker would remain in service, supplied radially from Merivale TS. The Working Group discussed options for locating the breaker and agreed that the best location would be at Almonte TS because it could also provide benefits to the loads supplied from Almonte TS.

This project was included in the June 2014 letter to Hydro One. The breaker is scheduled to be in service by mid- 2015, with an estimated cost of under $5 million.

The Working Group noted that the breaker does not protect against outages occurring on M29C on the Merivale side of the breaker. Due to the long length of M29C, it is not feasible to restore Terry Fox MTS after an outage between Merivale TS and Terry Fox MTS, as operating this circuit radially from Cherrywood TS would result in voltage collapse. Nevertheless, it will provide substantial improvement in reliability for both stations, and can be achieved relatively quickly.

Figure 6-6: Recommended in-line Breaker on M29C



Need for Additional Capacity for a Section of Circuit S7M

To address the thermal capacity need on the S7M section, additional conservation and DG were considered as measures to manage demand growth. However, since this thermal need is mainly driven by the requested connection of a single large industrial customer, managing future demand growth for existing customers is not sufficient to address these capacity needs.

Hydro Ottawa is planning to upgrade Richmond DS in the near term in order to accommodate the anticipated growth at that station. In conjunction with this station upgrade, the Working Group has recommended increasing the rating of the limiting section of S7M to support the forecast demand growth in the area. This issue was included in the June 2014 letter to Hydro One. An increased rating on S7M will be achieved by Hydro Ottawa lowering a distribution feeder which passes under S7M, to increase the separation between the transmission line and the feeder. The combination of the upgraded Richmond DS and increased rating on S7M will be sufficient to serve the forecast growth in the Richmond community for the forecast period.

Need for Additional Supply Capacity in the South Nepean Area

Despite recently completed and planned upgrades to the existing transmission lines and stations serving the area, as well as current assumptions of significant conservation contributions across the Region, forecast demand growth in the South Nepean area will exceed the supply capability of the existing system around the end of the decade.

The next step in the regional planning process is for public engagement following the release of this IRRP in order to identify the preferred alternative for meeting the supply needs of this area, including consideration of the potential for incremental conservation and DG resources.

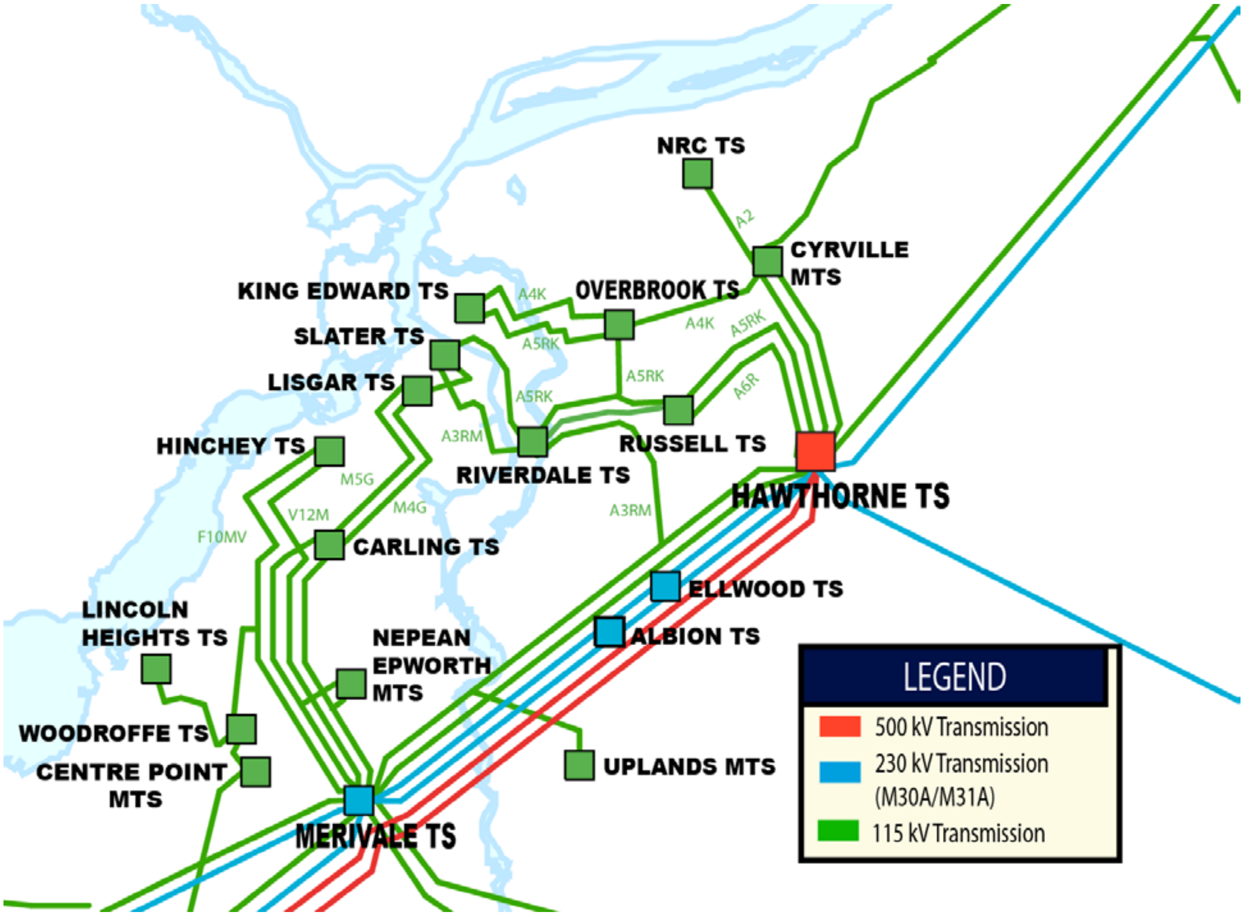
One option for providing new supply for South Nepean is transmission expansion in the form of a new TS and connection line supplied from the existing 230 kV system which is north of the Greenbelt. The timeline for early planning work, approvals (including environmental assessment) and construction of a new TS and connection line is typically at least five years. Given the required timeline, the Working Group recognizes that it would be beneficial for early planning work for a new TS and 230 kV connection line in the South Nepean area be initiated as an outcome of this IRRP, in parallel to the engagement process, in order to maintain this transmission solution as a feasible option.

6.4 Downtown Ottawa

6.4.1 System Description

For the purpose of this IRRP, Downtown Ottawa is defined as the geographic area bounded to the north by the Ottawa River and to the south by the Greenbelt, as shown in Figure 6-7 below. Downtown Ottawa is a substantially developed area with a high density of residential and commercial loads. The downtown system currently supplies about 800 MW of demand, including the downtown commercial core of the City of Ottawa, Parliament Hill, and the national museums and monuments located in the area.

Figure 6-7: Supply to Downtown Ottawa



The existing Downtown Ottawa transmission system is supplied from two main supply sources, Hawthorne TS and Merivale TS, from which 230 kV and 115 kV transmission lines radiate to supply 12 step-down transformer stations. The majority of the step-down transformer stations in the area are connected to 115 kV circuits A4K, A5RK, A6R and M4G/M5G. There are also connections to other 115 kV circuits including A3RM, A8M and F10MV/V12M. The south-eastern portion of Downtown Ottawa is supplied by the 230 kV circuits M30A/M31A.

All of the step-down transformer stations serving the Downtown Ottawa area are co-owned by Hydro One and Hydro Ottawa with the exception of Ellwood TS, which is wholly owned by Hydro Ottawa.

Planned Capacity Improvements in the Downtown Area

In 2014, Hydro Ottawa identified the requirement for increased transformer capacity at Lisgar TS by 2016 in order to supply anticipated near-term demand growth in the downtown sub-system. Hydro Ottawa subsequently requested that Hydro One, the asset owner, increase the capacity at Lisgar TS by replacing both of the two existing 45/60/75 MVA transformers at the station with larger 60/80/100 MVA units. Hydro Ottawa has noted that the existing transformers have limited reverse power flow capability and that the new transformers will also be capable of connecting a larger capacity of renewable generation to the distribution system in the area.

The transformers at Overbrook TS are reaching their end-of-life. At Hydro Ottawa's request, Hydro One is proceeding to replace the two transformers at Overbrook with two larger units, increasing the supply capability of the station in conjunction with their planned sustainment driven replacement. The increased station capabilities at Lisgar and Overbrook have been included in the existing system capability for the analysis of future needs.

Table 6-2: Downtown Ottawa Step-down Transformer Stations

Supply Circuits	Transformer Station	High-Side Voltage (kV)	10 day LTR[9] (MW)	2014 Peak (MW)
M4G/M5G	Carling TS	115	92.7	89
F10MV/C7BM	Lincoln Heights TS	115	71.1	49
F10MV/C7BM	Woodroffe TS	115	91.8	29
F10MV/V12M	Hinchey TS	115	77.4*	40
M4G/A5RK/A3RM	Slater TS	115	117.9	105
M4G/M5G	Lisgar TS	115	108.0*	74
A4K/A5RK	King Edward TS	115	71.0	79
A6R/A5RK	Russell TS	115	69.3	64
A4/A5RK	Overbrook TS	115	129.6*	72
A3RM/A6R	Riverdale TS	115	105.3	82
M30A/M31A	Albion TS	230	88.2	61
M30A/M31A	Ellwood TS	230	58.5	34
A2	Nation Research TS	115	24.7	25
X522A/X523A	Hawthrone TS - H.O.	500	89.1	43
X522A/X523A	Hawthrone TS - H1	500	89.1	67
C7BM	Centrepoint MTS	115	35.1	13
M30A/M31A/M32S/M29C	Merivale TS	230	18.0	14
M4G/M5G	Epworth MTS	115	25.2	14

*These LTR reflect the completion of transformer replacement work that is currently planned or in progress

[9] LTR apply during outage conditions.

6.4.2 Near- and Medium-Term Forecast

Over the next 10 years, the peak demand in the downtown area is forecast to grow by about 205 MW or 21%. This growth demonstrates the continued intensification and development in the downtown area, including development of Ottawa's LRT system, the Confederation Line.

6.4.3 Near- and Medium-Term Needs

Three near- and medium-term needs have been identified in the downtown sub-system:

1. the need for additional transformer capacity at Russell TS, Riverdale TS and King Edward TS; and
2. the need to increase thermal capacity on the A4K circuit.

Need for Additional Transformer Capacity in the Downtown Core

When determining the overall transformer capacity needs of the downtown core, distribution system load transfers between stations, where feasible, are the preferred means of accommodating demand growth so as to maximize the use of existing TS infrastructure. After crediting the load transfers that are currently feasible in the demand forecast, three downtown stations, Russell, Riverdale, and King Edward are still expected to reach their supply capability around 2018.

Need for Additional Supply Capacity for Circuit A4K

A4K is a 115 kV circuit that originates at Hawthorne TS and supplies the east part of the downtown sub-system. Beginning around 2017, the main section of A4K, from Hawthorne TS to Blackburn Junction, is expected to exceed its rating following the loss of the companion circuit, A5RK. Following the loss of A5RK, A4K must supply Moulton TS, Overbrook TS, King Edward TS and part of Cyrville TS (also supplied by A2).

6.4.4 Near- and Medium-Term Options

Need for Additional Transformer Capacity in the Downtown Core

Based on recommendations from the Working Group, Hydro Ottawa, the LDC serving the downtown sub-system, plans to take the following three near-term actions to address the transformer capacity needs at Russell TS, Riverdale TS and King Edward TS:

1. Increase load transfer capability between Russell TS and other near-by stations by creating new distribution ties.

2. Increase load transfer capability between Riverdale TS and other near-by stations by creating new distribution ties.
3. Request Hydro One, the asset owner, to increase the station capacity at King Edward TS. The two transformers at King Edward TS have different ratings, with one rated at 45/75 MVA and the other rated at 60/100 MVA. Hydro One has confirmed that additional station capacity can be provided at King Edward TS by replacing the smaller transformer with a larger unit.

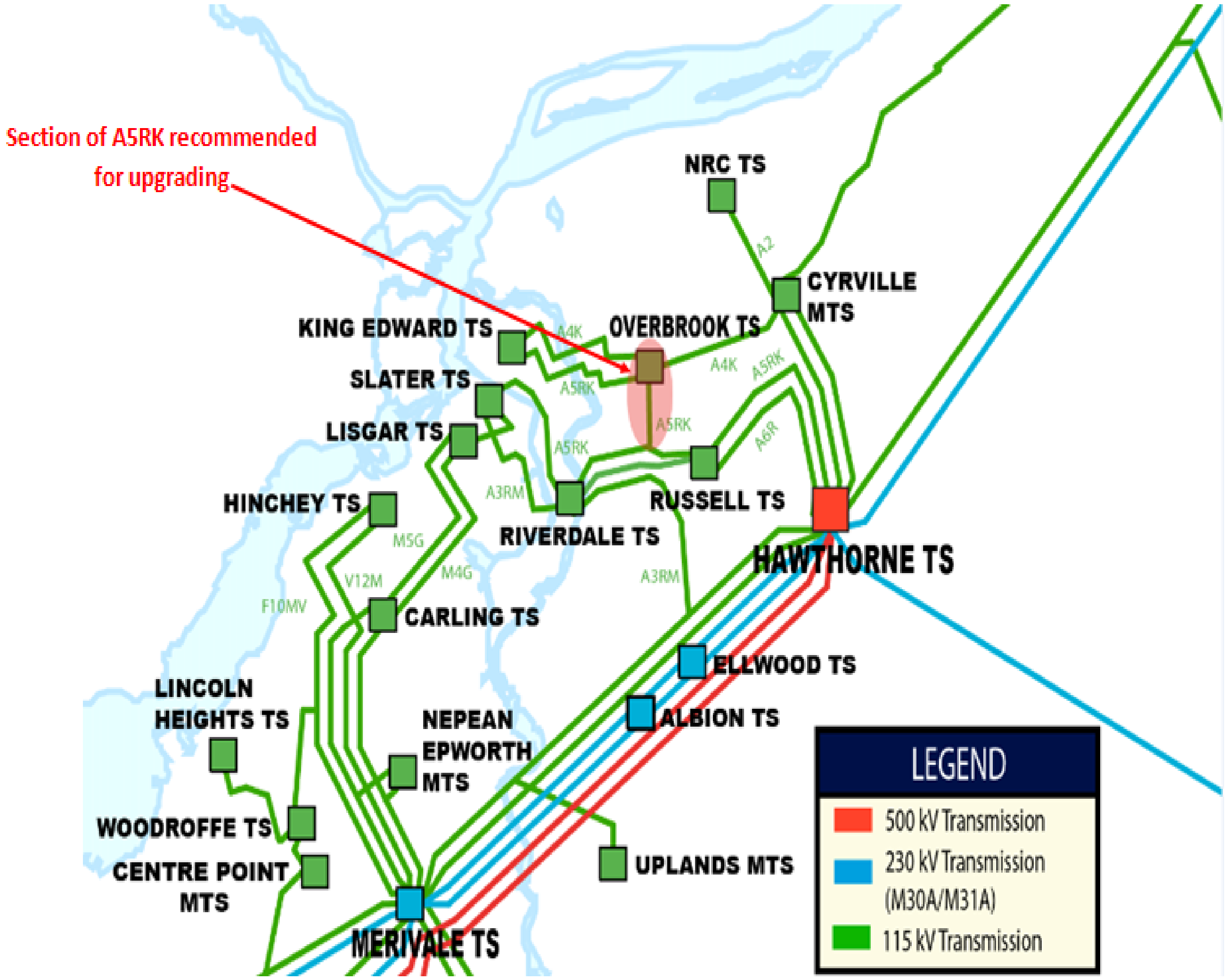
Need for Additional Supply Capacity for Circuit A4K

By 2025 demand from load served by A4K following the loss of A5RK is expected to exceed the supply capability of A4K by more than 45 MW and by 2032 the requirement for additional capacity is expected to be greater than 50 MW. Based on this large requirement, it is not feasible to target demand reduction through conservation or DG as a sufficient means of alleviating the need.

The Working Group therefore considered two transmission options to address the need: upgrading the main section of A4K and rebuilding a section of A5RK. Upgrading A4K would involve a section that is approximately 8 km in length while the rebuilding of the A5RK would involve a section that is about 2 km. Due to the ampacity rating of the existing main section of A4K, upgrading may not provide significant incremental supply capacity to the area. Therefore, the Working Group did not pursue the option of upgrading A4K.

The Working Group has recommended rebuilding the section of A5RK between Overbrook TS and Riverdale Junction and adding a tap to A6R to provide a double-circuit line supply to Overbrook TS. As part of this project, the supply to Overbrook TS will be reconfigured from being supplied by A4K/A5RK to being supplied by A5RK/A6R. This would reduce the loading on A4K following the loss of A5RK and relieve the thermal overload. This project was included in the June 2014 letter to Hydro One.

Figure 6-8: Recommended Rebuild Section of A5RK



6.5 East Ottawa/Orléans

6.5.1 System Description

The East Ottawa/Orléans area is defined in this study as shown in Figure 6-9 below. The main source of supply to the East Ottawa/Orléans area are the four 230/115 kV transformers at Hawthorne TS. The system serving the area includes the 230 kV circuit D5A and the 115 kV circuits H9A, A2 and A4K that originate at Hawthorne TS. The sub-system encompassing the loads and future load growth supplied from the stations are listed in Table 6-3. Orléans TS is a new Hydro One station that is expected to come into service in the second quarter of 2015, providing a new supply point for the southern part of the sub-system.

Figure 6-9: Supply to East Ottawa/Orléans

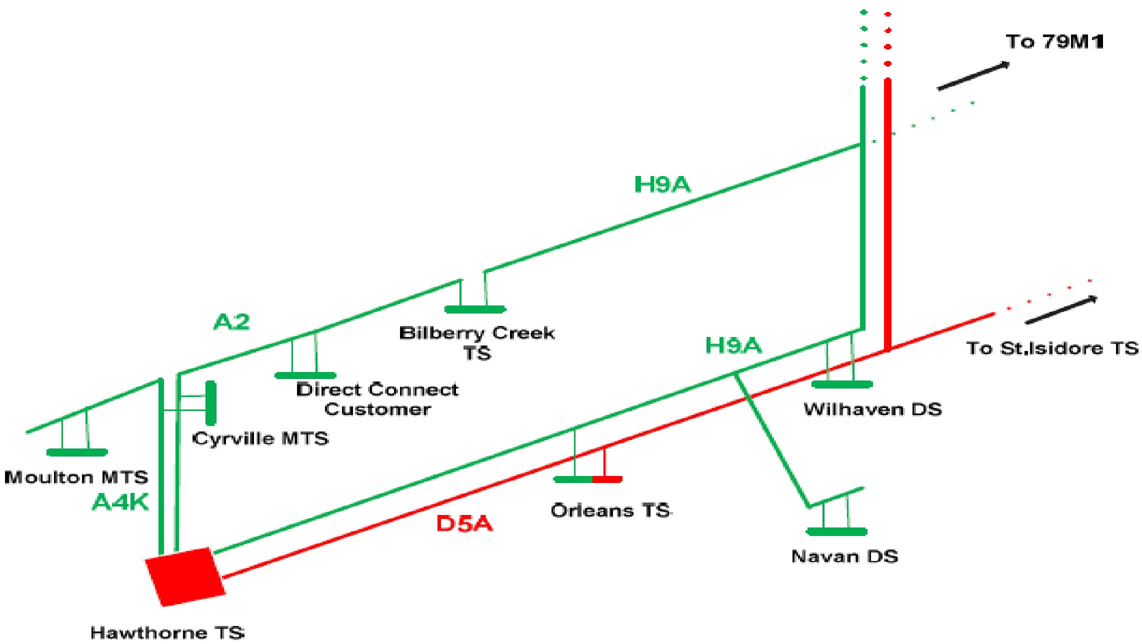


Table 6-3: East Ottawa/Orléans Step-down Transformer Stations

Circuit	Transformer Station	Voltage (kV)	10 day LTR[10] (MW)	2014 Peak (MW)
A2/H9A	Bilberry Creek TS - H.O.	115	84.6	45
A2/H9A	Bilberry Creek TS - H1	115	84.6	31
D5A/H9A	Orléans TS	230/115	101.7	0
A4K/A2	Cyrville MTS	115	58.5	20
A4K	Moulton MTS	115	34.0	26
H9A	Wilhaven DS	115	57.5	43
H9A	Navan DS	115	15.0	17
H9A	Cumberland DS	115	15.0	6

6.5.2 Near- and Medium-Term Forecast

Over the next 10 years, the East Ottawa/Orléans area will see an increase in the peak demand of about 57 MW or 27%. This increase is in part driven by the residential developments in the East Urban Community, where 4,000 housing units are expected to be built in the coming years.

6.5.3 Near- and Medium-Term Needs

Need for End-of-Life Refurbishment at Bilberry Creek TS

Bilberry Creek TS is a 115 kV station built in 1964 and owned by Hydro One. In recent years, this station has supplied a total of about 80 MW of load consisting mainly of Hydro Ottawa customers located in the northern part of the area as well as some Hydro One Distribution customers in the south part of the area. As mentioned above, Orléans TS is a new Hydro One station which will come into service in 2015 and will serve Hydro One Distribution customers who were previous supplied by Bilberry Creek TS, Wilhaven DS and Navan DS. Orléans TS

[10] Limited-time ratings (LTR) apply during outage conditions.

will reduce the load supplied by Bilberry Creek to about 50 MW consisting of solely Hydro Ottawa customers, allowing the remaining station capacity to be utilized as an emergency backup for Hydro One customers.

Hydro One Transmission has informed the Working Group that the two transformers, the low voltage breakers and the associated protection system at Bilberry Creek will reach their end-of-life around 2023. A decision will be needed around 2020 on whether to refurbish the station and maintain the 115 kV system in the area, or decommission the station and transfer its load to other stations, including Orléans TS.

Need for Improved Reliability of Supply to Orléans TS

Orléans TS is a DESN type station, a design which is typically supplied by two 230 kV circuits, or two 115 kV circuits, however the initial configuration of Orléans consists of one 230 kV circuit and one 115 kV circuit. The two transformers at Orléans are therefore connected to H9A (115 kV) and D5A (230 kV), respectively. As each transformer is connected to a different voltage, the station will be operated with the low voltage bus-tie breaker open. For loss of either the 230 kV or 115 kV supply circuit, the bus-tie breaker will close automatically, restoring supply to customers.

Despite the initial configuration of Orléans TS, the station improves the reliability in the East Ottawa/Orléans area as compared to the previous system. Under the previous system configuration, loads were supplied by HVDS, including Wilhaven and Navan, which could not survive following an N-1 contingency on H9A. Orléans TS provides additional transformation capacity in the area and accommodates some of the area's load growth on the 230 kV system, and provides dual supply reliability to customers who were previously connected to single supply stations on H9A (i.e. Wilhaven DS and Navan DS). However, due to the open bus-tie configuration, loads at Orléans TS will experience momentary outages upon N-1 transmission contingencies as the affected load is switched from one half of the station to the other stations. The demand at Orléans TS is forecast to grow to around 100 MW by 2022. Based on this forecast, this is not an immediate need.

6.5.4 Near- and Medium-Term Plan

Due to the timing of the need for a decision on the future of Bilberry Creek TS, no specific plan for this station is recommended at this time. Instead, this issue will be revisited in the next regional planning cycle, which is expected to begin around 2018. A preliminary study of the two main options, refurbishing Bilberry Creek on the 115 kV system, or decommissioning the station and transferring load to the 230 kV system, indicates that the cost of the two alternatives is similar. Demand growth on the 115 kV system in downtown Ottawa over the next few years may make the decommissioning option more valuable, so as to limit the 115 kV system to the downtown area where urban density makes new transmission supply infeasible. On the other hand, the decommissioning option would remove a supply point from the northern part of the sub-system, increasing feeder exposure for customers in that area, and reducing flexibility on the distribution system.

No action is recommended for Orléans TS at this time, however, the reliability of supply at Orléans should be revisited during the next regional planning cycle in conjunction with the plan for Bilberry Creek TS. Increased demand at Orléans TS as a result of load transferred from Bilberry Creek may necessitate a second 230 kV supply to Orléans.

As an outcome of this IRRP, the Working Group will monitor demand in the East Ottawa/Orléans area over the next planning cycle. Should the near term demand in the East Ottawa/Orléans materialize sooner than forecast, the next planning cycle could be initiated in advance of the 5-year minimum timeline.

6.6 Summary of Recommended Actions for the Near- and Medium-Term Plan

Beginning in 2015, the province's LDCs will deliver energy efficiency ("EE") programs to their customers as part of Ontario's Conservation First Framework based on assigned energy targets. As described in Section 5.3.2, the IESO has estimated the impact of these programs on peak demand, as well as the impact of other initiatives such as improved C&S and TOU rates. These impacts have been included in the planning forecast that has been used to identify the near- and medium-term needs.

Similarly, DG continues to be added to the Region, as a result of province-wide generation procurement programs including the FIT and microFIT renewable generation programs. As described in Section 5.3.3, the impact of contracted distributed generation on peak demand has also been factored into the planning forecast.

Transmission and Distribution Reinforcements

A number of transmission reinforcements have been identified as part of the near- and medium-term plan for the Region. In June 2014 the former OPA provided a letter to Hydro One to initiate development work on four reinforcement projects, as discussed in Section 2.1.

The recommended actions to address the near-term needs are summarized in Table 6-4 below.

Table 6-4: Summary of Needs and Recommended Actions

Area	Needs	Timing	Recommended Actions
Overall Regional Supply	Additional 230/115 kV transformer capacity at Hawthorne TS	Today	June 2014 letter to Hydro One recommended replacing two transformers which are approaching their end-of-life with higher capacity units.
	Additional 230/115 kV transformer capacity at Merivale TS	As early as 2019	Monitor demand growth on the Merivale 115 kV system in conjunction with the development of a supply plan for South Nepean. If the situation arises where there is a need for additional transformer capacity before a planned solution is in place, a SPS may be implemented for an interim period to enable the required amount of post-contingency load rejection.
Nepean/ Kanata	Improved reliability of supply to Terry Fox MTS	Today	June 2014 letter to Hydro One recommended the installation of an in-line breaker in circuit M29C at Almonte TS.
	Additional supply capacity for a section of circuit S7M	By 2019	An increased rating for S7M will be achieved by Hydro Ottawa lowering a distribution feeder which passes under S7M, to increase the separation between the transmission line and the feeder.
	Additional supply capacity in the South Nepean area	Around 2020	Engagement will identify the community's preferred alternative for meeting supply needs in this area. Given the required timeline, it would be beneficial for early planning work for a new TS and 230 kV connection line in the South Nepean area be initiated in parallel to the engagement process, in order to maintain this transmission solution as a feasible option.
Downtown Ottawa	Additional transformer capacity in the downtown core	Around 2018	It is recommended that Hydro Ottawa, the LDC serving downtown Ottawa: Increase load transfer capability between Russell TS and other near-by stations. Increase load transfer capability between Riverdale TS and other near-by stations Request that Hydro One, the asset owner, increase the station capacity at King Edward TS.
	Additional supply capacity for circuit A4K	Around 2017	June 2014 letter to Hydro One recommended rebuilding the section of A5RK between Overbrook TS and the junction with A6R into a double-circuit line. As part of this project, supply to Overbrook TS will be reconfigured from being supplied by A4K/A5RK to being supplied by A5RK/A6R.
	End-of-life refurbishment at Bilberry TS	2023	A decision on whether to maintain Bilberry Creek TS or retire the station and transfer the load to the 230 kV system will be required by 2020. No specific actions are recommended at this time.

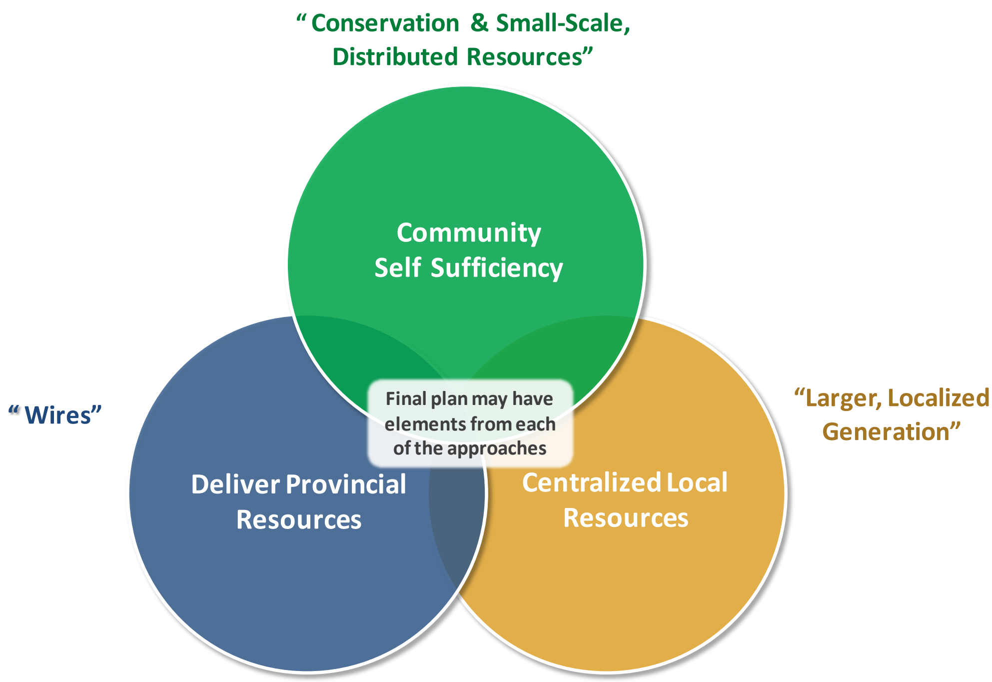
7. Long-Term Plan

No long-term supply capacity needs have been identified for the Ottawa Region at this time. Instead of considering specific needs and planning options, long-term planning activities for the Region will include engaging with First Nations and Métis communities and stakeholders; monitoring demand, conservation and DG trends in the area; coordinating with MEP/CEP activities; and generally laying the foundation for informed planning in the future. One additional consideration for the Region is that with continued load growth, there may be a need for voltage support in the long term. This bulk system issue, which is not part of the regional planning process, requires further detailed study. The IESO is planning to initiate this study in 2015.

In recent years, a number of trends, including technology advances, policy changes supporting DG, greater emphasis on conservation as part of electricity system planning, and increasing community interest and desire for involvement in electricity planning and infrastructure siting, are changing the landscape for Regional electricity planning. Traditional "wires" based approaches to electricity planning may not be the best fit for all communities. New approaches that acknowledge and take advantage of these trends, in addition to more traditional "wires-based", should also be considered.

To facilitate discussions about how a community might plan its future electricity supply, three conceptual approaches for meeting a region's long-term electricity needs provide a useful framework (see Figure 7-1). Based on regional planning experience across the province over the last 10 years, it is clear that different approaches are preferred in different Regions, depending on local electricity needs and opportunities, and the desired level of involvement by the community in planning and developing its electricity infrastructure.

Figure 7-1: Approaches to Meeting Long-Term Needs



The three approaches are as follows:

- **Delivering provincial resources**, or "wires" planning, is the traditional Regional electricity planning approach associated with the development of centralized electric power systems over many decades. This approach involves using transmission and distribution infrastructure to supply a Region's electricity needs, taking power from the provincial electricity system. This model takes advantage of generation that is planned at the provincial level, with generation sources typically located remotely from the Region. In this approach, utilities (transmitters and distributors) play a lead role in development.
- The **Centralized local resources** approach involves developing one or a few large, local generation resources to supply a community. While this approach shares the goal of providing supply locally with the community self-sufficiency approach below, the emphasis is on large central-plant facilities rather than smaller, distributed resources.
- The **Community self-sufficiency** approach entails an emphasis on meeting community needs largely with local, distributed resources, which can include: aggressive conservation beyond provincial targets; DR; DG and storage; smart grid technologies for managing distributed resources; integrated heat/power/process systems; and electric vehicles. While many of these applications are not currently in widespread use, for regions with long-term needs (i.e., 10-20 years in the future) there is an opportunity to

develop and test out these options before commitment of specific projects is required. The success of this approach depends on early action to explore potential and develop options, and on the local community taking a lead role. This could be through a MEP/CEP planning process, or an LDC or other local entity taking initiative to pursue and develop options.

Given that no long-term supply capacity needs have been identified in the Region, it is not necessary to consider the application of these options for Ottawa at this time. These concepts, which are being referenced in other planning regions around the province, are provided as background information for community members and stakeholders who are interested in the long-term considerations for regional electricity supply in Ottawa.

8. Community, Aboriginal 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 communities 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 activities undertaken to date for the Ottawa IRRP and those that will take place to discuss the longer-term needs identified in the plan and obtain input in the development of options.

A phased community engagement approach has been developed for the Ottawa 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 to determine how to improve the regional planning process, and they are now guiding the IRRP outreach with communities and will ensure this dialogue continues and expands as the plan moves forward.

Figure 8-1: Ottawa IRRP Community Engagement Process

Creating Transparency

To start the dialogue on the Ottawa IRRP and build transparency in the planning process, a number of information resources were created for the plan. A dedicated web page was created on the IESO (former OPA) website to provide a map of the regional planning area, information on why the plan was being developed, the TOR for the IRRP and a listing of the organizations involved was posted on the websites of the Working Group members. A dedicated email subscription service was also established for the Ottawa IRRP where communities and stakeholders could subscribe to receive email updates about the IRRP.

Engaging Early and Often

The first step in the engagement of the Ottawa IRRP was providing information to the municipalities and First Nation communities in the planning area. During the meeting held with the municipal planning representatives from the City of Ottawa, discussion included confirmation of the growth projections, discussion of the near- medium- and long-term needs identified in the area, a review of the identified near-term projects including those that have already begun due to timing requirements, and a discussion of the possible approaches to address medium- and long-term needs. The presentation and information was well received and form the foundation for building broader engagement and transparency in the development of the Ottawa IRRP.

Moving forward, engagement will continue on both the IRRP and the related near-term projects. For the projects identified as part of the near-term plan, Hydro Ottawa and Hydro One will undertake engagements on individual projects as needed. Information on these project-level engagements will be provided on the organization's website and will also be listed on the Ottawa IRRP main webpage.

Bringing Communities to the Table

Engagement on the IRRP will continue with a broader community discussion about the medium- and long-term needs identified in the regional plan. This engagement will begin with a webinar hosted by the Working Group to discuss the plan and initiate discussion of possible medium- and long-term options. Presentations on the Ottawa IRRP will also be made to the City of Ottawa Council, First Nation communities and the Métis Nation of Ontario on request.

To further continue the dialogue, a Local Advisory Committee (LAC) will be established in Ottawa as an advisory body to the Ottawa IRRP Working Group. The purpose of the committee is to establish a forum for members to be informed of the regional planning process. Their input and recommendations, information on local priorities, and ideas on the design of community engagement strategies will be considered throughout engagement and planning processes. The LAC meetings will be open to the public and meeting information will be posted on the IESO website. Information on the formation of the Ottawa LAC is available on the Ottawa IRRP main webpage.

Strengthening processes for early and sustained engagement with communities and the public were introduced following an engagement held in 2013 with 1,250 Ontarians on how to enhance regional electricity planning. This feedback resulted in the development of a series of recommendations that were presented to, and subsequently adopted by the Minister of Energy. Further information can be found in the report entitled "Engaging Local Communities in Ontario's Electricity Planning Continuum"[11] available on the IESO website.

Information on outreach activities for the Ottawa IRRP can be found on the IESO website and updates will be sent to all subscribers who have requested updates on the Ottawa IRRP.

[11] http://www.powerauthority.on.ca/stakeholder-engagement/stakeholder-consultation/ontario-Regional-energy-planning-review

9. Conclusion

This report documents an IRRP that has been carried out for the Ottawa Region, a sub-region of the Greater Ottawa planning region. The IRRP identifies electricity needs in the Region over the period from 2014 to 2032, recommends a plan to address the near-term needs that have been identified, and identifies actions to develop alternatives for the medium-term. No long-term needs have been identified in the Region at this time.

Implementation of the near-term plan is already underway, with the LDCs developing CDM plans consistent with the Conservation First Framework, and with infrastructure projects being developed by Hydro One.

To support development of the medium- and long-term plan, a number of actions have been identified to develop alternatives, engage with the community, and monitor growth in the Region. Information gathered as a result of these activities will inform the next regional planning cycle.

The planning process does not end with the publishing of this IRRP. Communities will be engaged in the development of the options for the medium and long term. In addition, the Working Group will continue to meet regularly throughout the implementation of the plan to monitor progress and developments in the area. If the demand forecast changes or conservation achievement is higher than forecast, the plan may be revisited in advance of the OEB-mandated 5-year schedule. This outcome would allow more time to develop alternatives and to take advantage of advances in technology in the next planning cycle.