

Hydro One Networks Inc.

7th Floor, South Tower
483 Bay Street
Toronto, Ontario M5G 2P5
www.HydroOne.com

Tel: (416) 345-5680
Cell: (416) 568-5534
frank.dandrea@HydroOne.com

Frank D'Andrea

Vice President
Regulatory Affairs & Chief Risk Officer



BY COURIER

November 1, 2018

Ms. Kirsten Walli
Board Secretary
Ontario Energy Board
Suite 2700, 2300 Yonge Street
Toronto, ON
M4P 1E4

Dear Ms. Walli,

EB-2011-0043 – 2018 Regional Planning Status Report of Hydro One Networks Inc.

Section 3C.3.3 of the Transmission System Code requires transmitters to submit an annual report to the Ontario Energy Board, on November 1st of each year, that identifies the status of regional planning for all regions.

Please find attached Hydro One Networks Inc.'s 2018 Regional Planning Process Annual Status Report, pursuant to the above noted Code section.

Sincerely,

ORIGINAL SIGNED BY FRANK D'ANDREA

Attach.



Regional Planning Process

Annual Status Report

2018

November 1st, 2018

[This page is intentionally left blank.]

EXECUTIVE SUMMARY

Transmitters are required under Section 3C.3.3 of the Transmission System Code ^[1] (TSC) to submit an annual report to the Ontario Energy Board (OEB or Board) on November 1st of each year which identifies the status of the regional planning for their respective regions. This Report is the fifth Annual Status Report produced by Hydro One Networks Inc. (Hydro One) and provides an update to the accomplishments and progress of regional planning activities between November 2017 and October 2018.

Progress to Date

The first cycle of the regional planning was completed in 2017 as per the process developed by the Planning Process Working Group (PPWG) ^[2]. During the first regional planning cycle, several lessons were learned to undertake improvements to the process, methodology, and discussion with respect to replacement of assets at or near their end of life (EOL) along with justification of documentation with respect to “right sizing” of equipment. In addition, as a Lead Transmitter, Hydro One also sent formal communications to Local Distribution Companies (LDCs) to seek feedback on prioritization and scheduling of regions, as well as suggestions for enhancements for the second cycle of regional planning. These enhancements were incorporated into the process, thereby significantly enhancing the quality of the planning reports. At this time, no significant changes to the prioritization to initiate regional planning are proposed. However, Hydro One is keeping abreast of the needs in the province and prepared to advance any of the regions based on emerging urgent needs in any particular area of the province.

The Regional Infrastructure Planning (RIP) report for the first cycle (February 2017) and the Needs Assessment (NA) report for the second cycle (May 2017) of the regional planning process for the Burlington to Nanticoke Region were the first set of reports to include the enhancements discussed above. Subsequently, these changes were further enhanced and incorporated by Hydro One in the NA reports completed to date for the second regional planning cycle currently underway (these reports cover the following regions: Burlington to Nanticoke, Greater Ottawa, GTA North, Toronto and Windsor-Essex). Hydro One continues to work with LDCs, the IESO and Board Staff to make future enhancements to the regional planning process.

The status of regional planning for each region is summarized in Table 1.

Table 1. Regional Planning Status Summary

Group	Region	Sub-region	1st Cycle (2013-2017)				2nd Cycle (2017→)		
			NA	SA	IRRP	RIP	NA	SA	IRRP
1	Burlington to Nanticoke	Brant	May, 2014	Sep, 2014	Apr, 2015	Feb, 2017	May, 2017	Aug, 2017	
		Bronte			Jun, 2016				
		Greater Hamilton			Not Required				In Progress
		Caledonia-Norfolk			Not Required				
	Greater Ottawa	Ottawa	Jul, 2014	Nov, 2014	Apr, 2015	Dec, 2015	Jun, 2018	Sep, 2018	
		Outer Ottawa			Not Required				In Progress
	GTA East	Pickering-Ajax-Whitby	Aug, 2014	Sep, 2014	Jun, 2016	Jan, 2017	Q3 2019		
		Oshawa-Clarington			Not Required				
	GTA North	York	Jun, 2014	Note1	Apr, 2015	Feb, 2016	Mar, 2018	Aug, 2018	In Progress
		Western			Not Required				
	GTA West	Northwestern	May, 2014	Sep, 2014	Apr, 2015	Jan, 2016	Q1 2019		
		Southern			Not Required				
	Kitchener-Waterloo-Cambridge-Guelph		Note1		Apr, 2015	Dec, 2015	In Progress		
Toronto Area	Central Downtown	Jun, 2014	Note1	Apr, 2015	Jan, 2016	Oct, 2017	Feb, 2018	In Progress	
	Northern			Not Required					
Northwest Ontario	North of Dryden	Note1	Jan, 2015	Jan, 2015	Jun, 2017	Q1 2019			
	Greenstone-Marathon			Jun, 2016					
	Thunder Bay			Dec, 2016					
	West of Thunder Bay			Jul, 2016					
Windsor-Essex		Note1		Apr, 2015	Dec, 2015	Oct, 2017	Mar, 2018	In Progress	
2	East Lake Superior	Hydro One Transmission is not the lead transmitter in this region. Status to be provided by lead transmitter.							
	London Area	Greater London	Apr, 2015	Aug, 2015	Jan, 2017	Aug, 2017	2 nd Cycle expected to commence in 2019		
		Alymer-Tillsonburg			Not Required				
		Strathroy			Not Required				
		Woodstock			Not Required				
		St. Thomas			Not Required				
	Peterborough to Kingston		Feb, 2015	Not Required	Not Required	Jul, 2016			
South Georgian Bay/ Muskoka	Barrie/Innisfil	Mar, 2015	Jun, 2015	Dec, 2015	Aug, 2017				
	Parry Sound/Muskoka			Dec, 2015					
Sudbury/Algoma		Mar, 2015	Not Required	Not Required	Jun, 2016				
3	North of Moosonee	Hydro One Transmission is not the lead transmitter in this region. Status to be provided by lead transmitter.							
	Chatham/Lambton/Sarnia		Jun, 2016	Not Required	Not Required	Aug, 2017	2 nd Cycle expected to commence in 2020 Note: Niagara Region may be initiated as early as Q1 2019		
	Greater Bruce/Huron		May, 2016	Not Required	Not Required	Aug, 2017			
	Niagara		Apr, 2016	Not Required	Not Required	Mar, 2017			
	North/East of Sudbury		Apr, 2016	Not Required	Not Required	Apr, 2017			
	Renfrew		Mar, 2016	Not Required	Not Required	Jul, 2016			
	St. Lawrence		Apr, 2016	Not Required	Not Required	Jul, 2016			

Note 1: The planning activity in the region was already in progress prior to the commencement of the regional planning process; hence the NA/SA was deemed to be already completed by the Working Group.

NA – Needs Assessment; **SA** – Scoping Assessment; **IRRP** – Integrated Regional Resource Plan; **RIP** – Regional Infrastructure Plan

TABLE OF CONTENTS

Executive Summary	2
1. Introduction	5
2. Regional Planning Process Overview	6
2.1 Regional Grouping.....	7
2.2 Conservation & Demand Management and Distributed Generation	9
3. Status of Group 1 Regions	10
3.1 Burlington to Nanticoke	10
3.2 Greater Ottawa	15
3.3 GTA East.....	19
3.4 GTA North.....	20
3.5 GTA West	22
3.6 Kitchener-Waterloo-Cambridge-Guelph (KWCG).....	24
3.7 Toronto Area	24
3.8 Northwest Ontario.....	28
3.9 Windsor-Essex.....	30
4. Status of Group 2 Regions	32
4.1 East Lake Superior	32
4.2 London Area	32
4.3 Peterborough to Kingston.....	34
4.4 South Georgian Bay/Muskoka	34
4.5 Sudbury/Algoma	36
5. Status of Group 3 Regions	36
5.1 Chatham/Lambton/Sarnia	37
5.2 Greater Bruce/Huron	39
5.3 Niagara.....	39
5.4 North/East Sudbury	40
5.5 Renfrew	40
5.6 St. Lawrence.....	40
6. Lessons Learned.....	41
7. LDC Surveys	43
8. Conclusion.....	44
9. References.....	45
Appendix A. Conservation, Distributed Generation, and Other Initiatives.....	46
A.1 Conservation Achievement	46
A.2 Distribution Generation.....	48
A.3 Other Initiatives	54
Appendix B. Planning Status Letters	56

1. INTRODUCTION

The process for electric power system planning in the Province of Ontario underwent a procedural change in 2013. A new regional planning process, which enables transparent, coordinated and cost-effective planning of regional transmission and distribution systems, was mandated by the Ontario Energy Board (OEB or Board) on August 26, 2013 through amendments to both the Transmission System Code^[1] (TSC) and the Distribution System Code^[3] (DSC). This process is outlined in the Planning Process Working Group's (PPWG) Report to the Board, titled "The Process for Regional Infrastructure Planning in Ontario"^[4], revised May 17, 2013.

As per Section 3C.3.3 of the TSC, transmitters are required to submit an annual report to the Board on November 1st of each year, which identifies the status of the regional planning process and its deliverables in their respective regions. This fifth Annual Status Report, produced by Hydro One Networks Inc. (Hydro One), provides an update to the accomplishments and progress status of the regional planning activities from November 2017 to October 2018. It also identifies plans and projects already in execution to address new and previously identified needs.

The Report is structured as follows:

- Section 2 provides an overview of the regional planning process and the grouping of the regions for study purposes.
- Sections 3, 4, and 5 discuss the various regional planning activities and plans or projects completed or being undertaken in each of the Group 1, 2, and 3 regions respectively.
- Section 6 and 7 identify LDC survey results regarding the regional planning process implementation, and lessons learned and improvements made to the regional planning process.
- Section 8 provides a brief summary of the current status of regional planning and its accomplishments over the last year.

2. REGIONAL PLANNING PROCESS OVERVIEW

Bulk System Planning, Regional Planning and Distribution Planning are the three levels of planning for the electricity system in Ontario. Bulk system planning typically looks at issues that impact the system on a provincial level, and require longer lead times and larger investments. Comparatively, planning at the regional and distribution levels look at issues on a more regional or localized level. Typically, the most essential and effective regional planning horizon is the near- to medium-term (1-10 years), whereas long-term (10-20 years) regional planning mostly provides a future outlook with little details about investments because the need and other factors may vary over time. On the other hand, bulk system plans are developed for the long term because of the larger magnitude of the investments.

The regional planning process begins with a Needs Assessment (NA) which is led by the transmitter to determine which of the needs a) can be addressed directly between the customer and Hydro One and b) that require further regional coordination along with general scopes and identifying Local Distribution Companies (LDCs) to be involved in further regional planning activities for the region.

At the end of the NA, a decision is made by the Study Team as to whether further regional coordination is necessary to address some or all of the regional needs. If no further regional coordination is required and needs are local in nature, any necessary investments are to be planned directly by the LDCs (or customers) and the transmitter through a Local Plan (LP). The Region's Study Team recommends a local planning process when needs a) are local in nature b) require limited investments in wires (transmission or distribution) solutions and c) do not require upstream transmission investments.

If coordination at the regional or sub-regional levels is required for identified regional needs, then the Independent Electricity System Operator (IESO) initiates the Scoping Assessment (SA) phase. During this phase, the IESO, in collaboration with the transmitter and impacted LDCs, reviews the information collected as part of the NA phase, along with additional information on potential non-wires or resource (e.g., Conservation and Demand Management (CDM), Distributed Generation (DG), etc.) alternatives in order to make a decision on the most appropriate regional planning approach including LP, Integrated Regional Resource Plan (IRRP) and/or Regional Infrastructure Plan (RIP).

The primary purpose of the IRRP is to identify and assess both resource and wires options at a higher or more macro level, but sufficient to permit a comparison of resource options to address the needs. The LDCs' CDM targets as well as contracted DG plans provided by the Independent Electricity System Operator (IESO) and LDCs are reviewed and considered at each step in the regional planning process.

If and when an IRRP identifies that resource and/or wires options may be most appropriate to meet a need, resource/wires planning can be initiated in parallel with the IRRP or in the RIP phase to

undertake a more detailed assessment, develop specific resource/wires alternatives, and recommend a preferred wires solution.

As a final step of the regional planning process, Hydro One as the lead transmitter undertakes to develop a RIP for the region and publishes a RIP report. The RIP reports include a complete discussion of all plans and infrastructure (wires) investments within each region identified in earlier phases. RIP reports are also referenced as supporting evidence in a cost of service or Leave-to-Construct approval application.

Figure 1 illustrates the various steps of the regional planning process that include NA (also known as Needs Screening), SA (also known as Scoping Process), LP, IRRP, and RIP.

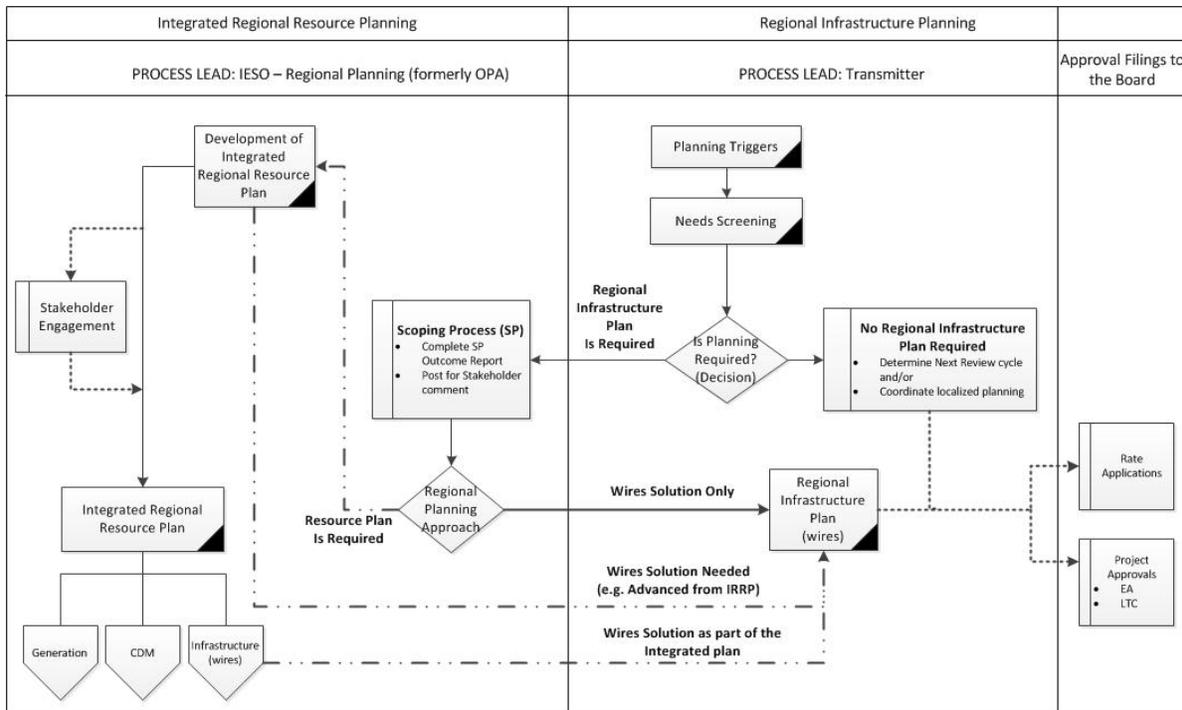


Figure 1. Regional Planning Process Flowchart

2.1 Regional Grouping

In order to manage and prioritize regional planning activities, the province was divided into 21 regions which were then assigned to three groups. Hydro One is the lead transmitter in all regions, except the East Lake Superior and North of Moosonee Regions. For each regional planning activity at the regional or sub-regional level, a Study Team is established for each region with representatives from the IESO, Hydro One, and respective LDCs of the area. During the regional planning process, the Study Team may further divide a region into two or more sub-regions based on electrical characteristics, contiguity and the need for efficient and effective assessment.

Regions were prioritized into three groups based on the urgency and anticipated near-term and mid-term needs in each region or where regional planning activities were already underway prior to the TSC and DSC amendments. For regions where regional planning activity was already in progress, Needs Assessment and/or SA phases were deemed to be complete and no reports were developed. The Working Group (PPWG) determined that these regions were already in the SA or IRRP phase of the process.

The planning regions are listed in Table 2 and shown pictorially in Figure 2.

Table 2. Regional Grouping

Group 1	Group 2	Group 3
Burlington to Nanticoke	East Lake Superior	Chatham/Lambton/Sarnia
Greater Ottawa	London Area	Greater Bruce/Huron
GTA East	Peterborough to Kingston	Niagara
GTA North	South Georgian Bay/Muskoka	North of Moosonee
GTA West	Sudbury/Algoma	North/East of Sudbury
KWCG		Renfrew
Toronto		St. Lawrence
Northwest Ontario		
Windsor-Essex		

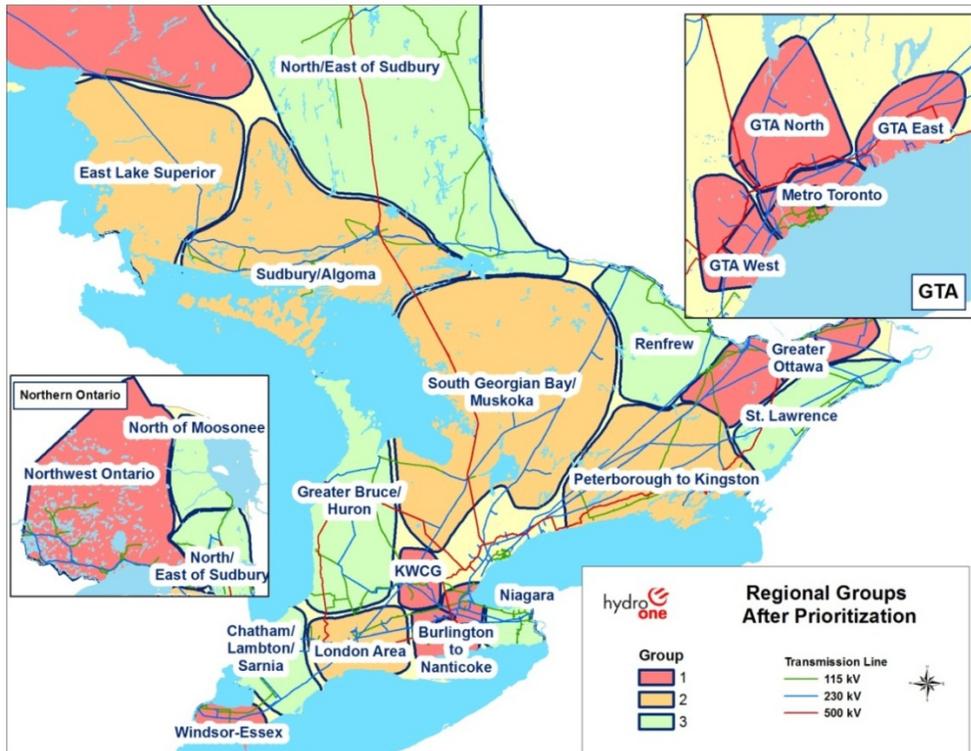


Figure 2. Regional Planning Regions

2.2 Conservation & Demand Management (CDM) and Distributed Generation (DG)

CDM is taken into account at each step of the regional planning process. It is based on requirements of individual LDCs to comply with conservation targets that are to be achieved through the provision of CDM programs to each customer segment in their service territories ^[5]. The CDM information is provided by the IESO and prepared jointly by the LDC and the IESO for regional planning assessments.

Consistent with Section 21.2.2 (g) of the IESO License and Section 3C.3 of the TSC, the IESO provides peak demand offsets resulting from LDC's CDM programs and total installed and effective capacity of the IESO contracted DG projects which are either in service or are under development for regions or sub-regions for which an IRRP is completed. The CDM and DG summary provided by the IESO is attached in Appendix A.

It is worth noting that peak demand offsets resulting from LDC CDM programs are the total offsets to be achieved by the LDC within its service territory and hence may not be limited to or reflective of offsets within the specific region. In addition, contracted DG plans have also been taken into account during the planning assessment. Both, CDM and DG information is used to develop a net forecast from the gross load forecast provided by the LDCs.

3. STATUS OF GROUP 1 REGIONS

Regional Infrastructure Plans (RIPs) have been completed for all Group 1 regions for the first cycle of the Regional Planning Process. During the first regional planning cycle, several lessons were learned to undertake improvements to the process, methodology, discussion with respect to replacement of assets at or near EOL along with justification for “right sizing” of equipment. In addition, as a Lead Transmitter, Hydro One also sent formal communication to the LDCs to seek feedbacks on prioritization of regions, scheduling, and suggestions for enhancements in the second cycle. These enhancements were later incorporated in the process and planning reports were significantly enhanced. At this time, no significant changes to the prioritization to initiate regional planning are proposed. However, Hydro One is prepared to advance planning in any of the regions based on emerging needs in various parts of the province.

Needs Assessment (second cycle – May 2017) and RIP (first cycle – Feb 2017) for the Burlington to Nanticoke region were the first reports to include these enhancements, which were duly incorporated in the second cycle of regional planning process. Each subsequent regional reports (Needs Assessment reports for Burlington to Nanticoke, Greater Ottawa, GTA North, Toronto and Windsor-Essex) developed by Hydro One on behalf of the Study Team have incorporated these changes, and these reports are available on the Hydro One’s Regional Planning website. The second cycle of regional planning is currently underway, with Needs Assessments for five (5) Group 1 regions completed to date.

3.1 Burlington to Nanticoke

Burlington to Nanticoke Region comprises the municipalities of Burlington, Hamilton, Oakville, Brantford, and the Counties of Brant, Haldimand, and Norfolk. Within the context of regional planning, the region is divided into four sub-regions: Brant, Bronte, Greater Hamilton, and Caledonia-Norfolk sub-regions.

The first cycle RIP and the Needs Assessment led by Hydro One for the second cycle have been completed. The Hamilton Sub-region IRRP is currently in progress with an anticipated completion date of Q4 2018. Updates to the regional plans for each sub-region are discussed below.

3.1.1 Brant Sub-region

Brant sub-region encompasses the County of Brant, City of Brantford and surrounding areas. The electricity supply to this area is provided by Brant TS, Powerline MTS, and Brantford TS. Updates to previously identified needs are as follows:

- **115 kV B12/B13 – Transmission Line Capacity**

Brant IRRP and the RIP for the region identified an immediate need for additional transmission supply capacity in the Brant-Powerline 115 kV subsystem. The 2017 SA recommended to be addressed directly between Hydro One and the local LDC, as non-wires options were not feasible. The preferred option involves construction of a new switching facility that consists of three (3) new 115 kV breakers and associated disconnect switches. This will provide approximately 61 MW of additional supply capacity by providing a third 115 kV supply circuit (B8W) from Karn TS. The project is currently underway and it is planned for completion by Q3 2019.

3.1.2 Bronte Sub-region

Bronte sub-region includes the area served by Bronte TS in Oakville, supplied by 115 kV circuits B7/B8 connecting to Burlington TS and Cumberland TS. In addition, the study area extends to include the adjacent transformer stations, namely Palermo TS, Tremaine TS, Glenorchy MTS, and Oakville TS #2.

No additional needs were identified in the sub-region during the RIP and the second cycle Needs Assessment. However, updates to previously identified needs are as follows:

- **115 kV Circuit B7/B8 End of Life Section (Burlington TS x Nelson JCT)**

The 115kV double circuit line B7/B8 supplies around 130 MW to Burlington and Oakville area loads through Bronte TS. Line section from Burlington TS to Nelson junction (approximately 2.3 km) was built in 1920's and was assessed that the conductor on this line section from Burlington TS to Nelson junction has reached end of useful life. This project is expected to be finalized and to be in-service by Q4 2020.

3.1.3 Greater Hamilton Sub-region

The Greater Hamilton Sub-region encompasses the City of Hamilton and surrounding areas. Several local needs were identified in this sub-region and were addressed directly by Hydro One and affected LDCs through a LP completed in October 2015. Following is an update to previously identified needs to be addressed through local planning:

- **Mohawk TS Station Capacity and End-of-Life (EOL) T1/T2 Transformers**

The sustainment plan to replace the existing non-standard supply transformers at Mohawk TS with standard 75 MVA units will address the issue of aging infrastructure and provide sufficient station supply capacity. The expected in-service date for the replacement work is Q2 2019.

- **Power Factor at Cumberland TS**

The power factor at Cumberland TS under peak load conditions is lagging slightly below the requirement of 0.9. The LDC is addressing this need as part of their distribution system planning and the assessment is in progress.

- **Power Factor at Kenilworth TS**

The power factor at Kenilworth TS is lagging below the requirement of 0.9. The LDC is addressing this need as part of their distribution system planning and it will be addressed by installing a capacitor bank at Kenilworth TS.

In the first cycle of regional planning RIP, and the second cycle Needs Assessment report, following station equipment have been identified for replacement in the Greater Hamilton sub-region. These needs are being further discussed and assessed by the Study Team as part of the IRRP:

- **Newton TS Transformers and Switchgear**

The preliminary plan is to refurbish Newton TS with new equipment built to current standards including two 75 MVA transformer units replacing the EOL 67 MVA transformers and LV switchgear. This will address the needs at Newton TS by maintaining the station's operability and reliability of supply. This project is currently planned to be in service in 2024.

- **Beach TS T7/T8 Autotransformers and T5/T6 LV Switchgear**

Beach TS is a major switching and transformer station in East Hamilton. Station facilities include a 230 kV switchyard, three 230/115 kV autotransformers (T1/T7/T8), a 115 kV switchyard, a 230/13.8 kV DESN T5/T6 and a 115/13.8 kV DESN T3/T4. Hydro One has identified that the autotransformers T7, T8 and the T5/T6 DESN LV Metal-clad switchgear are approaching their EOL and the project is currently planned in 2026-2028.

- **End of Life Cables in Hamilton Area: HL3/HL4, K1G/K2G, H5K/H6K**

Underground cables in Hamilton area (listed below) are expected to be approaching their EOL over the next 10 years.

- **115 kV H5K/H6K Cable (Beach TS to Kenilworth TS)**
- **115 kV K1G/K2G Cable (Kenilworth TS to Gage TS)**
- **115 kV HL3/HL4 Cable (Newton TS x Elgin TS x Stirton TS)**
Anticipated replacement timeframe: 2025

Given that the replacement of high voltage underground cables will be very challenging and costly, it is required that alternatives be developed and assessed ahead of time. Options are being reviewed by the Study Team in the IRRP phase.

The Needs Assessment Study Team concluded that following EOL needs from the Needs Assessment report will be addressed directly by Hydro One and/or LDCs, and no further regional co-ordinations are required.

- **Kenilworth TS Station Reconfiguration**

The recommended plan is for Hydro One to proceed with the reconfiguration of the station and reduce it to two transformers and two switchgears only. The recently replaced EOL transformer and one of the existing metal-clad switchgear will be utilized while the other EOL transformer and switchgear will be replaced. The new transformer will be a standard unit similar to T2 that was replaced in 2014. The current in-service date for the replacement work is Q4 2021.

- **Beach TS T3/T4 Transformers**

The recommended plan is for Hydro One to proceed with reconfiguring the 115 kV T3/T4 DESN to a 230 kV configuration by replacing the existing EOL non-standard transformers with standard 100 MVA 230/13.8 kV units. The project is currently in execution and is planned to be in service in Q4 2019.

- **Gage TS T3/T4/T5/T6 Transformers and LV Switchgear**

The recommended plan is to reconfigure the station and reduce it from 3 DESNs to 2 DESNs. Under this plan, the EOL T3/T4 and T5/T6 DESNs will be replaced by a single T10/T11 DESN with two 100 MVA standard units, and switchgear currently supplied by T5/T6 transformers will also be replaced. The project is currently planned to be in service by Q4 2020.

- **Horning TS DESN Transformers**

The recommended plan is to replace EOL T1/T2 transformers with similar 100 MVA units and refurbishing EOL low voltage metalclad switchgears. The newly replaced transformers and refurbished switchgear will provide sufficient capacity to serve the forecasted load over the next 10 years. The project is currently in execution and is planned to be in service by December 2018.

- **Bronte TS T5/T6 Transformers**

The recommended plan is to replace the EOL T5/T6 83 MVA transformers with similar units and refurbish the associated switchgear. This project is currently expected to be in-service by Q3 2019.

- **Elgin TS T1/T2 and T3/T4 Transformers and LV Switchgear**

The recommended plan is to reconfigure the station and reduce it to two transformers and two switchgears only. Under this plan, the EOL T1/T2 and T3/T4 DESNs will be replaced by a single T5/T6 DESN with two 100 MVA standard units and four new switchgears. This will maintain adequate supply capacity for the forecasted load. The project is currently planned to be in service by Q4 2019.

- **Birmingham TS LV Switchgear**

The recommended plan is to replace the two EOL 13.8 kV LV metal-clad switchgears at Birmingham TS to meet the unique connection needs of the customer at this station. This project is currently planned to be in-service by Q4 2023.

- **Dundas TS LV Switchgear**

The recommended plan is to refurbish the Dundas TS T1/T2 27.6 kV Medium Voltage (MV) switchgear which is at its EOL. This project is currently expected to be in service in 2025.

3.1.4 Caledonia-Norfolk Sub-region

This sub-region includes the Haldimand and Norfolk Counties, and covers the southern part of Burlington to Nanticoke Region.

Several new needs were identified in this sub-region. Needs Assessment Study Team recommended that the following needs do not require regional coordination and will be directly addressed between Hydro One and the local LDC as there were no economical non-wires options available.

- **Norfolk TS LV Switchgear EOL**

The recommended plan is to refurbish the Norfolk TS LV switchgear which is at its EOL. This project is currently expected to be in service in Q4 2024.

- **Caledonia TS T1/T2 Transformers EOL**

The Caledonia TS T1/T2 transformers are of 1972 built and the switchgear is of the same vintage. The condition assessment has identified that both T1/T2 transformers are at their EOL and requiring refurbishment. The Study Team recommends replacement of existing 83 MVA EOL 230/ 27.6 kV T1/T2 DESN transformers with similar units. The project is tentatively planned to be undertaken between 2022 and 2025.

- **Jarvis TS T3/T4 Transformers EOL**

The T3/T4 transformers are of 1972 built and the switchgear is of almost the same vintage. The condition assessment has identified that both T3/T4 transformers are at their EOL and requiring refurbishment. The Study Team recommends replacement of existing 83 MVA EOL 230/ 27.6 kV T3/T4 DESN transformers with similar units. The project is tentatively planned to be undertaken between 2022 and 2025.

3.2 Greater Ottawa

Greater Ottawa Region covers the municipalities bordering the Ottawa River from Stewartville in the West to Hawkesbury in the East and North of Highway 43. For the purpose of regional planning, the region is divided into two sub-regions: Ottawa Area and Outer Ottawa.

Following the completion of the RIP for the Greater Ottawa Region in December 2015, the second cycle Needs Assessment led by Hydro One was initiated in February 2018. The Needs Assessment report was completed and published in June 2018. The IRRP phase for this region is currently underway with an anticipated completion date of Q2 2019, and it will be followed with RIP. Updates for each sub-region are discussed below:

3.2.1 Ottawa Area Sub-region

The Ottawa Area sub-region covers the central part of the Greater Ottawa Region and includes the City of Ottawa and the surrounding municipalities. Updates to previously identified needs from the first cycle RIP are as follows:

- **Merivale TS T22 – LTR Exceeded**
The need for additional 230/115kV auto-transformation capacity at Merivale TS is being assessed by Study Team as part of the broader South West Area’s need for capacity (described below) in the IRRP phase.
- **South West Area – Capacity**
The new 230kV connection line and station project (“South Nepean”) to provide capacity in this area is undergoing an environmental assessment with target in-service is by year 2022.
- **S7M Circuit – Supply Capacity**
Line rating for the circuit was increased and will be adequate to meet load forecasted up to year 2026. Capacity beyond 2026 will be assessed by the Study Team as part of the South Nepean project in the IRRP and addressed in RIP.
- **Hawthorne TS T5 and T6 – LTR exceeded**
The project is currently under execution with the recent completion of transformer T6 replacement. Protection upgrades and T5 replacement is expected to be completed by 2021 in order to accommodate the earlier replacements of end-of-life Hawthorne T7 and T8 transformers in 2019.
- **Russell TS and Riverdale TS (Part of Ottawa Center 115kV Area – Station Capacity)**
The loading on these stations will be kept within equipment limits through the construction of feeder ties by Hydro Ottawa to transfer excess loads to other area stations. Feeder ties are expected to be completed by 2020.

- **Overbrook TS (Part of Ottawa Center 115kV Area – Station Capacity)**

Step-down transformers at Overbrook TS were identified to be approaching EOL. To address the EOL and additional future capacity needs in the region, the station transformers have been replaced with standard sized units that resulted in an increase in the station capacity from 72MW to 130MW. The replacement work is now complete.

- **Hawthorne TS – T7 and T8 LTR exceeded**

To address the EOL need of T7 and T8 transformers, Hydro One is installing larger, 75/100/125 MVA transformers with an LTR of 153MW. The replacement work is currently under execution. The expected in-service date is Q4 2019.

- **Bilberry Creek TS – Refurbishment & Orleans TS – Reliability**

Bilberry Creek TS consists of a 115/27.6 kV step-down transformer in East Ottawa, supplying up to 85 MW of load customers to both Hydro Ottawa and Hydro One Distribution. The station was built in 1964 and a number of its key components have been identified for replacement by Hydro One. A decision will be required by 2020 on whether to refurbish the station and keep the load on the 115 kV systems or to retire the station and move the load over to the 230 kV systems by supplying it from the newly built Orleans TS.

Supply configuration at Orleans TS will also be impacted by the Bilberry Creek TS refurbishment options. These options are being further reviewed and assessed by Study Team during the IRRP and addressed in the RIP.

- **Ottawa Center 115kV Area – Station Capacity**

Ottawa downtown station (including Russell TS, Riverdale TS, and Overbrook TS) capacity needs are being currently reassessed within the context of updated forecasts, EOL stations upgrades and feeder ties by Study Team during the IRRP phase and will be addressed in the RIP.

- **King Edward TS – Station Capacity**

The capacity at King Edward TS is limited to 71MW. Station assessment identified station equipment that is at end of life and requires replacement, including the replacement of the T3 power transformer, protection, control and telecom (PCT) equipment along with disconnect switches. The T3 power transformer is being replaced with a larger sized unit rated 115-14.2-14.2kV, 60/80/100MVA that is similar with the companion T4 unit ratings. The project is currently under execution, and the expected in-service date is Q4 2019.

- **Almonte TS/Terry Fox MTS – Voltage Regulation**

Circuit E34M/T33E is a 290 km line between Clarington TS in Oshawa, and Merivale TS in Ottawa. If the circuit E34M is open at the Merivale TS end, Terry Fox MTS and Almonte TS will need to be supplied radially by Clarington TS. However, studies have shown that Clarington TS will not be able to provide adequate support for Almonte TS and Terry Fox MTS during peak loading period, which would in turn result in voltages below the minimum

allowable levels. This is currently being assessed during the IRRP with the consideration of the upcoming South Nepean project. Based on the findings it will be further addressed in RIP phase.

- **A4K Supply Capacity**

This need is to be addressed by providing an additional supply to Overbrook TS from a tap to circuit A6R. **Riverdale JCT x Overbrook TS: Build New A6R Tap** project is currently under execution, and expected in-service is 2019.

- **Load Loss for S7M Contingency**

Load forecast for Bridlewood MTS, Fallowfield MTS, Manotick MTS, and Richmond DS is being reviewed as part of the IRRP phase, with further assessment to follow.

The second cycle Needs Assessment report has also identified new needs in the Ottawa Area Sub-region that require further regional co-ordination. The following needs are being currently assessed in the IRRP phase:

- **S7M 115kV Line Refurbishment**

The 115 kV conductors, spread across multiple S7M line sections totaling 13.9 km, have been identified at or near their end of service life. As suggested by Hydro One, refurbishment of these line sections is recommended by the Study Team, to replace conductors, wood poles, insulators, and other components. The refurbishment is expected to be completed between 2021 and 2022.

- **Albion TS – EOL T1/T2, switchgears, breakers**

Albion TS is a 230/13.8/13.8kV station connected to 230kV M30A and M31A circuits, supplying Hydro Ottawa. The transformers T1 and T2 rated at 45MVA each, were built in the 1970s, and have been identified to be approaching end of their service lives. As per the recommendation from Needs Assessment, it is being currently assessed by the study team as part of the IRRP. Albion T1 and T2, along with associated metal-clad switchgears and breakers are currently scheduled for replacement in 2028, but the timeline is subject to change depending on the outcome of the IRRP and RIP assessments.

The Needs Assessment identified that the following new EOL needs in the Ottawa Area Sub-region do not require further regional co-ordination:

- **Slater TS – EOL Transformers T1/T2/T3**

Slater TS is a 115/13.8/13.8kV station connected to 115kV A3RM, M4G, and A5RK circuits, supplying Hydro Ottawa. Transformers T1, T2, and T3, rated at approximately 65MVA each, built in the 1960s, and have been identified to be at the end of their service life. The study team recommended that this need be addressed by Hydro One and Hydro Ottawa to coordinate the replacement plan. The replacement of the EOL equipment is expected to be completed by 2022-2023.

- **Merivale MTS Rebuild**

Merivale MTS is a 115/8.3kV station connected to 115kV circuits A3RM and A8M. Transformers T1 and T2, both rated at 10MVA, built in the 1960s, and have been identified approaching their end of service life. The study team recommended that Hydro Ottawa continues with refurbishing Merivale MTS. The work is expected to be completed between 2018 and 2020.

- **Riverdale TS 13.8kV Switchgear Replacement**

Riverdale TS is a 115/13.8kV station connected to 115kV circuits A3RM, A5RK, and A6R. Switchgears on Riverdale TS 13.8kV side have been identified approaching their end of service life. The study team recommended that Hydro Ottawa continues with the 13.8kV switchgear replacement plan. The work is expected to be completed between 2021 and 2023.

3.2.2 Outer Ottawa Sub-region

The Outer Ottawa sub-region includes the eastern and western parts of the Greater Ottawa Region. The eastern part extends from the city of Clarence-Rockland, municipality of Casselman and eastward to Champlain Township. Along the Ottawa River there are several LDC-owned distribution stations supplied by the 115 kV circuit 79M1. The western part covers the area west of Kanata.

Previously identified needs during the RIP phase are re-affirmed in the second cycle Needs Assessment, and updates are as follows:

- **Voltage Regulation at Stewartville TS**

The load on the Stewartville TS was previously expected to increase significantly as a result of the connection of a large utility load forecasted for 2018. However, the most recent Outer Ottawa Sub-region forecast revealed that loading on Stewart TS is expected to remain at around 25MW over the next 10 years. No further actions are required at this time.

- **79M1 Circuit – Voltage Regulation**

There is low voltage observed on this circuit and the voltage regulation is dependent on the amount of load being supplied by the circuit. In addition, it is impacted by load supplied by 115kV circuit H9A within the Ottawa Area sub-region. This voltage regulation need is being reviewed during the IRRP phase along with load forecast for stations supplied by 79M1 and planned to be addressed in the RIP.

The following newly emerged EOL needs identified in the second cycle Needs Assessment for the Outer Ottawa Sub-region do not require further regional co-ordination:

- **Arnprior TS – EOL Transformers T1/T2**

Arnprior TS is a 115/44 kV DESN connected to W6CS and C7BM 115 kV circuits, supplying Hydro One Distribution. Transformers T1 and T2, built in 1960 and 1957, respectively, rated at 42MVA each, have been identified to be at the end of their service life. The study team recommended that this need be addressed by Hydro One Transmission and Distribution to co-ordinate the replacement plan. The replacement of the EOL equipment is expected to be completed by 2023-2024.

- **Longueuil TS – EOL Transformers T3/T4**

Longueuil TS is a 230/44kV DESN connected to 230kV B5D and D5A circuits, supplying Hydro One Distribution. Transformers T3 and T4, built in 1965 and 1964, respectively, are rated 93MVA each, and they have been identified to be at EOL. Considering the relatively flat load growth rate at the station, replacing the EOL transformers with similarly size units is recommended in the Needs Assessment. The Study Team recommended that this need be addressed by Hydro One and Hydro One Distribution to coordinate the replacement plan. The replacement of the EOL equipment is expected to be completed by 2024-2025.

3.3 GTA East

GTA East Region comprises the municipalities of Pickering, Ajax, Whitby, Oshawa and parts of Clarington and other parts of Durham Region. The region is divided into two sub-regions for the purpose of regional planning: Pickering-Ajax-Whitby and Oshawa-Clarington sub-regions.

The RIP for GTA East Region was completed in January 2017 and recommended regional plans are being monitored by Hydro One for timely completion. An update is provided below. The second cycle of Regional Planning for the GTA East Region is currently anticipated to begin in Q3 2019.

3.3.1 Pickering-Ajax-Whitby Sub-region

This sub-region includes the area served by Cherrywood TS, Whitby TS, and the 230kV transmission system covering most of the City of Pickering, Town of Ajax, part of the Town of Whitby, and part of the Townships of Uxbridge and Scugog. With the development of the new residential and mixed use commercial area in the sub-region, called Seaton; it is expected to significantly increase in load demand, resulting in a shortage of 27.6kV transformation capacity by 2019. Therefore Study Team recommended proceeding with Seaton MTS: a new 230/27.6/27.6kV station being built by Veridian. This station will be supplied by two parallel 230 kV circuits – C10A and C28C, emanating from Cherrywood TS. The anticipated in-service date is Q3 2019.

3.3.2 Oshawa-Clarington Sub-region

This sub-region includes the area served by Thornton TS, Wilson TS, and the 230kV transmission system encompassing the City of Oshawa, part of the Municipality of Clarington and part of the Township of Scugog.

Previously, to address the station capacity need of Hydro One Distribution and Oshawa Power and Utilities Corporation's (OPUCN) at Wilson TS and Thornton TS, the Study Team recommended building a new transformer station, Enfield TS, at the Clarington TS site. The project is currently expected to be in-service in 2019.

3.4 GTA North

The GTA North Region is approximately bounded by the Regional Municipality of York, and also includes parts of the Cities of Toronto, Brampton, and Mississauga. For the purpose of regional planning, the region was divided into two sub-regions: York and Western sub-regions.

The first cycle RIP for this region was completed in February 2016. The Needs Assessment led by Hydro One for the second cycle was completed and the report was published in March 2018. The IRRP phase is currently underway, and it is anticipated for completion in Q4 2019. RIP will be initiated after the completion of IRRP to develop wires plans.

3.4.1 York Sub-region

This sub-region is further classified into Southern York and Northern York areas to reflect the layout of the electricity infrastructure. Southern York area includes the municipalities of Vaughan, Markham, and Richmond Hill; while the Northern York area encompasses the municipalities of Aurora, Newmarket, King, East Gwillimbury, Whitchurch-Stouffville and Georgina, as well as some load in Simcoe County that is supplied from the same electricity infrastructure.

Below are updates to the York Sub-region needs identified during the first cycle of RIP:

- **Load Security on V71P/V75P – Parkway to Claireville**
In the first planning cycle, the Study Team recommended the installation of in-line switches at the Vaughan MTS #1 junction in order to improve the capability of the system to restore load in the event that both 230 kV circuits V71P/V75P are lost. This need requires regional coordination and is being currently being assessed in the IRRP. It will be followed with RIP phase in order to review options and to develop a preferred plan.
- **Vaughan MTS Transformation Capacity**
Based on the current extreme summer weather non-coincident peak net load forecast, the need for additional transformation capacity is identified beyond 2027. This need is being currently assessed in the IRRP phase and will be further addressed in the RIP to develop a preferred plan.
- **Markham MTS Transformation Capacity**

In the first cycle RIP, the study team recommended to continue the assessment of wires and non-wires options to address the need for additional transformation capacity in the Markham-Richmond Hill area and to refine the need timing. Based on the latest extreme summer weather non-coincident peak net load forecast, the need for additional transformation capacity is projected to be in the 2025-2026 timeframe. This need is currently being assessed in the IRRP and it will be followed with the RIP phase to review wires options in order to develop a preferred plan.

- **Station Service Supply to York Energy Centre**

In the previous RIP, a need for addressing station service supply to York Energy Centre (currently supplied from Holland TS) in the event of a (i) low-voltage breaker failure at Holland TS or (ii) double circuit 230 kV contingency was identified. These events can result in an interruption to the station service supply to York Energy Centre and therefore the loss of all generation output until the station service can be restored from the alternate source. This need is currently being assessed in the IRRP and will be followed with RIP phase to review wires options in order to develop a preferred plan.

- **Northern York Area Transformation Capacity**

In the previous RIP, the study team recommended that the need for additional transformation capacity in the Northern York Area, along with associated transmission capacity, be further assessed in the current regional planning cycle. The latest electricity demand growth forecast shows that the transformer stations capability (Holland TS/Armitage TS) to be exceeded post 2027. This need is being currently assessed in the IRRP and will be followed with RIP phase to review wires options in order to develop a preferred plan.

To provide additional transformation supply capability and meet near-term demand growth in Vaughan, a new transformer station as discussed in the previous report, Vaughan MTS #4 is under development by Alectra Utilities. The station will connect to the 230 kV transmission lines B82V/B83V. The project is now complete and the station went into service in Q4 2017.

The second cycle of Needs Assessment has identified following new needs in the York Sub-region:

- **Woodbridge TS: T5 Transformer End-Of-Life**

Woodbridge TS supplies both Alectra and THESL. Woodbridge TS comprises one DESN unit, T3/T5 (75/125 MVA), with two secondary winding voltages at 44 kV and 28 kV. T5 is currently about 45 years old and has been identified to be refurbished or replaced. The study team recommended that there is limited opportunity to reconfigure and resize the facility. Replacement should be undertaken by Hydro One and impacted LDCs with no further regional co-ordination required. The current timing of replacement for Transformer T5 is 2022-2023.

- **Load Restoration – P45+P46**

Based on the latest extreme summer weather coincident peak net load forecast and following the simultaneous loss of two 230kV circuits P45 and P46, load supplied by the Parkway to Buttonville circuits is at risk of not meeting the 30 minute restoration guidelines under 2021 peak load conditions as established by Ontario Resource and Transmission Criteria (ORTAC)^[6]. This need is being currently assessed in the IRRP and will be followed with RIP phase to review wires options and to develop a preferred plan.

3.4.2 Western Sub-region

This sub-region comprises the Western portion of the City of Vaughan, roughly bordered geographically by Highway 407 on the south, King-Vaughan Road on the north, Highway 50 on the west, and Islington Avenue on the east.

Below is an update on Western Sub-region needs identified during the first cycle RIP:

- **Load restoration for 230 kV circuit V43 and V44**

V43 and V44 circuits supply Woodbridge TS, Vaughan #3 MTS, and Kleinburg TS. The need was identified in 2016 during the first cycle Needs Assessment for the GTA North – Western Sub-Region because the load restoration timelines as per the ORTAC ^[6] may not be met. At that time, the study team recommended that this need should be addressed as part of IESO's GTA West bulk system planning initiative. However, the restoration need was not addressed in the subsequent GTA West bulk system study. As a result, this need is being currently assessed in the IRRP and will be followed with RIP phase to review options in order to develop a preferred plan.

3.5 GTA West

The GTA West Region covers the Regional Municipalities of Halton and Peel, and comprises parts of the municipalities of Brampton, South Caledon, Halton Hills, Mississauga, Milton, and Oakville. For the purpose of Regional Planning, the region was divided into two sub-regions: Northwestern and Southern sub-regions.

The RIP for this region was completed in January 2016. The next cycle of Regional Planning for the GTA West Region is currently anticipated to commence in Q1 2019. A brief update is provided below:

3.5.1 Northwestern Sub-region

This sub-region includes the municipalities of Milton, Halton Hills, and Southern Caledon and parts of the City of Brampton.

The GTA West RIP identified the following:

- **Additional Station Capacity need at Halton TS**

Halton TS supplies Halton Hills Hydro and Milton Hydro. The recommendations were to build two new step-down stations as follows: Halton Hills Hydro to construct, own and operate a new step-down station at the Halton Hills Gas Generation facility with an anticipated in-service year of 2020. In parallel, Hydro One is to initiate the development of Halton TS #2, at the site of the existing Halton TS. Engineering work for Halton TS #2 project is expected to begin in Q2 2019, with an anticipated in-service date of Q2 2021.

- **T38B/T39B – Thermal Capacity Limitations**

The thermal capacity limitations in the medium-term of circuits T38B/T39B under a single-circuit contingency with Halton Hills GS out of service is part of the IESO-led Bulk System Planning study. IESO's Bulk System Planning has not yet taken place and, the regional planning Study Team will be provided an update by the IESO on the outcome of the assessment.

- **Northwest Greater Toronto Area (NWGTA) Electricity Corridor Need**

In February 2018, the IESO and the Ministry of Transportation have announced a joint corridor identification study on a proposed land corridor in the Northwest Greater Toronto Area (NW GTA). The purpose of this study was to identify land to be protected for future multi-purpose linear infrastructure (such as transmission lines and transportation infrastructure) to ensure it can be accommodated if and when the need arises. This project has been deferred and put on hold.

3.5.2 Southern Sub-region

This sub-region comprises parts of the municipalities of Mississauga and Oakville. Updates to the previously identified needs are as follows:

- To address the supply capacity issue at Erindale TS T1/T2 (230/27.6kV), the RIP report recommended that Alectra Utilities Inc. build a new 44/27.6kV distribution station to utilize extra capacity on the 44kV system. This project has been deferred from 2019 to 2022.
- Loading limitations on 230 kV circuits between Richview TS and Trafalgar TS is being further assessed as part of the IESO-led Bulk System Planning study. IESO's Bulk system planning is not yet taken place and the regional planning Study Team will be provided an update by the IESO on the outcome of the assessment.

3.6 Kitchener-Waterloo-Cambridge-Guelph (KWCG)

The KWCG region includes the municipalities of Kitchener, Waterloo, Cambridge and Guelph, as well as portions of Perth and Wellington Counties and the Townships of Wellesley, Woolwich, Wilmot and North Dumfries.

The first RIP was completed in December 2015 and recommended regional plans are being monitored by Hydro One for timely completion. The second cycle of Regional Planning for the KWCG region is currently underway with the completion of the Needs Assessment phase expected to be completed in Q4 2018. The following transmission projects were developed by Hydro One to address near-term supply needs:

- The Guelph Area Transmission Refurbishment Project (GATR) has been placed into service since Q4 2016.
- The switching facilities work at Galt Junction to improve supply reliability for the Cambridge-Kitchener 230 kV Sub-system is now complete. This project was in-serviced in Oct 2017.

The following need from the first cycle of Regional Planning will be revisited during the second cycle:

- **Waterloo North Hydro – Step-down Transformation Capacity**
The first cycle RIP identified additional transformation capacity by 2018, specifically at Waterloo North Hydro's MTS #4. This need is managed by Waterloo North Hydro by maximizing the utilization of existing stations and distribution load transfer capability along with CDM and DG. Accordingly, transformation capacity is not anticipated prior to 2024 and it will be reviewed in the second cycle of regional planning.

3.7 Toronto Area

The Toronto Area (formerly referred to as Metro Toronto) Region comprises the municipality of Toronto and it includes the area roughly bordered geographically by Lake Ontario to the south, Steeles Avenue to the north, Highway 427 to the west and Regional Road 30 to the east. For the purpose of regional planning, the region was divided into two sub-regions: Central Toronto Area and Northern sub-regions.

The second cycle Needs Assessment report for this region was completed and published by Hydro One in October 2017 and the IRRP is currently underway. Recommended regional plans are being monitored by Hydro One for timely completion. Updates are provided below.

3.7.1 Central Toronto Area Sub-region

The Central Downtown sub-region includes the core of the city, and is made up mainly of commercial towers, multi-unit residential and condominium towers, and mixed residential and commercial land uses. Electricity to this area is mainly supplied by the 115kV Hydro One transmission system. It includes the area extending northward from Lake Ontario to Highway 401, westward to the Humber River, and eastward to Victoria Park Avenue.

Following transmission projects were developed to address near- and medium-term needs identified in the RIP:

- **West Toronto Area Station and Line Capacity**

This project includes adding a new 115/27.6kV DESN at the Runnymede TS site and upgrading the respective 115kV circuits, K1W/K3W/K11W/K12W. This project is close to completion and is expected to be in service by end of 2018.

- **Southwest Toronto Station Capacity**

This project includes adding a new 230/27.6kV DESN at the Horner TS site. New distribution feeder ties are also required to be built between Manby TS and Horner TS by THESL to accommodate load transfer out of Manby TS to Horner TS as the loading at Manby TS exceeds its capacity. Hydro One is continuing the development and estimate work for this project. The planned in-service date is currently scheduled for Q4 2020.

- **Downtown District Station Capacity**

Phase 1 is expected to be in service in Q4 2018. Phase 2 of the project includes adding a second 115/13.8kV DESN at the Copeland MTS site. Based on the station capacity consideration for the Downtown District stations, the need date for Phase 2 is in the medium to long term. However, the Study Team is reviewing other considerations and will be assessed in the IRRP and RIP phases.

- **Richview TS to Manby TS Corridor Line Capacity**

This need is required in 2020 at the earliest. The recommended plan is staged as follows:

Stage 1: Rebuild existing 115kV idle line to 230kV and reconfigure two existing circuits R2K and R15K into "Super-circuits". Stage 1 is currently expected to be in-service in Q2 2021.

Stage 2: Terminate the new conductors on VxR circuits and Manby TS (3 new breakers) and complete station work coincident with Manby TS EOL replacement work, both of which are planned for completion in Q2 2024.

- **Breaker Failure at Manby TS**

To address the risk of breaker failure at Manby TS causing the outage of any two of the three 230/115kV autotransformers at either the west or east yard of Manby TS and

resulting in the remaining transformer exceeding its Short Term Emergency (STE) rating, the RIP recommended the installation of a Remedial Action Scheme (RAS) to protect equipment overloading. The project was scheduled for completion by Q2 2018, but it is now delayed due to outstanding work associated with Toronto Hydro's remote stations.

Below are the updates for the new needs identified in the second cycle Needs Assessment from October 2017:

- **East Harbor / Port Lands Area Transformation Capacity**

The LDC has identified an emerging area of load growth in the East Harbor and Port Lands in Toronto. The current load in the area is supplied from Esplanade TS and Basin TS. Transformation capacity in the area is sufficient with present day loading; however, due to the potential growth in area load, there may be a need for increased capacity around 2025+. This need will be further assessed in the IRRP and RIP phases to review options and to develop a preferred plan.

- **Load restoration – C14L+C17L, C5E+C7E, and K3W+K1W**

For the loss of circuits, C14L+C17L, C5E+C7E, and K3W+K1W, the load interrupted by configuration can exceed 150 MW and/or 250 MW and are required to be restored within the prescribed timelines as described in the ORTAC [6]. This need will be further assessed in the IRRP and RIP phases to review options and to develop a preferred plan.

Several EOL equipment needs were identified for replacement in the Toronto Region in the second cycle Needs Assessment report. The Needs Assessment Study Team recommended that the following refurbishment or replacement needs do not require further regional coordination and will be replaced with similar type of equipment with the same or higher ratings. Hydro One is coordinating with Toronto Hydro to develop implementation plans for the following stations:

- **Bridgman TS T11/T12/T13**
- **Cecil TS T1**
- **Charles TS T3/T4**
- **Dufferin TS T1/T3**
- **Fairbank TS T1/T3, T2/T4**
- **Fairchild TS T1/T2**
- **Runnymede TS T3/T4, 115 kV line grounding switches**
- **Richview TS T2, 230kV breakers**
- **Sheppard TS T3/T4**
- **Strachan TS T12**
- **115kV H7L/H11L Underground Cable**
 - Main TS to Lumsden JCT
 - Todmorden JCT to Leaside TS

The Study Team recommended the following refurbishment or replacement needs may require further regional co-ordination. These needs will be assessed further in the IRRP and RIP phases to review options and to develop a preferred plan for the following:

- **Bermondsey TS – T3/T4**
Expected Replacement Timing: 2022-2023
- **John TS – T1, T2, T3, T4, T6, 115 kV breakers**
Expected Replacement Timing: 2024-2025
- **Main TS – T3/T4, 115 kV line disconnect switches, installation of 115 kV CVTs**
Expected Replacement Timing: 2021-2022
- **Manby TS – T7, T9, T12 autotransformers, T13 step-down transformer, and, rebuild 230kV yard**
Expected Replacement Timing: 2024-2025
- **115kV C5E/C7E Underground Cable Esplanade TS to Terauley TS**
Expected Replacement Timing: 2024-2025
- **115 kV H1L/H3L/H6LC/H8LC Overhead Line Bloor St. JCT to Leaside JCT**
Expected Replacement Timing: 2020-2021
- **115kV L9C/L12C Overhead Line Leaside TS to Balfour JCT**
Expected Replacement Timing: 2021-2022

Several long term needs identified in the Needs Assessment are being further reviewed and assessed in the IRRP by the Study Team:

- **230/115 kV Transformation Capacity and Voltage Collapse at Leaside TS**
Expected Timing: Beyond 2027 (timing to be updated based on demand outlook)
- **230/115 kV Transformation Capacity at Manby TS**
Expected Timing: Beyond 2035 (timing to be updated based on demand outlook)
- **115 kV Line Capacity for Leaside TS to Wiltshire TS Corridor**
Expected Timing: 2034 (timing to be updated based on demand outlook)
- **115 kV Line Capacity for Manby West to Riverside Junction**
Expected Timing: Beyond 2035 (timing to be updated based on demand outlook)
- **115 kV Don Fleet Junction TS to Esplanade TS**
Expected Timing: 2026 (timing to be updated based on demand outlook)

3.7.2 Northern Sub-region

The Toronto Northern sub-region includes the area roughly bordered geographically by Highway 401 on the south, Steeles Avenue on the north, Highway 427 on the west and Regional Road 30 on

the east in addition to the area east of the Don Valley Parkway and north of O'Connor Dr. This Sub-region comprises the northern portion of the municipality of Toronto.

No new updates have been identified for this Sub-region.

3.8 Northwest Ontario

The Northwest Ontario region is a large geographic area, stretching from the town of Marathon to the western and northern borders of the province, with diverse characteristics. Therefore this region has been divided into four sub-regions for the purpose of regional planning: North of Dryden, Greenstone-Marathon, Thunder Bay and West of Thunder Bay sub-regions.

The first cycle RIP for this region was completed in June 2017 with the publication of the RIP report. The second cycle of Regional Planning for the Northwest Ontario region is currently anticipated to commence in Q1 2019.

3.8.1 North of Dryden Sub-region

This includes the portion of the Northwest Ontario Region north of the cities of Dryden and Kenora that includes Ear Falls, Red Lake and Pickle Lake. The sub-region has residential, commercial and mining load, as well as hydroelectric generation. This sub-region will supply the Remote Communities and has the potential for supplying the future Ring of Fire mining load.

Planning for the North of Dryden sub-region started prior to the implementation of the new regional planning process. The IESO-issued the IRRP report in January 2015 identified a potential need for increased capacity to meet the anticipated increased demand from the mining sector, including the potential for supply to the Ring of Fire, and connection of the Remote Communities. Currently, there is one transmission infrastructure investments being developed to meet the near-term electricity needs north of Dryden:

- **Watay Line to Pickle Lake Connection (Developed by Wataynikaneyap Power Limited Partnership)**

This project involves building a new 230 kV transmission line from Dinorwic (Dryden area) to Pickle Lake, a new 230 kV switching station at Dinorwic and a new 230/115kV transformer station at Pickle Lake, along with a radial network of 115 kV system to connect the remote communities north of Pickle Lake. Hydro One will connect these facilities to the existing transmission system through a new junction on the 230 kV transmission line D26A at Dinorwic and a new 115 kV switching station at Pickle Lake.

This project will off-load the existing 115 kV transmission lines E4D and E1C (which currently supply the Pickle Lake area load), resulting in increased capacity for supply in the Red lake area, without the need for E4D upgrade at this time.

Wataynikaneyap Power LP (WPLP) is also developing a network of 115 kV system to connect the remote communities north of Red Lake. Hydro One will connect these facilities to the existing transmission system through a new junction on the 115 kV transmission line E2R at Red Lake.

WPLP has submitted the Leave-to-Construct application for the Pickle Lake and Red Lake projects. Hydro One is in the process of conceptual design and cost estimation of its new junctions and switching stations to connect the new WPLP transmission facilities to Hydro One's transmission system. The expected in-service date is Q4 2020.

Ring of Fire Sub-System Need

The North of Dryden IRRP indicated that since the Ring of Fire area is remote from the existing transmission system, any additional capacity needs would require new facilities. It indicated that transmission system connection, either from Pickle Lake or from Marathon area, is the most economic option when compared to diesel generation. Development in the area is still in the early stages and no firm recommendations are made at this time.

3.8.2 Greenstone-Marathon Sub-region

This sub-region covers the southeastern portion of the Northwest Ontario Region. The sub-region has distribution load and light industry, with a proposal for a new mine and future potential mines.

For the Greenstone-Marathon sub-region, the IRRP report was published in June 2016.

To meet the forecast demand from LDCs, as reported in 2016, and with the cancellation of the Energy East pipeline project in 2017, no new system enhancements were identified. Accordingly, new industrial and/or mining loads will be monitored and investments will be initiated once formal connection requests are received from the customer(s).

3.8.3 Thunder Bay Sub-region

This sub-region includes the city of Thunder Bay and its vicinity. The sub-region has residential, commercial and industrial load, as well as dispatchable and embedded generation, supplied by the distribution and transmission facilities.

The RIP for the region identified potential need to upgrade the thermal rating of circuit R2LB and the work has been completed.

- **Port Arthur TS - Transformation Capacity**

The limiting low voltage equipment at Port Arthur is nearing end-of-life and is planned to be replaced and upgraded in the mid-term. This upgrade would bring the station

capacity up to 59 MW, sufficient to meet the need beyond 2035. No additional plan is required at this time and load at Port Arthur TS will be monitored and supply options will be assessed in the next regional planning cycle.

- **Lakehead TS and Birch TS - Transformation Capacity**

Currently the Thunder Bay 115 kV system can accommodate approximately 150 MW of additional load growth. Under the high load growth scenario, the Thunder Bay system would require additional supply capacity of approximately 20 MW by 2030. Therefore a potential long-term solution may be required, however no immediate action is recommended beyond monitoring of the sub-system load growth.

3.8.4 West of Thunder Bay Sub-region

This includes the portion of the Northwest Ontario region from of the western boundary of Thunder Bay sub-region up to and including the cities of Dryden and Kenora in the north. The sub-region has residential, commercial and mining load, as well as bio-mass and hydroelectric generation. It supplies the North of Dryden sub-region, which in the future will include the Remote Communities, when the generation in that sub-region is insufficient to meet the demand. Several LDCs serve the customers in this sub-region.

The RIP and the IRRP recommended monitoring electricity demand growth closely to determine if and when a decision on Dryden 115kV subsystem is required. As reported previously, the Study Team will also ensure communities are informed of all the bulk, coordinated regional, distribution and community energy planning activities.

3.9 Windsor-Essex

The Windsor-Essex region includes the most southerly portion of Ontario, extending from Chatham southwest to Windsor. It consists of the City of Windsor, the Municipality of Leamington, the Town of Amherstberg, the Town of Essex, the Town of Kingsville, the Town of Lakeshore, the Town of LaSalle, the Town of Tecumseh, and the Township of Pelee, as well as the western portion of the Municipality of Chatham-Kent.

The RIP for this region, completed in December 2015, identified the Supply to Essex County Transmission Reinforcement (SECTR) project to address supply interruptions in the J3E/J4E subsystem, as well as to provide additional supply capacity in the Kingsville-Leamington area. The SECTR project consists of installation of a new transformer station (Leamington TS), and 13 km of 230 kV double circuit to connect Leamington TS to the existing C21J/C22J. This project is now complete.

The second cycle of regional planning was triggered in 2017 and the Needs Assessment report for the region was completed and published in October 2017. The IRRP phase is currently underway,

and it is expected for completion by Q4 2019. Emergent new needs in the region arose because of forecasted increase of greenhouse loads.

During the first cycle, it was identified that SECTR project will not be able to fully address the load restoration challenges in the J3E/J4E sub-system following the loss of C23Z/C24Z. This load restoration need will be further assessed in the upcoming IRRP and RIP phases.

Updates to needs identified in the Needs Assessment are as follows:

- **Leamington TS Capacity**

The Needs Assessment has identified that Leamington TS may require additional station supply capacity by 2021. Since the completion of the Needs Assessment, the updated load forecast shows that by 2021 the load demand in the Leamington area will exceed the capacity of the existing Leamington TS by about 200 MW. As a consequence, Hydro One is in the process of expanding the transformation capacity at Leamington TS with the addition of 2 x 75/125 MVA, 230/27.6 kV transformers. The anticipated in-service date is December 2019.

- **Kingsville TS – T1/T2/T3/T4 Transformers End-Of-Life**

As the result of significant load increase in the Kingsville area, Hydro One is planning to replace the existing 4x42MVA units with 2x83MVA units. The first 83MVA unit is expected to go into service by Q3 2020, while the second unit is expected to be in service in Q4 2021.

- **Keith TS – T11/T12 autotransformers End-Of-Life**

T11 and T12 are to be replaced with larger 250MVA units to improve load supply and restoration capability for the 115kV J3E/J4E subsystem. This work is currently planned to be completed in Q3 2023.

- **Crawford TS – T3 transformer End-Of-Life**

T3 has been replaced with similar 83MVA unit in May 2018.

- **Malden TS – 27.6kV Breaker End-Of-Life**

Two (2) feeder breakers will be replaced with SF6 equivalent units in November 2018.

- **Lauzon TS T6/T8 Transformer End-Of-Life**

T6 and T8 step-down transformers are currently planned for replacement with similar size units by 2025. However, there may be opportunities to re-configure the station to improve system restoration and to consider if any upsizing would worth merit based on future load and or changes to installed/contracted generation in the region.

The Study Team has concluded that based on the needs identified in the Needs Assessment, an IRRP is recommended for the Windsor-Essex region. The IRRP scope will consider the following:

- Capacity needs in the Kingsville and Leamington areas
- Confirmation of the load meeting capabilities of Kingsville TS after reconfiguration
- Capacity needs at Lauzon and Belle River TS
- System restoration needs following loss of the C23Z/C24Z or C21J/C22J or K2Z/K6Z or Z1E/Z7E double circuit lines
- Lauzon TS re-configuration / upsizing

The Study Team has also concluded that a Local Planning process is recommended for end-of-life needs at Malden TS.

4. STATUS OF GROUP 2 REGIONS

Regions were prioritized into three groups based on their anticipated near-term and mid-term needs and the urgency to address them. Group 2 regions were expected to have fewer and less urgent needs than regions in Group 1. This expectation was supported by the Group 2 Needs Assessments. Group 2 consists of the following regions:

- East Lake Superior (Led by Hydro One Sault Saint Marie)
- London Area
- Peterborough to Kingston
- South Georgian Bay/Muskoka
- Sudbury/Algoma

The RIPs for all Group 2 Regions are now complete for the first cycle of regional planning.

4.1 East Lake Superior

The lead transmitter for the region is Hydro One Sault Saint Marie. The regional transmission system connects with provincial grid at Wawa TS and Mississagi TS, north of Thessalon. During the last regional planning, there were no new needs identified in this region and Hydro One Sault Saint Marie will not be submitting a separate Annual Status Report for this region.

4.2 London Area

The London Area includes the Cities of Woodstock, London and St. Thomas as well as the Counties of Middlesex, Elgin and Oxford. The RIP for the region was completed in August 2017, and the next cycle of Regional Planning for the London Area Region is currently anticipated to commence in 2019-2020.

The London Area region was divided into five sub-regions based on electrical supply boundaries for further regional planning purposes:

4.2.1 Greater London Sub-region

The Greater London sub-region is a summer-peaking area that includes the City of London, and customers in surrounding municipalities supplied from Buchanan DESN, Clarke, Highbury, Nelson, Talbot, and Wonderland transformer stations (TS). This sub-region includes customers of London Hydro and Hydro One Distribution, supplied by Buchanan DESN TS, Clarke TS, Highbury TS, Nelson TS, Talbot TS, and Wonderland TS.

In 2017, condition assessment of Wonderland TS identified it as in poor condition and must be replaced in the near-term. It will be replaced with a similar unit to match the ratings of transformer T6. The project is currently underway, and the expected completion date is Q3 2022.

In addition, two load restoration needs were identified in this sub-region:

- **Loss of W36/W37 (Clarke TS and Talbot TS)**
For the loss of W36/W37, the Study Team recommended the implementation of automated switching devices and feeder extensions on the distribution system.
- **Loss of W42L/W43L (Buchanan TS)**
No further action is required for the loss of W42L/W43L, as load transfer and temporary fixes/emergency by-pass solutions are possible.

4.2.2 Aylmer-Tillsonburg Sub-region

Aylmer- Tillsonburg sub-region includes city of Aylmer, city of Tillsonburg and surrounding areas within service territories of Erie Thames Powerlines, Tillsonburg Hydro, and Hydro One Distribution, supplied by Aylmer TS and Tillsonburg TS.

Needs identified in this sub-region include the following:

- **Voltage constraint at Tillsonburg TS**
- **Thermal constraints at 115kV circuit W8T (Buchanan TS x Edgeware JCT)**
- **Sub-standard customer delivery performance at Tillsonburg TS.**
As per the Study Team recommendation, Hydro One is currently developing budgetary estimates for each of the proposed alternatives to evaluate their cost and benefits. Hydro One plans to provide feedback with the results to the Working Group by the end of 2018

4.2.3 Strathroy Sub-region

This sub-region includes Strathroy TS that supplies the Middlesex County and townships of Adelaide-Metcalf, Warwick, Strathroy-Caradoc via Entegrus and Hydro One Distribution.

The Study Team determined that there were no needs and/or no further regional coordination was required for the sub-region.

4.2.4 Woodstock Sub-region

Woodstock region includes town of Ingersoll, City of Woodstock and rest of northern part of Oxford County, supplied by Ingersoll TS, Woodstock TS, Commerce Way TS, and Karn TS.

A load restoration need was identified in this sub-region as the result of simultaneous loss of 230kV circuit M31W/M32W and this need has been further assessed in a Local Plan completed in May 2017. Based on load forecast and transfer capability information, it was determined that there is sufficient transfer capability in the existing system, and therefore no further action is required.

4.2.5 St. Thomas Sub-region

This sub-region includes city of St. Thomas and surrounding areas supplied by Edgeware TS and St. Thomas TS via distribution network of St. Thomas Energy Inc., London Hydro, and Hydro One Distribution.

The Study Team determined that there were no needs and/or no further regional coordination was required for the sub-region.

4.3 Peterborough to Kingston

The Peterborough to Kingston Region includes the area roughly bordered geographically by the municipality of Clarington on the West, North Frontenac County on the North, Frontenac County on the East and Lake Ontario on the South.

The Study Team determined that no further regional coordination required for the region. A local plan was developed addressing the local need of load balancing at Gardiner TS and was implemented in Q4 2016. Hydro One published a RIP in July 2017.

The next cycle of Regional Planning for the Peterborough to Kingston region is currently anticipated to commence in 2019-2020.

4.4 South Georgian Bay/Muskoka

The geographical area of the South Georgian Bay/Muskoka Region is the area roughly bordered by West Nippising on the North-West, the Algonquin Provincial Park on the North-East, Scugog on the South, Erin on the South-West and Grey Highlands on the West.

The RIP report for this region was completed in August 2017, and the next cycle of Regional Planning for the South Georgian Bay/Muskoka region is currently anticipated to commence in 2019-2020.

The region was divided into following two sub-regions during scoping phase: Barrie/Innisfil and Parry Sound/Muskoka sub-regions.

4.4.1 Barrie/Innisfil Sub-region

The Barrie/Innisfil sub-region includes the areas supplied by Midhurst TS, Barrie TS, Everett TS, and Alliston TS, and transmission circuits E8V/E9V, E3B/E4B, and M6E/M7E. Updates to the previously identified needs are as follows:

- **Increase Transformation Capacity in Barrie/Innisfil Sub-Region**

Barrie/Innisfil sub-region is forecasted to experience significant load growth, limiting station and line capacity and the end of life equipment replacements. The Study Team recommended to rebuild and uprate Barrie TS as the best solution to meet the transformation capacity need in the Sub-Region. Hydro One is currently developing this plan, named 'Barrie Area Transmission Upgrade project'. The plan includes uprating 115kV lines E3/4B to 230 kV, upgrading existing DESN transformer from 115/44 kV, 55/92 MVA to 230/44 kV, 75/125 MVA. The project is planned to be in-service by 2020/2021.

- **Transformation Capacity Need at Uprated Barrie TS**

Over the 20 year planning period, Barrie TS will experience the biggest growth in the Sub-region. With the forecast data collected, it is determined that the uprated Barrie TS will exceed its LTR by 2031. This need will be monitored and investigated further in the second cycle of the Regional Planning Process.

4.4.2 Parry Sound/Muskoka Sub-region

The Parry Sound / Muskoka sub-region includes the areas supplied by Parry Sound TS, Waubaushene TS, Orillia TS, Bracebridge TS, Muskoka TS, and Minden TS, and transmission circuits M6E/M7E and E26/E27. Updates to the previously identified needs are as follows:

- **Increase Transformation Capacity in Parry Sound/Muskoka Sub-Region**

Based on the current load forecasts, additional transformation capacity relief is required for both Parry Sound TS and Waubaushene TS to accommodate the load growth and improve reliability in this sub-region. The Study Team has determined that replacing both transformers at Parry Sound TS with two standard 50/83MVA units will address the need. The project is currently undergoing design and estimation phase, and the expected in-service date is Q4 2022.

- **Parry Sound/Muskoka Load Restoration**

For the loss of M7E/M6E transmission lines, the load interrupted with the existing circuit configuration during peak periods will not be able to meet load restoration criteria as described in the ORTAC [6]. Study Team recommended to install motorized disconnect switches (MDS) at the Orillia TS JCT in order to address this need. This project is currently in the execution phase, and its expected in-service date is Q3 2019.

- **Minden TS – End of Life Assets**

Minden T1 and T2 transformers are rated at 25/42 MVA each and are non-standard as per the current standards. The transformers are currently beyond their expected service life and their condition is deteriorating and leak risk is increasing. In mid-2018, Minden T1 transformer failed, and a replacement transformer rated at 50/83 MVA is scheduled to be in service by November 2018.

The preferred alternative for Hydro One was to replace the existing transformers with standard 50/83 MVA units. The new equipment is expected to have a service life of over 50 years and will be able to supply the forecasted load growth in the Minden area. The project is currently undergoing detailed cost estimation, and the expected in-service date for transformer T2 is Q4 2020.

It is worth noting that there are potential bulk power system elements that are also at the end of their useful lives. These include 230 kV transmission lines D1M/D2M, E8V/E9V, and M6E/M7E. IESO will undertake the bulk power system studies for these lines in coordination with Hydro One.

4.5 Sudbury/Algoma

The Sudbury/Algoma region includes the municipalities of Greater Sudbury and Espanola and surrounding areas. There are municipal LDCs serving each of those municipalities and Hydro One Distribution serves the remainder of the Region. The area is supplied from transformer stations Clarabelle TS, Coniston TS, Elliot Lake TS, Larchwood TS, Manitoulin TS and Martindale TS.

Hydro One has developed and published a RIP report in June 2016. The Study Team determined that no further regional coordination was required.

The next cycle of Regional Planning for the Sudbury /Algoma region is currently anticipated to commence in 2019-2020.

5. STATUS OF GROUP 3 REGIONS

Group 3 consists of the following regions:

- Chatham/Lambton/Sarnia
- Greater Bruce/Huron
- Niagara
- North of Moosonee (led by Five Nations Energy Inc.)
- North/East of Sudbury
- Renfrew
- St. Lawrence

The RIPs for all the six (out of seven) regions where Hydro One is the lead transmitter are now complete for the first cycle of regional planning. No status update is provided for the North of Moosonee region in this report since Five Nations Energy Inc. is the lead transmitter for that region.

5.1 Chatham/Lambton/Sarnia

The Chatham-Lambton-Sarnia region is located to the west of the Greater Toronto Area in southwestern Ontario. The region includes the municipalities of Lambton Shores and Chatham-Kent. It also includes the Townships of Petrolia, Plympton-Wyoming, Brooke-Alvinston, Dawn-Euphemia, Enniskillen, St. Clair, Warwick and the Villages of Oil Springs and Point Edward.

Hydro One developed and published a RIP in August 2017. The next cycle of Regional Planning for this region is currently anticipated to commence between 2020 and 2021.

The Study Team determined that no further regional coordination is required. However, several needs that are local in nature were identified during Needs Assessment phase, and updates are provided below:

- **Kent TS – Transformation Capacity**
Needs Assessment identified Kent TS – Transformer T3 will be overloaded for the loss of its companion Transformer T4. Subsequently, Hydro One and relevant distributors developed a LP, and it was concluded that there is sufficient transfer capability in the existing distribution system to reduce loading on Kent TS T3 following a loss of T4. Therefore, the local planning team agreed no further action is required.
- **Chatham SS – Component Replacement**
This investment is targeted towards EOL components at Chatham SS. Due to operational requirements, capacitor SC21 needs to be replaced. The expected completion date for replacement is Q4 2023.
- **St. Andrews TS – T3, T4 & Switchyard Refurbishment**
This investment is targeted at EOL components due to stranded load at the station and available real estate. The investment will include a complete AIS yard rebuild and transformer replacement by Q1 2023.

- **Sarnia Scott TS – T5 & Component Replacement**

This investment includes replacing EOL Transformer T5, and the associated 115kV breaker. The expected completion date is Q4 2023.

5.2 Greater Bruce/Huron

The Greater Bruce/ Huron area is located to the west of the Greater Toronto Area in southwestern Ontario. The region includes the municipalities of Arran–Elderslie, Brockton, Kincardine, Northern Bruce Peninsula and South Bruce. It also includes the township of Huron-Kinloss.

Hydro One developed and published the RIP report in August 2017. The next cycle of Regional Planning for this region is currently anticipated to commence in 2020-2021.

The Study Team determined that no further regional coordination is required. Below is an update to the needs identified during the first cycle of Regional Planning:

- **115kV L7S Circuit – Capacity Increase**

L7S is a single 115 kV circuit transmission line operated radial from Seaforth TS to St. Mary’s TS. Based on the analysis from Needs Assessment, the circuit will reach its Load Meeting Capability (“LMC”) in 2019 based on the gross load forecast and 2025 based on the net load forecast. However, the winter 2017 loading on circuit L7S was peaking at approximately 65% of the circuit capacity and did not trigger the need to increase the rating. Loading will continuously be monitored after each peak load season, winter and summer.

5.3 Niagara

The Niagara Region comprises the municipalities of City of Port Colborne, City of Welland, City of Thorold, City of Niagara Falls, Town of Niagara-On-The-Lake, City of St. Catharines, Town of Fort Erie, Town of Lincoln, Township of West Lincoln, Town of Grimsby, Township of Wainfleet, and Town of Pelham. Haldimand County has been included in the Niagara Region Group 3 for Needs Assessment.

Hydro One developed and published the RIP report in March 2017, and the next cycle of Regional Planning for this region is currently anticipated to commence in 2019 due to emerging needs in the region.

Below are updates to the needs identified by the Study Team:

- **Thermal Overloading on 115kV Q4N**

Under high generation scenarios at Sir Adam Beck GS #1, the loading on Q4N (Beck #1 SS x Portal Jct) can exceed circuit ratings. The potential overloading issue will be addressed under sustainment project that is scheduled for completion in Q3 2021.

5.4 North/East Sudbury

The geographical area of the North/East of Sudbury Region is the area roughly bordered by Moosonee on the North, Hearst on the North-West, Ferris South and Kirkland Lake on the East.

Hydro One developed and published a RIP in April 2017. The Study Team determined that no further regional coordination was required.

The next cycle of Regional Planning for this region is currently anticipated to commence in 2020-2021.

5.5 Renfrew

The Renfrew Region includes all of Renfrew County.

Hydro One developed and published a RIP report in July 2016. The Study Team determined that there were no needs in the region and no further regional coordination was required.

The next cycle of Regional Planning for this region is currently anticipated to commence in 2020-2021.

5.6 St. Lawrence

The St Lawrence Region covers the southeastern part of Ontario bordering the St Lawrence River. The region starts at Gananoque on the eastern end of Lake Ontario and extends to the inter-provincial boundary with Quebec. The City of Cornwall is supplied by Fortis Ontario with transmission lines from Quebec and is not included in this Region.

Hydro One developed and published a RIP report in July 2016. The Study Team determined that there were no needs over the next 5 years in the region and no further regional coordination was required.

The next cycle of Regional Planning for this region is currently anticipated to commence in 2020-2021.

6. LESSONS LEARNED

During the first cycle of the regional planning process, several lessons and opportunities for improvement were identified pertaining to the regional planning process and its deliverables. These improvements were identified following a thorough review of the regional planning process and reports from the first cycle, and also through discussions with regional Study Teams consisting of LDCs and IESO, and input from the OEB Regional Planning Process Advisory Group (“RPPAG”). Based on the lessons learned, Hydro One has implemented most of the improvements in the regional planning process and reports. Some examples of these enhancements are described below:

Improvements in data gathering:

- Data gathering templates – more clarity and consistency in request for data in order to reconcile the data quicker.
- Load forecast methodology and development is continuously discussed in light of CDM and Distributed Energy Resource (DER) penetration along with electric vehicle (EV) and micro grids in coordination with IESO and LDCs to improve data accuracy (retrieving actual load, new technology, basis of extreme weather correction factor, forecasting methodology, applying CDM and DG).

Improvements in reporting of analysis and plans:

- Comprehensive discussion and assessment of major high voltage equipment reaching the end of its useful life within Needs Assessment and RIP reports. As part of this analysis different options are evaluated and discussed along with justifications for preferred options based on load forecasts for growth that takes into account changing customer requirements and the impact of new technologies. The assessment includes, but not limited to: downsizing/eliminating/right sizing equipment by transferring load to other existing facilities; replacing equipment with similar equipment of same or higher ratings; and, consideration of economic and practical implementation of incremental CDM to defer or eliminate the need while maintaining safe and reliable service to customers.
- Regional planning report templates – various updates, including new section on EOL equipment assessment and new comprehensive template for RIP reports for all regions.

Process Improvements:

- Revised Local Planning guidelines within PPWG report to aid the Study Team in determining when LP is the appropriate approach to address a specific need(s).
- Revised Regional Planning Process flow diagrams within PPWG report to reflect process more clearly.
- Ensured consistency in terminology within PPWG report and regional planning reports.
- Further enhancements to be made to clarify the scope and planning approach for EOL equipment needs in regional planning reports.

Hydro One also sent formal communications and surveys to LDCs in 2018 to seek their feedbacks on prioritization of regions, scheduling, and suggestions for enhancements.

7. LDC SURVEYS

As an on-going effort to ensure that the Regional Planning process meets the objectives that were laid out in the PPWG report, Hydro One conducted a survey over the past year to seek the views of the LDCs. The survey was conducted for LDCs in regions where the second cycle of the Needs Assessment phase has been completed at the time of the survey, i.e., Burlington to Nanticoke, Toronto, GTA North, and Windsor-Essex.

There was 100% participation in the survey from LDCs in the four regions. The survey questions covered the following broad areas from the point of view of the LDCs:

- Understanding of the purpose and scope of the Needs Assessment
- Involvement in the Needs Assessment phase and decision making
- Representation of LDCs needs and issues in the final report
- Positive aspects of the process and any suggestions for improvement

The responses to the survey questions were compiled and the results are displayed graphically in Figure 3:

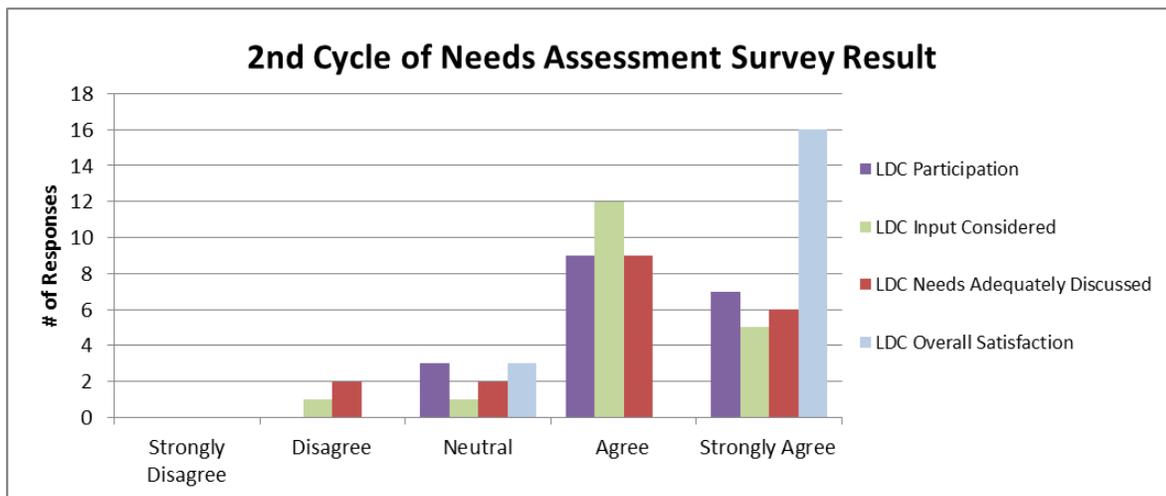


Figure 3. Survey Result of LDCs Participating in the 2nd Cycle of Needs Assessment

As illustrated by the graph, there was a consensus among the LDCs that their inputs and needs were properly discussed and considered throughout the process, and are generally satisfied with the final Needs Assessment report.

Some aspects of the Needs Assessment phase that were highlighted by several participants for further improvement include: restrictive schedule at times to gather the required information and provide feedback in light of mandatory time constraints, and ensure that Needs Assessment scope of work is well understood by all participants, including those that are new to the Regional Planning process.

8. CONCLUSION

The first regional planning cycle is complete, and the second regional planning cycle started in 2017. It followed the process developed by the Process Planning Working Group (“PPWG”) that the OEB established. Members from the IESO, LDCs and Hydro One transmission are represented on Study Teams during the various phases of the regional planning process. Team members have been able to make decisions and undertake the appropriate level of planning based on the assessment of needs. For example, the concept of LP is being effectively utilized by the Study Team to address needs that are local in nature, where straight forward wires only options are the obvious and appropriate solution. These needs do not require further regional coordination and are directly addressed by the transmitter and affected LDC(s) (or customers). Other needs were further assessed by the Study Team during the IRRP and RIP phases of the regional planning process. Frequently, ‘wires’ planning is initiated in parallel with IRRP when the Study Team determines that a wires approach is the best alternative to address a need.

The sharing of information by the Study Team members and the publishing of reports and other relevant information on the Hydro One and IESO websites allows stakeholders to be aware of current and future plans that may influence their planning strategies. This transparency and stakeholder engagement was intended as one of the hallmarks of the regional planning process as envisioned by the Board.

Since the regional planning process was introduced, Hydro One, LDCs, and the IESO have met mandatory timelines to complete each of the regional planning phases with the exception of one IRRP for a sub-region of Northwest Ontario IRRP.

Other key accomplishments since the commencement of the second cycle include the completion of:

- 5 Needs Assessment reports (second cycle);
- 5 Scoping Assessment reports (second cycle);
- Improvements in data gathering, reporting of analysis and plans, and regional planning process

From a wires infrastructure perspective, the RIP for a region is the most important phase in the regional planning process because it provides a comprehensive source of information for regional power system infrastructure (wires) plans. Specifically, the RIP report provides a report for the region to address all the needs in the regions including a consolidated account of wires infrastructure plans developed during Needs Assessment, LP and IRRP for the region.

The second cycle of regional planning started in 2017 and Needs Assessments for Group 1 regions, including Burlington to Nanticoke, Toronto, Windsor-Essex, GTA North, and Greater Ottawa are complete. Scoping Assessments for these five (5) regions were also completed over the past year.

9. REFERENCES

- [1] Ontario Energy Board. "Transmission System Code". Last Revised April 30, 2018 (Originally Issued on July 14, 2000).
- [2] Hydro One Networks Inc. "Regional Planning Process – Annual Status Report". November 1, 2016.
- [3] Ontario Energy Board. "Distribution System Code". Last Revised March 15, 2018 (Originally Issued on July 14, 2000).
- [4] "Planning Process Working Group Report to the Board – The Process for Regional Infrastructure Planning in Ontario". March 13, 2013. Last Revised May 17, 2013.
- [5] Ontario Energy Board. "Conservation and Demand Management Requirement Guidelines For Electricity Distributors". Last Revised August 11, 2016.
- [6] Independent Electricity System Operator. "Ontario Resource and Transmission Assessment Criteria (ORTAC)". Issue 5.0. August 22, 2007.

APPENDIX A. CONSERVATION, DISTRIBUTED GENERATION, AND OTHER INITIATIVES

A.1 Conservation Achievement

The table below shows the most recently available verified peak demand offsets resulting from conservation energy efficiency programs by LDCs. Because verified results only become available in August 2018 for the previous calendar year, the data shown is based on 2017 (inclusive of programs and persistence from 2011 through 2016). These savings do not include the impact due to system wide demand response initiatives, such as Capacity Based Demand Response (CBDR) and the DR Auction. As CBDR was a transitional program, information was not collected by LDC. Currently DR Auction results are reported at IESO zones. Efforts are being made to track granularity of results by LDC so that the impact can be included in future conservation achievement results. Due to the methodology used in monitoring and evaluating programs, verified results can only be provided by LDC, and not by planning region.

Table 3. Conservation Status Update

Sub region	LDC	Verified Net Annual Peak Demand Savings from Conservation Energy Efficiency Programs, Persisting in 2017 (MW)
Barrie/Innisfil	InnPower Corporation	1.6
	Former PowerStream Inc.	*
	Alectra Utilities	*
	Hydro One Distribution	*
	Total**	1.6
Brant	Former Brant County Power Inc.*	1.2
	Brantford Power Inc.	12.8
	Energy+ Inc.	*
	Hydro One Distribution	*
	Total**	14
Bronte	Burlington Hydro	15.4
	Oakville Hydro	15.8
	Total**	31.2
Central Toronto	Toronto Hydro	248.4
Greenstone-Marathon	Hydro One Distribution	*
Greater London	London Hydro	30
	Hydro One Distribution	*
	Total**	30
KWCG	Kitchener-Wilmot Hydro	20.6
	Waterloo North Hydro	12.4
	Former Cambridge & North Dumfries Hydro*	11.1
	Guelph Hydro Electric Systems Inc.	28.8
	Energy+ Inc.	6.5

	Hydro One Distribution	*
	Total**	79.4
North of Dryden	Hydro One Distribution	*
Northwest GTA	Former Hydro One Brampton*	29.6
	Milton Hydro	7.3
	Halton Hills Hydro	3.9
	Alectra Utilities	*
	Hydro One Distribution	*
	Total**	40.8
Ottawa	Hydro Ottawa Limited	71.7
	Hydro One Distribution	*
	Total**	71.7
Pickering-Ajax-Whitby	Veridian Connections	20.1
	Whitby Hydro	6.9
	Hydro One Distribution	*
	Total**	27
Parry Sound/Muskoka	Lakeland Power Distribution Ltd.	2.0
	Midland Power Utility Corporation	2.5
	Orillia Power Distribution Corporation	2.7
	Alectra Utilities	*
	Former PowerStream Inc.	*
	Hydro One Distribution	*
	Newmarket-Tay Power Distribution Ltd.	*
	Veridian Connections Inc.	*
	Total**	7.2
Thunder Bay	Thunder Bay Hydro Electric Distribution Inc.	9.29
	Hydro One Distribution	*
	Total**	9.29
Windsor-Essex	Essex Powerlines Corporation	4.6
	E.L.K Energy Inc.	1.4
	Enwin	21.1
	Entegrus Inc.	13.8
	Hydro One Distribution	*
	Total**	40.9
West of Thunder Bay	Fort Frances Power	0.58
	Atikokan Hydro	0.14
	Kenora Hydro	0.41
	Sioux Lookout Hydro	0.21
	Hydro One Distribution	*
	Total**	1.34
York	Alectra Utilities	*
	Former PowerStream Inc.	*
	Newmarket Tay Power Distribution Ltd	6.3
	Hydro One Distribution	*

	Total**	6.3
--	----------------	------------

Notes:**[*]**

- **Former PowerStream Inc.**
Total conservation savings for 2017 is 69.4 MW. Persisting savings from former PowerStream Inc. service territory due to 2011-2015 conservation activities and persisting savings attributed to Alectra Utilities from 2016-2017 conservation activities have been separated to provide more detail; these savings were not separated in the previous report.
- **Hydro One Distribution**
Total conservation savings for 2017 is 190.0 MW, which is the total achievement for all Hydro One Distribution service territory.
- **Alectra Utilities**
Total conservation savings in 2017 is 65.1 MW. This value is for all conservation activity within Alectra Utilities' service territory including persisting savings since 2016.
- **Energy+ Inc.**
Conservation achievement for 2017 (including persisting savings from 2016) is 6.5 MW. Note that for the report provided to Hydro One in 2017, persisting savings 2011-2015 conservation activity from former Brant County Power Inc. & Cambridge & North Dumfries Hydro Inc. service territories were included in the Energy+ Inc. savings. Persisting savings from these past activities have now been removed and kept apart from the total Energy+ Inc. reported savings.
- **Newmarket-Tay Power Distribution Ltd.**
Total conservation achievement for 2017 is 6.3 MW. (The large majority of Newmarket-Tay Power Distribution Ltd. load is outside the Parry Sound/Muskoka sub region).
- **Veridian Connections Inc.**
Total conservation achievement for 2017 is 20.1 MW. (The large majority of Veridian Connections Inc. load is outside the Parry Sound/Muskoka sub region).
- **Former Brant County Power Inc. and Former Cambridge & North Dumfries Hydro**
For the report provided to Hydro One in 2017, persisting savings due to 2011-2015 conservation activity from former Brant County Power Inc. & Cambridge & North Dumfries Hydro Inc. service territories were included in the Energy+ Inc. savings. Persisting savings from these past activities have now been removed and kept apart from the total Energy+ Inc. reported savings. Large majority of Energy+ Inc.'s load is within the KWCG region, with minority of load in the Brant sub region.
- **Former Hydro One Brampton**
Persisting savings from former Hydro One Brampton service territory and persisting savings attributed to Alectra Utilities have been separated as Alectra Utilities' service territory spans much broader than Northwest GTA sub region

[]**

- Total conservation achievement for the sub region may not include some of the LDC(s) achievement, whose load is spread over multiple sub regions.

A.2 Distribution Generation

The table below shows the total installed and effective capacity of IESO Contracted Distributed Generation ("DG") projects which have come into service or under development since the base year of the region/sub region load forecast. This does not include net or behind the meter generation. This table does not include projects which had already been in service prior to this date, except in cases where a new contract was formed to account for incremental capacity of a facility.

The equivalent effective capacity for these new generation sources is based on capacity factors consistent with the zonal assumptions applied in the region/sub region load forecast. Data is based on the IESO contract list as of July 31, 2018.

Table 4. DG Status Update

Sub region	Station	Installed Capacity (MW)	Effective Capacity (MW)	Base Forecast Year
Barrie/Innisfil	BARRIE TS	.9	0.2	2014 Peak
	MIDHURST TS	16.3	3.6	
	EVERETT TS	2.3	0.5	
	ALLISTON TS	2.4	0.5	
	TOTAL	21.9	4.8	
Brant	BRANT TS	10.49	4.12	2012 Peak
	BRANTFORD TS	4.59	1.83	
	POWERLINE MTS	2.94	1.18	
	TOTAL	18	7.2	
Bronte	BRONTE TS	2.07	0.70	2014 Peak
	CUMBERLAND TS	2.37	0.81	
	BURLINGTON DESN	1.62	0.55	
	PALERMO TS	0.00	0.00	
	TRAFALGAR DESN	0.00	0.00	
	TREMAINE TS	1.66	0.56	
	GLENORCHY MTS	1.33	0.45	
	OAKVILLE #2 TS	1.04	0.35	
	TOTAL	10.09	3.43	
Central Toronto	AGINCOURT	4.29	1.46	2013 Peak
	BASIN	0.14	0.05	
	BATHURST TS DESN1	3.24	1.10	
	BATHURST TS DESN2	1.93	0.66	
	BERMONDSEY TS DESN1	0.57	0.19	
	BERMONDSEY TS DESN2	1.99	0.68	
	BRIDGMAN TS DESN1	0.35	0.12	
	BRIDGMAN TS DESN3	0.03	0.01	
	CARLAW TS	0.78	0.27	
	CAVANAGH MTS	2.21	0.75	
	CECIL TS DESN1	0.02	0.01	
	CECIL TS DESN2	0.28	0.10	
	CHARLES TS DESN1	0.01	0.00	
	CHARLES TS DESN2	0.32	0.11	
	DUFFERIN TS DESN1	0.55	0.19	
	DUFFERIN TS DESN2	0.71	0.24	
	DUPLEX TS DESN1	0.04	0.01	
	DUPLEX TS DESN2	0.22	0.07	
	ELLESMERE TS	3.93	1.34	
	ESPLANADE TS	0.09	0.03	
	FAIRBANK TS DESN1	0.74	0.25	
	FAIRBANK TS DESN2	2.16	0.74	
	FAIRCHILD TS DESN1	2.51	0.85	
FAIRCHILD TS DESN2	0.56	0.19		

	FINCH TS DESN1	3.12	1.06	
	FINCH TS DESN2	5.77	1.96	
	GLENGROVE TS DESN1	0.07	0.02	
	GLENGROVE TS DESN2	0.39	0.13	
	HORNER TS	2.23	0.76	
	JOHN TS DESN2	0.04	0.01	
	JOHN TS DESN3	3.85	3.85	
	LEASIDE TS DESN1	0.32	0.11	
	LEASIDE TS DESN2	0.20	0.07	
	LESLIE TS DESN1	1.47	0.50	
	LESLIE TS DESN2	2.44	0.83	
	MAIN TS	0.91	0.31	
	MALVERN TS	2.50	1.46	
	MANBY TS DESN1	1.62	0.05	
	MANBY TS DESN2	0.64	1.10	
	MANBY TS DESN3	0.79	0.66	
	REXDALE TS	5.28	0.19	
	RICHVIEW TS DESN1	2.61	0.68	
	RICHVIEW TS DESN2	1.91	0.12	
	RICHVIEW TS DESN3	0.01	0.01	
	RUNNYMEDE TS	1.44	0.49	
	SCARBORO TS DESN1	2.60	0.88	
	SCARBORO TS DESN2	2.44	0.83	
	SHEPPARD TS DESN1	1.84	0.96	
	SHEPPARD TS DESN2	2.46	0.84	
	STRACHAN TS DESN1	0.02	0.01	
	STRACHAN TS DESN2	0.21	0.07	
	WARDEN TS	3.07	1.05	
	WILTSHIRE TS DESN1	0.26	0.09	
	WILTSHIRE TS DESN2	0.20	0.07	
	WOODBIDGE TS DESN1	0.78	0.27	
	TOTAL	79.21	29.80	
Greenstone-Marathon	LONGLAC TS	0.01	0.003	2014 Peak
	MARATHON DS	0.02	0.006	
	PIC DS	0.01	0.003	
	TOTAL	0.04	0.01	
Greater London	CLARKE TS	2.06	0.92	2016 Peak
	TALBOT TS	0.344	0.127	
	BUCHANAN DESN	0.187	0.07	
	HIGHBURY TS	0.75	0.276	
	NELSON TS		0	
	WONDERLAND TS	1.18	0.436	
	TOTAL	4.53	1.83	
KWCG	ARLEN MTS	0.21	0.06	2010 Peak (July 7, 2010)
	CAMBRIDGE #1	5.14	1.54	

	CAMPBELL TS	8.41	2.52	
	CEDAR TS	1.91	0.57	
	DEWELER TS	0.02	0.01	
	ELMIRA TS	5.56	4.24	
	FERGUS TS	47.29	8.84	
	GALT TS	5.55	2.01	
	HANLON TS	1.00	0.30	
	KITCHENER #1	0.53	0.16	
	KITCHENER #3	1.77	0.53	
	KITCHENER #4	1.45	0.43	
	KITCHENER #5	2.08	0.62	
	KITCHENER #6	2.55	0.77	
	KITCHENER #7	1.43	0.43	
	KITCHENER #8	1.21	0.36	
	KITCHENER #9	2.54	0.76	
	PRESTON TS	2.72	0.82	
	PUSLINCH DS	1.33	0.40	
	RUSH MTS	0.52	0.16	
	SCHEIFELE TS	4.16	1.25	
	WATERLOO #3	1.66	0.50	
	WOLVERTON DS	0.69	0.21	
	TOTAL	100	27	
North of Dryden	N/A*			
Northwest GTA	BRAMALEA TS	8.06	2.74	2012 Peak
	GOREWAY TS	13.01	4.42	
	HALTON TS	3.45	1.17	
	JIM YARROW MTS	6.26	2.13	
	KLEINBURG TS	6.04	4.19	
	PLEASANT TS	17.77	6.04	
	TREMAINE TS	1.72	0.58	
	WOODBIDGE TS	0.78	0.27	
	TOTAL	57.08	21.54	
Ottawa	ALBION TS	1.282	1.29	2012 Peak
	BILBERRY CREEK TS	1.21	0.411	
	BRIDLEWOOD MTS	0.75	0.254	
	CARLING TS	29.894	21.025	
	CENTER POINT MTS	0.064	0.021	
	CUMBERLAND DS	0.264	0.09	
	CYRVILLE MTS	0.297	0.101	
	ELLWOOD MTS	0.35	0.119	
	FALLOWFIELD DS	0.14	0.047	
	GREELY DS	0.877	0.298	
	HAWTHORNE TS	2.589	0.882	
	HINCHEY TS	0.128	0.043	

	KANATA MTS**	1.123	0.381	
	KING EDWARD TS	0.125	0.0416	
	LIMEBANK MTS	0.521	0.177	
	LINCOLN HEIGHTS TS	0.381	0.129	
	LISGAR TS	0.07	0.024	
	MANORDALE MTS	0.053	0.018	
	MANOTICK DS	0.543	0.513	
	MARCHWOOD MTS	0.371	0.126	
	MARIONVILLE DS	0.771	0.591	
	MERIVALE MTS	0.14	0.047	
	MOULTON MTS	0.1	0.034	
	NAVAN DS	0.511	0.173	
	NEPEAN TS	1.95	0.662	
	OVERBROOK TS	1.041	0.354	
	RICHMOND MTS	0.28	0.095	
	RIVERDALE TS**	0.248	0.084	
	ROCKLAND DS	0.041	0.014	
	ROCKLAND EAST DS	0.076	0.026	
	RUSSELL DS	0.027	0.009	
	RUSSELL TS	2.185	0.742	
	SOUTH GLOUCESTER DS	0.122	0.041	
	SOUTH MARCH TS	2.264	0.769	
	TERRY FOX MTS	0.132	0.044	
	UPLANDS MTS #2	0.221	0.075	
	WENDOVER DS	0.24	0.0815	
	WILHAVEN DS	2.084	0.708	
	WOODROFFE TS	0.431	0.146	
	TOTAL	53.90	30.69	
Pickering-Ajax-Whitby	THORNTON TS	0.26	0.088	2016 Peak
	WHITBY TS	0.697	0.237	
	WILSON TS	19.48	1.69	
	TOTAL	20.44	2.01	
Parry Sound/Muskoka	BRACEBRIDGE TS	0.0	0.0	2014 Peak (Winter)
	MIDHURST TS DESN1	22.1	0.0	
	MIDHURST TS DESN2	1.8	0.0	
	MINDEN TS	4.8	1.5	
	MUSKOKA TS	12.6	0.1	
	ORILLIA TS	33.3	0.5	
	PARRY SOUND TS	2.2	0.6	
	WAUBAUSHENE TS	21.2	0.0	
TOTAL	98.02	2.75		
Thunder Bay	BIRCH TS	0.54	0.02	2014 Peak (January 20, 2014)
	FORT WILLIAM TS	0.09	0	
	MURILLO DS	0.33	0.08	
	NIPIGON DS	0	0	

	PORT ARTHUR TS	0	0	
	RED ROCK DS	0	0	
	TOTAL	25.1	1	
Windsor-Essex	BELLE RIVER TS	2.7	1.0	2013 Peak (Summer)
	CRAWFORD TS	1.1	0.4	
	ESSEX TS	1.3	0.5	
	KEITH TS	2	0.7	
	KINGSVILLE TS	12.5	3.2	
	LAUZON TS DESN1	5.3	1.9	
	LAUZON TS DESN2	2.8	1.2	
	MALDEN TS	5.3	2.0	
	TILBURY TS	0.0	0.0	
	TILBURY WEST TS	1.8	0.7	
	WALKER TS #1	2	0.8	
	WALKER TS #2	4.9	1.8	
	TOTAL	41.7	14.2	
West of Thunder Bay	AGIMAK DS	-	-	2014 Peak (January 20, 2014)
	BARWICK TS	25	1	
	BURLEIGH DS	-	-	
	CLEARWATER BAY DS	0.01	0.0004	
	DRYDEN TS	0.02	0.0008	
	ETON DS	0.02	0.0008	
	FORT FRANCES MTS	0.05	0.002	
	FORT FRANCES TS	-	-	
	KEEWATIN DS	-	-	
	KENORA DS	-	-	
	KENORA MTS	0.045	0.0018	
	MARGACH DS	0.005	0.0002	
	MINAKI DS	-	-	
	MOOSE LAKE TS	0.01	0.0004	
	NESTOR FALLS DS	0.01	0.0004	
	SAM LAKE DS	0.02	0.0006	
	SAPAWE DS	-	-	
	SHABAQUA DS	-	-	
	SIOUX NARROWS DS	0.01	0.0004	
	VALORA DS	-	-	
VERMILLION BAY DS	-	-		
TOTAL	25.1	1		
York	HOLLAND TS	4.4	1.5	2013 Peak (Summer)
	ARMITAGE TS	11.6	3.6	
	BROWN HILL TS	32.0	10.9	
	BUTTONVILLE TS	1.4	0.5	
	MARKHAM 1 MTS	2.2	0.7	
	MARKHAM 2 MTS	6.8	4.9	
	MARKHAM 3 MTS	5.3	3.7	

	MARKHAM 4 MTS	0.5	0.2
	RICHMOND HIL MTS	3.1	1.0
	VAUGHAN 1 MTS	5.9	2.0
	VAUGHAN 2 MTS	3.1	1.1
	VAUGHAN 3 MTS	2.5	0.8
	TOTAL	78.8	31.3

Notes:

[*] No additional distributed generation has come into service in the North of Dryden sub region than was considered as part of the IRRP in section 4.2.

[**] Kanata MTS and Riverdale TS in the Greater Ottawa Region have reduced MW of connected DG comparing to 2016 since the 2016 report had mistakenly included the DG that have been connected prior to 2012.

A.3 Other Initiatives

Other Electricity System Initiatives, as identified by the IESO, include:

Sub region	Other Electricity System Initiatives
Barrie/Innisfil	There is a Local Achievable Potential Study being developed in the Barrie area to explore the potential of demand side options to help address the needs identified in regional planning. These studies are a part of the continued efforts to explore non-wires options as part of the integrated solutions to manage identified needs.
Brant	No updates available
Bronte	No updates available
Central Toronto	There is a Local Achievable Potential Study being developed in the Central Toronto area to explore the potential of demand side options to help address the needs identified in regional planning. These studies are a part of the continued efforts to explore non-wires options as part of the integrated solutions to manage identified needs.
Greenstone-Marathon	No updates available
Greater London	No updates available
KWCG	No updates available
North of Dryden	No updates available
Northwest GTA	No updates available
Ottawa	There is a Local Achievable Potential Study being developed in the Ottawa area to explore the potential of demand side options to help address the needs identified in regional planning. These studies are a part of the continued efforts to explore non-wires options as part of the integrated solutions to manage identified needs.
Pickering-Ajax-Whitby	No updates available
Parry Sound/Muskoka	There is a Local Achievable Potential Study being developed in the Parry Sound/Muskoka area to explore the potential of demand side options to help address the needs identified in regional planning. These studies are a part of the continued efforts to explore non-wires options as part of the integrated solutions to manage identified needs.
Thunder Bay	No updates available
Windsor-Essex	No updates available
West of Thunder Bay	No updates available

York	There is a Local Achievable Potential Study being developed in the York Region to explore the potential of demand side options to help address the needs identified in regional planning. These studies are a part of the continued efforts to explore non-wires options as part of the integrated solutions to manage identified needs.
-------------	--

APPENDIX B. PLANNING STATUS LETTERS

The TSC requires that letters be issued by the transmitter as per Section 3C.2.2 item (h):

(h) within 45 days of receipt of a request to do so, provide a letter to a licensed distributor or a licensed transmitter confirming the status of regional planning for a region, including any Regional Infrastructure Plan that is being developed for the region that includes the distributor's licensed service area or within which the requesting transmitter's transmission system is located, suitable for the purpose of supporting an application proposed to be filed with the Board by the distributor or requesting transmitter.

In compliance with this requirement, Hydro One has provided Planning Status Letters to the following LDCs since October 2017

- EPCOR (Formerly Collus PowerStream)
- Energy+ Inc.