

Greater Bruce/Huron Region Scoping Assessment Report

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Greater Bruce/Huron Region Participants

Companies

Independent Electricity System Operator

Hydro One Networks Inc. (Transmission)

Hydro One Networks Inc. (Distribution)

Festival Hydro

Entegrus Powerlines Inc.

ERTH Power

Wellington North Power Inc.

Westario Power Inc.

Scoping Assessment Outcome Report Summary

Region: Greater Bruce/Huron

Start Date: Jun 26, 2019

End Date: September 19, 2019¹

¹ Updated September 17, 2020

1. Introduction

This Scoping Assessment Outcome Report is part of the Ontario Energy Board (OEB)'s regional planning process. The Board endorsed the Planning Process Working Group's Report to the Board in May 2013 and formalized the process and timelines through changes to the Transmission System Code and Distribution System Code in August 2013.

The first cycle of regional planning for the Greater Bruce/Huron region was completed in August 2017. Needs were identified in the near- to medium-term time frames, and a number of solutions were recommended to address them.

The second cycle of the regional planning process for the Greater Bruce/Huron region was triggered in April 2019. The Needs Assessment (NA) is the first step in the regional planning process and was carried out by the study team led by Hydro One Networks Inc. (Hydro One). The needs identified in the resulting report, issued on May 31, 2019, identified a number of needs. These needs are inputs to the scoping process to determine the planning process required.

During the Scoping Assessment process, regional participants reviewed the nature and timing of known needs to determine the most appropriate planning approach going forward, as well as the best geographic grouping of the needs in order to efficiently facilitate further studies. The planning approaches considered include:

- An Integrated Regional Resource Plan (IRRP), where regional coordination is needed and there is a potential for wide range of options including both wires and non-wires options;
- A Regional Infrastructure Plan (RIP), which considers wires-only options; and
- A local plan undertaken by the transmitter and the affected local distribution company (LDC), where no further regional coordination is needed.

This report:

- Lists the needs requiring more comprehensive planning and regional coordination;
- Reassesses the areas that need to be studied and the geographic grouping of needs;
- Determines the appropriate regional planning approach and scope for each sub-region where a need for regional coordination or more comprehensive planning is identified;
- Creates terms of reference for an IRRP if one is required; and
- Establishes the composition of the Working Group for the IRRP.

2. Team

The Scoping Assessment was carried out by a study team of the following Regional Participants:

- Independent Electricity System Operator
- Hydro One Networks Inc. (Transmission)
- Hydro One Networks Inc. (Distribution)
- Festival Hydro Inc.
- Entegrus Powerlines Inc.
- ERTH Power
- Wellington North Power Inc.
- Westario Power Inc.

3. Categories of Needs, Analysis and Results

I. Overview of the Region

The Greater Bruce/Huron region is located in southwestern Ontario, and comprises the counties of Bruce, Huron and Perth, as well as portions of Grey, Lambton, Wellington, Waterloo, Oxford, Lambton, and Middlesex counties.

Several Indigenous communities reside in the region, including Saugeen First Nation, Nawash First Nation, Chippewas of the Thames First Nation, Aamjiwnaang First Nation, Bkejwanong (Walpole Island First Nation), Chippewas of Kettle and Stony Point, Historic Saugeen Métis and Métis Nation of Ontario.

The electricity infrastructure supplying the Greater Bruce/Huron region is shown in Figure 1.

Local distribution companies (LDCs) that serve this region include Hydro One Distribution, Festival Hydro Inc., Entegrus Powerlines Inc., EARTH Power, Wellington North Power Inc., and Westario Power Inc.

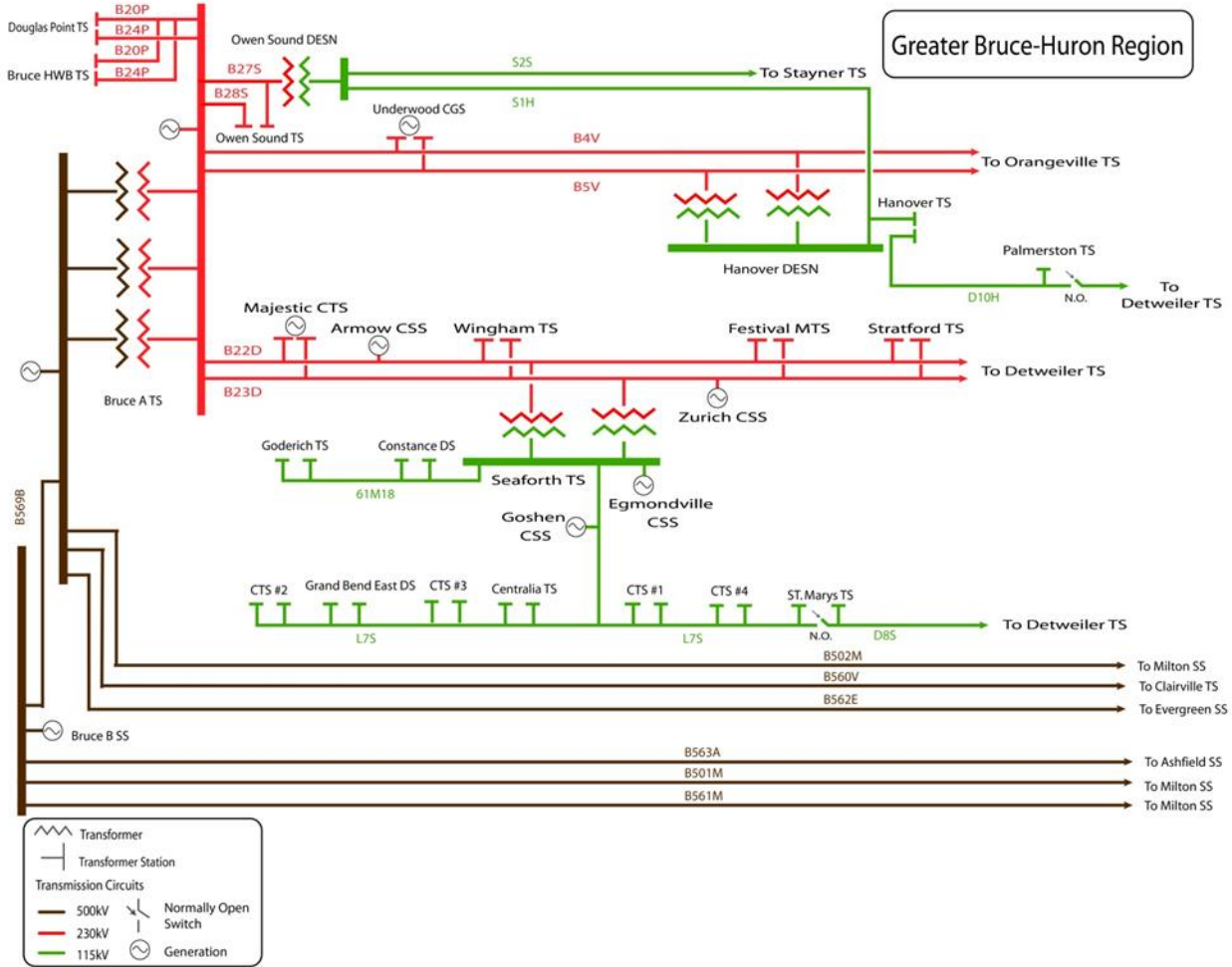
Figure 1: Electricity Infrastructure in the Greater Bruce/Huron Region²



The region is supplied by the 230 kilovolt (kV) and 115 kV transmission lines and stations shown in Figure 1. Main sources of supply come from the Bruce Nuclear Generating Station and local renewable generation facilities. The Bruce A transformer station (TS) and stations in adjacent regions, such as South Georgian Bay/Muskoka and Kitchener-Waterloo-Cambridge-Guelph (KWCG), are connected through 230 kV circuits B4V/B5V, B22D/B23D, B27S/B28S. The recent identified capacity needs in NA are on the 115 kV circuit L7S, located in the southern portion of the region. The L7S circuit provides supply from Seaforth TS and a local wind farm to seven local load stations, including Centralia TS, Grand Bend East DS, St. Marys TS, and four customer transformer stations (CTS). The D8S circuit further connects St. Marys TS to Detweiler TS in the KWCG region.

² The region is defined by electricity infrastructure; geographical boundaries are approximate

Figure 2: Single Line Diagram of Greater Bruce/Huron Region³



II. Background: the previous planning process

The regional planning process was formalized by the OEB in August 2013. To manage this process, Ontario was organized into 21 regions, each of which was assigned to one of three groups by order of priority, with Group 1 regions scheduled to be reviewed first. Greater Bruce/Huron was assigned to Group 3.

The first cycle of regional planning for Greater Bruce/Huron was triggered in February 2016. Completed in May 2016, the NA – the initial stage in the regional planning process identified a number of near- and medium-term needs. Following the NA, the study team agreed that there was no need for further integrated regional planning for the region and localized wires-only plans would be developed to address identified needs.

³ The 500kV side of Bruce A TS, Bruce B SS, and 500 kV lines are not included in the Greater Bruce/Huron study area.

In August 2016, a Regional Infrastructure Plan (RIP) was published that summarized findings from local planning, and reviewed new needs from updated load forecasts in the Kincardine area. The Local Planning Report and RIP recommended: monitoring loading on L7S and increasing the emergency rating once loading approaches capacity; a two-stage plan to reduce frequency and duration of interruptions due to adverse weather; and monitoring load growth in the Kincardine area to identify any potential step-down transformation capacity needs at Douglas Point TS.

These recommendations and current status are summarized in Section III.

The second cycle of regional planning was triggered due to potential incremental load from customer connection requests received in 2018 that would exceed the capacity of L7S. The second cycle started in early 2019 with the NA report published by Hydro One on May 31.

The needs identified in this report form the basis of the analysis for this scoping assessment, and are discussed in further detail in Section III.

III. Needs Identified

Based on the most up-to-date sustainment plans and 10-year demand forecast, Hydro One’s NA identified a number of needs in the Greater Bruce/Huron region. This section outlines the needs and projects/plan identified in the previous cycle of regional planning, and the needs to be addressed in the new cycle.

Needs and plans identified in the last cycle of Greater Bruce/Huron regional planning

The needs and plans recommended in the first cycle of regional planning for the Greater Bruce/Huron region are summarized in Table 1, including summaries of their current statuses.

Table 1: Status of needs and plans from the first cycle of regional planning

Type of Need	Plan	Status
Delivery Point Performance	Enhance delivery point performance for L7S to reduce frequency and duration of outages by installing spacers, ground rods, and remote-controlled load interrupting switches.	Projects to install spacers and ground rods to be initiated and completed in 2020. Installation of remote-controlled load interrupting switches at Kirkton JCT, Biddulph JCT, and St Marys TS are currently in execution phase, expected to be in service by end of 2020.
Capacity	Monitor loading on L7S, and execute solutions from Local Plan that increase emergency thermal rating once loading is anticipated to exceed capacity.	L7S capacity has been re-assessed in the recent NA and capacity needs will be addressed in the new cycle of regional planning.
Capacity	Monitor load growth in Kincardine area connected to Douglas Point TS, and execute solutions when load is anticipated to exceed capacity.	Need is deferred because of slower load growth from latest forecast.

Needs to be addressed in the new regional planning cycle

The needs identified in the 2019 NA are summarized in Table 2 below and are grouped by type. Needs that arise in the next five years are marked as near-term while those arise in the five to ten-year time frame are marked as medium-term timeframe.

Table 2: Needs to be addressed in the new planning cycle

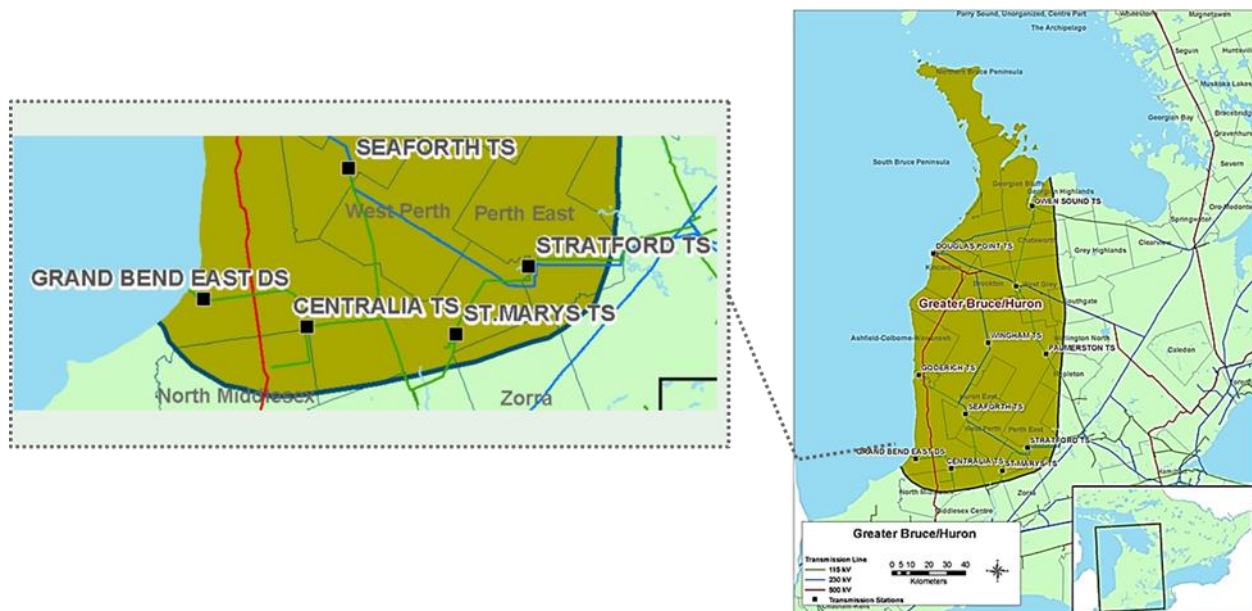
Type of Need	Facilities	Need Date
Equipment End-of-Life	Wingham TS T1/T2 supply transformers and component replacement	2022 (near-term)
Equipment End-of-Life	Stratford TS T1 supply transformer and component replacement	2023 (near-term)
Equipment End-of-Life	Seaforth TS T1/T2/ supply transformers, T5/T6 autotransformers, and component replacement	2023 (near-term)
Equipment End-of-Life	Hanover TS T2 supply transformer and component replacement	2024 (near-term)
Capacity	L7S emergency rating exceeded under contingency (with one element D8S out)	2022 (near-term)
Capacity	L7S continuous rating exceeded with all elements in service	2027 (medium-term)

IV. Analysis of Needs and Identification of Sub-Regions

A number of factors were considered in determining recommended planning approaches to address identified needs in NA, and the overall approach for further study in this area. Broadly speaking, where there is a need for regional coordination, and a potential for a wide range of solutions – including conservation, generation, new technologies, wires infrastructure, and non-wires solutions – an integrated approach is optimal.

The Regional Participants have discussed the needs in the Greater Bruce/Huron region and have identified one sub-region for further study through the regional planning process. The sub-region, “Southern Huron Perth” is shown in Figure 3.

Figure 3: Southern Huron-Perth Sub-Region



Southern Huron-Perth Sub-Region

An integrated approach is recommended to address the capacity needs in the Southern Huron Perth sub-region. This sub-region is summer-peaking, and includes the following infrastructure:

- 115 kV Connected Stations – Grand Bend East DS, Centralia TS, St. Marys TS,
- Four customer owned transformer stations
- 115 kV Transmission Lines – L7S, B8S

Customers in this sub-region are supplied by Entegrus Powerlines Inc., Festival Hydro Inc. or Hydro One Distribution. However, the sub-region’s transmission connected customers are supplied directly by Hydro One Transmission.

There are potential opportunities to assess wires and non-wires solutions to meet the needs in the area, and coordinate end-of-life needs within the context of updated forecast data.

The section below provides additional details on needs to be assessed in the IRRP planning process.

Integrated capacity planning in the Southern Huron-Perth Sub-region

The NA identified both near- and medium-term capacity needs on L7S resulting from load growth in the area it supplies.

This near-term need is expected to arise in 2022, when the emergency rating will be exceeded once D8S is out of service. This need was first identified in the previous cycle of regional planning, and the Local Planning Report, L7S Thermal Overload, was developed in 2016 to evaluate alternatives and recommended solutions.

In the medium-term, the continuous rating of L7S will be exceeded in 2027, even when all facilities are in service. While the existing infrastructure cannot accommodate the 20-year demand forecast in this area, with the slow load growth, non-wires solutions – such as integration of community energy plans, demand response, distributed generation, and storage – should be explored alongside wires solutions. A capacity margin also needs to be considered to prepare for potential additional load growth.

Opportunities to optimize end-of-life investments

Facilities reaching end-of-life provide an opportunity to re-examine their current use and configuration in the context of the latest load forecast and generation data. This will ensure that any new assets installed in their place will continue to appropriately service both the impacted LDCs and their customers, over their lifetime. To allow enough lead time to conduct planning for facilities that are reaching end-of-life, expected service life (ESL) information will be considered to optimize future end-of-life investment.

The study team recommends that the assessment of needs outlined above will benefit from an integrated view. There are potential opportunities to assess wires and non-wires solutions to meet the needs in the area, and to address multiple needs in an optimal manner. The study team recommends that capacity needs in the area supplied by L7S be studied through an IRRP that focuses on the Southern Huron-Perth sub-region, and opportunities for optimizing future end-of-life investments be investigated.

Local Planning

The remaining needs identified in the 2019 Greater Bruce/Huron NA report are related to end-of-life needs at four transformer stations, as noted in Table 3 below.

Local planning is recommended to address these needs as they are singular in nature, and there is limited opportunity to reconfigure and resize the facilities to align with other regional needs. In addition, given that all of these end-of-life needs will arise in the near-term, the study team recommends local planning involving the transmitter and the impacted LDCs as the optimal approach for ensuring reliable supply in the region.

Table 3: Needs to be addressed through local planning

Type of Need	Facilities	Need Date	Planning Approach
Equipment End-of-Life	Wingham TS T1/T2 supply transformers and component replacement	2022 (near-term)	Local Planning
Equipment End-of-Life	Stratford TS T1 supply transformer and component replacement	2023 (near-term)	Local Planning
Equipment End-of-Life	Seaforth TS T1/T2/ supply transformers, T5/T6 autotransformers, and component replacement	2023 (near-term)	Local Planning
Equipment End-of-Life	Hanover TS T2 supply transformer and component replacement	2024 (near-term)	Local Planning

In addition, the IESO has identified low voltage issues at Hanover TS upon the loss of 230 kV circuits B4V/B5V. This issue will be further investigated in a bulk study of the Bruce area.

4. Conclusion

The Scoping Assessment concludes that:

- An IRRP be undertaken for the Southern Huron-Perth sub-region to:
 - Plan for near- and medium-term capacity needs in the sub-region supplied by L7S, taking into account of non-wires alternatives
 - Explore opportunities to optimize end-of-life investments
- Additional needs identified in the NA (outlined below) will be addressed through local planning involving the transmitter and relevant LDC:
 - End-of-life replacements
 - T1/T2 transformers and components at Wingham TS
 - T1 transformer and component at Stratford TS
 - T5/T6 autotransformers, and T1/T2 transformers at Seaforth TS
 - T2 transformer and component at Hanover TS
- Hanover TS voltage issue upon loss of 230 kV circuits B4V/B5V will be further investigated in a bulk study of the Bruce area.

The draft Terms of Reference for the Southern Huron-Perth sub-region IRRP is attached in Appendix A.

List of Acronyms

Acronym	Description
CDM	Conservation and Demand Management
DG	Distributed Generation
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resource Plan
kV	Kilovolt
LDC	Local Distribution Company
MW	Megawatt
NA	Needs Assessment
OEB	Ontario Energy Board
ORTAC	Ontario Resource and Transmission Assessment Criteria
RIP	Regional Infrastructure Plan
TS	Transformer Station

Appendix A: Southern Huron-Perth Sub-region IRRP Terms of Reference

1. Introduction and Background

These Terms of Reference establish the objectives, scope, key assumptions, roles and responsibilities, activities, deliverables and timelines for an Integrated Regional Resource Plan (IRRP) for the Southern Huron-Perth sub-region, as part of the Greater Bruce Huron Region.

Based on the needs identified within the sub-region, including opportunities for coordinating demand and supply options with capacity needs in the sub-region supplied by L7S, an integrated regional resource planning approach for the Southern Huron-Perth sub-region is recommended.

The Greater Bruce/Huron Region

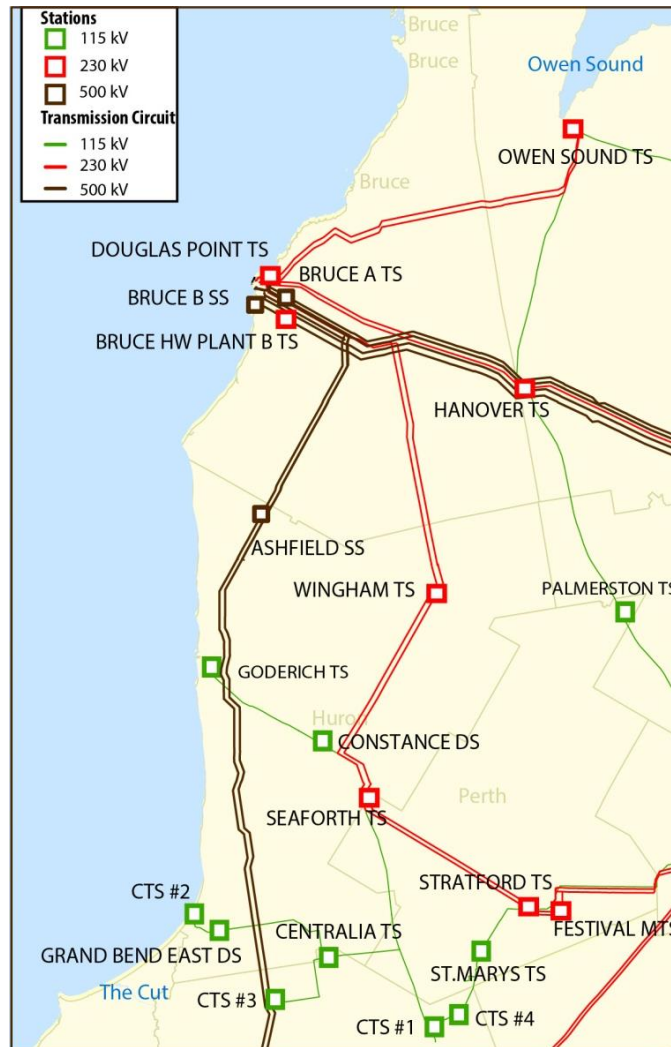
The Greater Bruce/Huron region is located in southwestern Ontario that comprises the counties of Bruce, Huron and Perth, as well as portions of Grey, Wellington, Waterloo, Oxford, Lambton, and Middlesex counties. Several Indigenous communities reside in the region, including Saugeen First Nation, Nawash First Nation, Chippewas of the Thames First Nation, Aamjiwnaang First Nation, Bkejwanong (Walpole Island First Nation), Chippewas of Kettle and Stony Point, Historic Saugeen Métis and Métis Nation of Ontario.

The Southern Huron-Perth Sub-Region

This IRRP is for the Southern Huron-Perth sub-region supplied by L7S, which includes municipalities of Bluewater, South Huron, Lambton Shores, Lucan Biddulph, Middlesex Centre, North Middlesex, Thames Centre, Zorra, Perth South, Town of St. Marys, and West Perth.

The approximate geographical boundaries of the sub-region are shown in Figure A-1.

Figure A-1: Electricity Infrastructure in the Southern Huron-Perth Sub-Region⁴

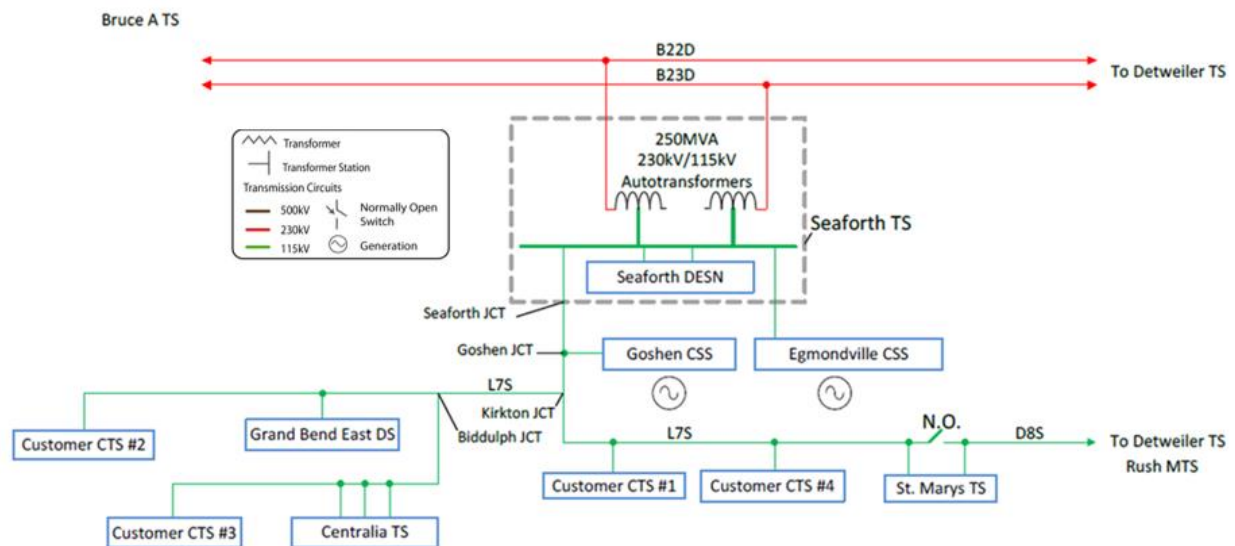


⁴ The region is defined by electricity infrastructure; geographical boundaries are approximate

Greater Bruce/Huron Region Electricity System

The Greater Bruce/Huron region's electricity demand is comprised of a mix of residential, commercial and industrial loads. It is a winter-peaking region, although the Southern Huron-Perth sub-region, which is the focus of this IRRP, is summer-peaking. The Greater Bruce/Huron region is supplied by 230 kV and 115 kV transmission lines and stations as shown in Figure A-2. In the Southern Huron-Perth sub-region, L7S provides supply from Seaforth TS and a local wind farm to seven local load stations, including Centralia TS, Grand Bend East DS, St. Marys TS, and four customer transformer stations (CTS). The D8S circuit further connects St. Marys TS to Detweiler TS in the KWCG region.

Figure A-2: Single Line Diagram of Southern Huron-Perth Sub-Region



1. Background

The regional planning process was formalized by the OEB in August 2013. To manage the regional planning process, Ontario was organized into 21 regions, each of which was assigned to one of three groups by order of priority, where Group 1 region were reviewed first. Greater Bruce/Huron was assigned to Group 3.

The first cycle of regional planning of the Greater Bruce/Huron region started in February 2016 with the Needs Assessment (NA) process, and proceeded to local planning. Subsequently, and in accordance with the OEB's process, Hydro One Transmission published a regional infrastructure plan (RIP) in August 2017.

The second cycle of regional planning, triggered primarily by connection requests in the Southern Huron-Perth sub-region, launched in early 2019, starting with the NA process. Hydro One published its NA report on May 31, 2019. Multiple needs identified in the report require an integrated regional consideration. The Scoping Assessment led by the IESO with Hydro One and LDCs in the region has concluded that an IRRP be undertaken to address these needs in the Southern Huron-Perth sub-region.

2. Objectives

The Southern Huron-Perth IRRP will assess the adequacy of electricity supply to customers in the sub-region supplied by L7S, explore opportunities to optimize future end-of-life investments, and make recommendations to maintain reliability of supply to the sub-region over the next 20 years. Specifically, the IRRP will:

- Assess the adequacy of electricity supply to customers in the study area over the next 20 years;
- Determine whether there is a need to initiate development work or to fully commit infrastructure investments in this planning cycle;
- Identify and coordinate major asset renewal needs with customer needs, and develop a flexible, comprehensive, integrated electricity plan for Greater Bruce/Huron; and,
- Develop an implementation plan, while maintaining the flexibility required to accommodate changes in key assumptions over time.

3. Scope

This IRRP will develop and recommend an integrated plan to meet the needs in the Southern Huron-Perth sub-region within the Greater Bruce/Huron region. The plan is a joint initiative involving the IESO, Hydro One Transmission, and LDCs in this sub-region including Hydro One Distribution, Festival Hydro Inc., and Entegrus Powerlines Inc., which are the five members of the Working Group for the SHPIRRP.

The IRRP will focus on these specific items in order of priority:

- Integrated planning for capacity needs for the Southern Huron-Perth sub-region supplied by L7S, including documentation of outcomes and rationale of capacity needs related to L7S emergency rating, and the development of plans for longer term needs related to the L7S continuous rating; and,
- Opportunities to optimize future end-of-life investments

Like all IRRPs, in its identification or confirmation of any capacity or restoration needs, an analysis of options for addressing end-of-life needs, the plan will integrate:

- Forecast electricity demand growth, conservation and demand management (CDM) with transmission;
- Distribution system capability
- Relevant community plans
- Other bulk system developments; and,
- Distributed energy resources (DER) uptake

Based on the identified needs, the Southern Huron-Perth IRRP process will:

- 1) Create an updated 20-year demand forecast for the study area
- 2) Confirm the adequacy of transformer station ratings and the area's load meeting capability and reliability through:
 - a. Identification or confirmation of transformer station capacity needs and sufficiency of the area's load meeting capability for the study period using the updated load forecast
 - b. Confirmation of identified restoration needs using the updated load forecast

- c. Collection of information on any known reliability issues and load transfer capabilities from the local distribution companies (LDCs)
- 3) For confirmed needs, carry out an assessment of options using decision-making criteria included, but not limited to, technical feasibility, economics, reliability performance, and environmental and social factors

The options analysis has been divided into groupings based on the priority/timing of the needs, any known lead time information, and the depth of analysis required

- 4) Develop long-term recommendations and the implementation plan
- 5) Complete the IRRP report, and document near-, mid-, and long-term needs and recommendations

In order to carry out this scope of work, the working group will consider the data and assumptions outlined in section 4 below.

4. Data and Assumptions

The plan will consider the following data and assumptions:

- Demand Data
 - Historical coincident and non-coincident peak demand information for the region
 - Historical weather correction, for median and extreme conditions
 - Gross peak demand forecast scenarios by region, TS, etc.
 - Coincident peak demand data including transmission-connected customers
 - Identified potential future load customers
- Conservation and Demand Management
 - LDC CDM plans
 - Incorporation of verified results and CDM programs/opportunities in the area
 - Long-term conservation forecast for LDC customers based on planned provincial CDM activities
 - Conservation potential studies, if available
 - Potential for CDM at transmission-connected customers' facilities
 - Load segmentation data for each TS based on customer type (e.g., residential, commercial, industrial, agricultural) and the proportion of LDC service territory within the study area
- Local resources
 - Existing local generation, including distributed generation (DG), district energy, customer-based generation, non-utility generators and hydroelectric facilities as applicable
 - Existing or committed renewable generation from Feed-in-Tariff (FIT) and non-FIT procurements
 - Future resource proposals as relevant

- Relevant local plans, as applicable
 - LDC Distribution System Plans
 - Community Energy Plans, Indigenous Community Energy Plans, and Municipal Energy Plans
 - Municipal Growth Plans
 - Any transit plans impacting electricity use or tied to community developments
- Criteria, codes and other requirements
 - Ontario Resource and Transmission Assessment Criteria (ORTAC)
 - Supply capability
 - Load security
 - Load restoration requirements
 - NERC and NPCC reliability criteria, as applicable
 - OEB Transmission System Code
 - OEB Distribution System Code
 - Reliability considerations, such as the frequency and duration of interruptions to customers
 - Other applicable requirements
- Existing system capability
 - Transmission line ratings as per transmitter records
 - System capability as per current IESO PSS/E base cases
 - Transformer station ratings (10-day LTR) as per asset owner
 - Load transfer capability
 - Technical and operating characteristics of local generation
- End-of-life asset considerations and sustainment plans
 - Transmission assets
 - Distribution assets
 - Impact of ongoing plans and projects on applicable facility ratings
- Other considerations, as applicable

5. Working Group

The core Working Group will consist of planning representatives from the following organizations including embedded LDCs that have identified needs in the Southern Huron-Perth sub-region:

- Independent Electricity System Operator (Team Lead for IRRP)
- Hydro One Distribution
- Festival Hydro Inc.
- Entegrus Power Lines Inc.
- Hydro One Transmission

Authority and Funding

Each entity involved in the study will be responsible for complying with regulatory requirements as applicable to the actions/tasks assigned to that entity under the implementation plan resulting from this IRRP. For the duration of the study process, each participant is responsible for their own funding.

6. Engagement

Integrating early and sustained engagement with communities and stakeholders in the planning process was recommended by the IESO and adopted by the provincial government to enhance the regional planning and siting processes in 2013. The Working Group is committed to conducting plan-level engagement throughout the development of the Southern Huron-Perth IRRP.

The first step in engagement will consist of meetings with municipalities (lower tier and upper tier) and Indigenous communities within the planning area to discuss regional planning, the development of the Southern Huron-Perth IRRP, and integrated solutions.

Regional and community engagement will continue throughout the development and completion of the plan. The Working Group will develop a comprehensive stakeholder engagement plan, according to the Activities Timeline shown in Section 6.

7. Activities, Timeline and Primary Accountability

Table A-1: Summary of IRRP Timelines and Activities

#	Activity	Lead Responsibility	Deliverable(s)	Time frame
1	Prepare Terms of Reference considering stakeholder input	IESO	Finalized Terms of Reference	July-Sept 2019
2	Develop the planning forecast for the sub-region	-	-	-
2	Establish historical coincident and non-coincident peak demand information	IESO	Long-term planning forecast scenarios	Sept-Nov 2019
2	Establish historical weather correction, median and extreme conditions	IESO	Long-term planning forecast scenarios	Sept-Nov 2019
2	Establish gross peak demand forecast and high/low growth scenarios	LDCs	Long-term planning forecast scenarios	Sept-Nov 2019
2	Establish existing, committed and potential DG	LDCs	Long-term planning forecast scenarios	Sept-Nov 2019
2	Establish near- and long-term conservation forecasts based on planned CDM activities	IESO	Long-term planning forecast scenarios	Sept-Nov 2019
2	Develop planning forecast scenarios - including the impacts of CDM, DG and extreme weather conditions	IESO	Long-term planning forecast scenarios	Sept-Nov 2019

#	Activity	Lead Responsibility	Deliverable(s)	Time frame
3	Provide information on load transfer capabilities under normal and emergency conditions	LDCs	Load transfer capabilities under normal and emergency conditions	Sept-Nov 2019
4	Provide and review relevant community plans, if applicable	LDCs and IESO	Relevant community plans	Sept-Nov 2019
5	Review expected service life (ESL) information to optimize future end-of-life (EOL) investment	IESO and Hydro One Transmission	Summary of ESL/EOL review findings regarding optimization opportunities	Sept-Nov 2019
6	Capacity planning of the Southern Huron-Perth subregion	-	-	-
6	Obtain PSS/E base case, include bulk system assumptions as identified in the key assumptions	IESO	Summary of needs based on demand forecast scenarios for the 20-year planning horizon	Q4 2019 – Q2 2020
6	Apply reliability criteria as defined in ORTAC to demand forecast scenarios	IESO	Summary of needs based on demand forecast scenarios for the 20-year planning horizon	Q4 2019 – Q2 2020
6	Confirm and refine the need(s) and timing/load levels	IESO	Summary of needs based on demand forecast scenarios for the 20-year planning horizon	Q4 2019 – Q2 2020
7	Develop options and alternatives	-	-	-
7	Develop conservation options	IESO and LDCs	Develop flexible planning options for forecast scenarios	Q2-Q4 2020
7	Develop local generation options	IESO and LDCs	Develop flexible planning options for forecast scenarios	Q2-Q4 2020
7	Develop transmission (see Action 7 below) and distribution options	Hydro One, and LDCs	Develop flexible planning options for forecast scenarios	Q2-Q4 2020
7	Develop options involving other electricity initiatives (e.g., smart grid, storage)	IESO/ LDCs with support as needed	Develop flexible planning options for forecast scenarios	Q2-Q4 2020
7	Integrate with bulk needs	IESO	Develop flexible planning options for forecast scenarios	Q2-Q4 2020

#	Activity	Lead Responsibility	Deliverable(s)	Time frame
7	Develop portfolios of integrated alternatives	All	Develop flexible planning options for forecast scenarios	Q2-Q4 2020
7	Complete technical comparison and evaluation	All	Develop flexible planning options for forecast scenarios	Q2-Q4 2020
8	Plan and undertake community and stakeholder engagement	-	-	-
8	Early engagement with local municipalities and Indigenous communities within study area, First Nation communities who may have an interest in the study area, and the Métis Nation of Ontario	All	<ul style="list-style-type: none"> Community and stakeholder engagement plan Input from local communities 	Q4 2019
8	Develop communications materials	All	<ul style="list-style-type: none"> Community and stakeholder engagement plan Input from local communities 	Q4 2019
8	Undertake community and stakeholder engagement	Input from local communities	<ul style="list-style-type: none"> Community and stakeholder engagement plan Input from local communities 	Q3-Q4 2020
8	Summarize input and incorporate feedback	All	<ul style="list-style-type: none"> Community and stakeholder engagement plan Input from local communities 	Q3-Q4 2020
9	Develop long-term recommendations and implementation plan based on community and stakeholder input	IESO	<ul style="list-style-type: none"> Implementation plan Monitoring activities and identification of decision triggers Hand-off letters Procedures for annual review 	Q4 2020 - Q1 2021
10	Prepare the IRRP report detailing the recommended near-, medium- and long-term plan for approval by all parties	IESO	IRRP report	Q1-Q2 2021