London Area Region Scoping Assessment Outcome Report – DRAFT

January 20, 2025

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1. Introduction

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

This is the third cycle of regional planning for the London Area region, and was initiated in autumn 2024. Information and links to earlier products are available on the IESO webpage, here. The Needs Assessment is the first step in the regional planning process and was carried out by the Technical Working Group (TWG) led by Hydro One. This report was finalized on November 26, 2024 and identified needs that require further regional coordination. This need information was an input into the Scoping Assessment. The TWG reviewed the nature and timing of all the known needs in the region to determine the most appropriate planning approach. It also considered past or ongoing initiatives in the region.

The Scoping Assessment considers three potential planning approaches for the region (or sub-regions, if applicable), including: an Integrated Regional Resource Plan (IRRP) – where both wires and non-wires options have potential to address needs; a Regional Infrastructure Plan (RIP) – which considers wires-only options; or a local plan undertaken by the transmitter and affected local distribution company – where no further regional coordination is needed.

This Scoping Assessment report:

- Lists the needs requiring more comprehensive planning, as identified in the Needs Assessment report;
- Reassesses the areas that need to be studied and the geographic grouping of the needs (if required);
- Determines the appropriate regional planning approach and scope where a need for regional coordination or more comprehensive planning is identified;
- Establishes a terms of reference for an IRRP, if an IRRP is required; and
- Establishes the composition of the TWG for an IRRP, if an IRRP is required.

2. Study Team

The Scoping Assessment was carried out with the following participants:

- Independent Electricity System Operator (IESO)
- Hydro One Networks Inc. (Transmission)
- Hydro One Networks Inc. (Distribution)
- Entegrus Powerlines Inc.
- ERTH Power Inc.
- London Hydro Inc.
- Tillsonburg Hydro Inc.

3. Categories of Needs, Analysis, and Results

3.1 Overview of the Region and Sub-Regions

The London Area region is located in southwestern Ontario and includes all or part of the following Municipalities: City of London, City of St. Thomas, City of Woodstock, Elgin County,[1] Middlesex County,[2] Norfolk County, and Oxford County.[3] For electricity planning purposes, the planning region is defined by electricity infrastructure boundaries, not municipal boundaries. The region also encompasses several Indigenous communities that are located in or near the Region, including:

- Aamjiwnaang First Nation;
- Caldwell First Nation;
- Chippewas of Kettle and Stony Point First Nation;
- Chippewas of the Thames First Nation;
- Eelūnaapèewi Lahkèewiit (Delaware Nation);
- Grand River Métis Council;
- Haudenosaunee Confederacy Chiefs Council;
- Mississauga of the Credit First Nation;
- Munsee-Delaware Nation;
- Oneida Nation of the Thames;
- Six Nations of the Grand River; and,
- Walpole Island First Nation (Bkejwanong Territory).

The London Area region is supplied by a network of 230 kV and 115 kV circuits. The 230 kV network is supplied from the bulk transmission system primarily through Longwood TS, and in part through Middleport TS (east of the region). The 115 kV network is supplied through 230/115 kV autotransformers primarily from Buchanan TS and Ingersoll TS, and in part from Burlington TS (east of the region). The electricity infrastructure supplying the region is shown in Figure 1.

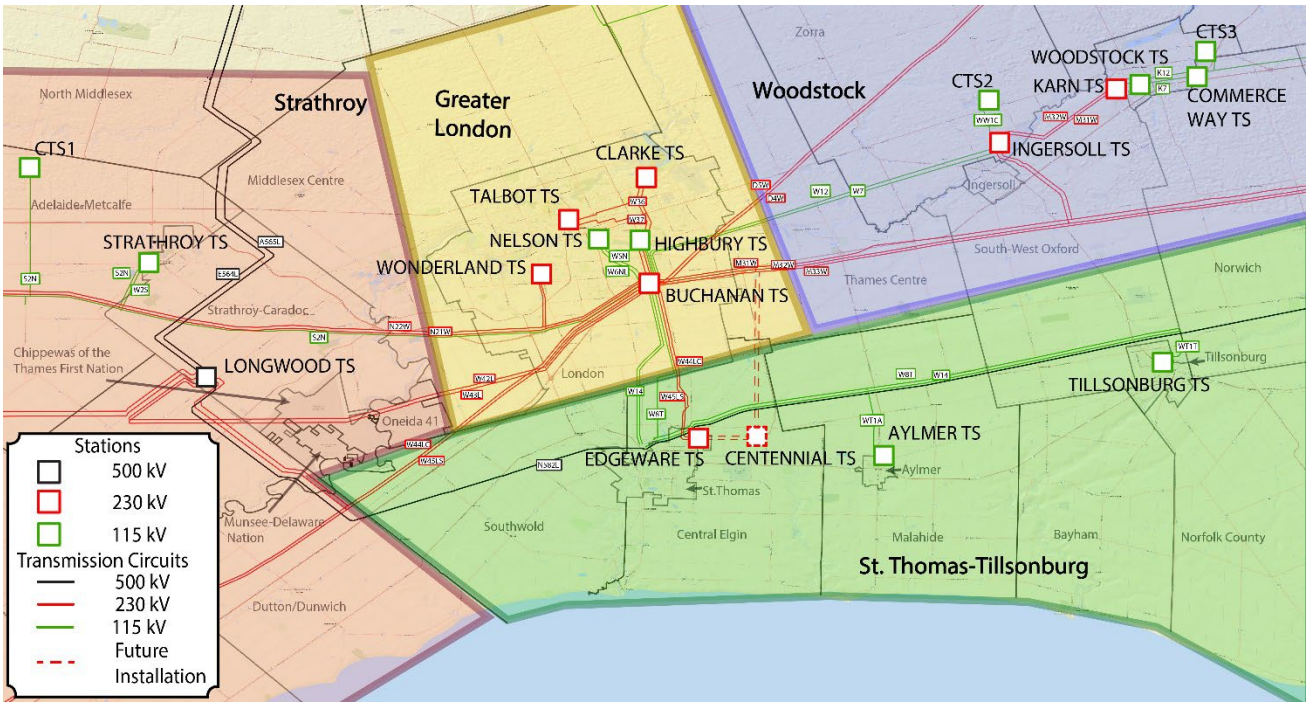
Historically, the London Area region has been sub-divided into five sub-regions. However, upon completing this Scoping Assessment, the TWG has decided upon four sub-regions for the purposes of this cycle of regional planning. The four sub-regions are: Greater London, St. Thomas-Tillsonburg, Strathroy, and Woodstock. Figure 1 also shows the boundaries of the new sub-regions, each of which include both 230 kV and 115 kV subsystems.

[1] Comprising Municipality of Town of Aylmer, Municipality of Bayham, Municipality of Central Elgin, Municipality of West Elgin, Municipality of Dutton/Dunwich, Township of Malahide, Township of Southwold

[2] Comprising Municipality of Adelaide Metcalfe, Municipality of Lucan Biddulph, Municipality of Middlesex Centre, Municipality of North Middlesex, Municipality of Southwest Middlesex, Municipality of Strathroy-Caradoc, Municipality of Thames Centre, Village of Newbury

[3] Comprising Township of Blandford-Blenheim, Township of East Zorra-Tavistock, Town of Ingersoll, Township of Norwich, Township of South-West Oxford, Town of Tillsonburg, Township of Zorra

Figure 1 | Overview of the London Area Region with New Sub-Regions



NOTE: Region is defined by electricity infrastructure; geographical boundaries are approximate.

The Greater London sub-region is geographically centred around the City of London, electrically centred around Buchanan TS, and includes all transformer stations which supply the City of London. Geographically, this covers the City of London and the southeast portion of Middlesex County. This sub-region is primarily supplied from Buchanan TS.

The St. Thomas-Tillsonburg sub-region combines the historically defined St. Thomas and Aylmer-Tillsonburg sub-regions, and includes the areas serviced by Aylmer TS, Edgeware TS (and the future Centennial TS), and Tillsonburg TS. Geographically, this covers the City of St. Thomas, most of Elgin County, the southern portion of Oxford County, and the western portion of Norfolk County. This sub-region is primarily supplied from Buchanan TS.

The Strathroy sub-region was extended to include Longwood TS in addition to Strathroy TS[4]. Geographically, this covers the west portion of Middlesex County, the Chippewas of the Thames First Nation, the Munsee-Delaware Nation, and the Oneida Nation of the Thames. In this sub-region, the 230 kV subsystem is supplied primarily from Longwood TS and supported by Buchanan TS, while the 115 kV subsystem is supplied from Buchanan TS.

The Woodstock sub-region is geographically centred around the City of Woodstock and electrically centred around Ingersoll TS. This sub-region includes Ingersoll TS and the 115 kV subsystem supplied by Karn TS.[5] Geographically, this covers the northern portion of Oxford County. In this sub-region, the 230 kV subsystem is supplied from both Buchanan TS and Middleport TS (east of the region), while the 115 kV subsystem is supplied from Karn TS and Burlington TS (east of the region).

[4] Industrial customer CTS1 is also considered within the Strathroy sub-region.
[5] Industrial customers CTS2 and CTS3 are also considered within the Woodstock sub-region.

The London Area region is summer-peaking (i.e., electricity demand is highest during the summer months) and had a coincident, net peak demand of 1,112 MW in 2023. Demand in the region is expected to grow strongly, particularly in the near term, resulting in several needs throughout the region.

3.2 Background of the Previous Planning Process

The first cycle of regional planning for the London Area region was initiated with a Needs Assessment led by Hydro One and published in April 2015, which recommended a Scoping Assessment be completed. The Scoping Assessment was published in August 2015, and concluded on a need for: an IRRP for the Greater London sub-region, RIP for the Aylmer-Tillsonburg sub-region, and a local plan for the Strathroy sub-region. The resulting RIP for the region was published in 2017, and local planning reports were published in 2016 and 2017.

The second cycle of regional planning began with a Needs Assessment led by Hydro One, which was published in May 2020. The Needs Assessment recommended a local plan be developed to address a load restoration need affecting the Greater London sub-region, but no further regional coordination was needed. As a result, no Scoping Assessment was completed in the second cycle. The resulting local planning report was completed in October 2021.

Between the second and third cycle of regional planning, the IESO published the Central-West Bulk Plan in April 2024. This bulk plan considered the area from the Municipality of Waterloo and City of Hamilton in the east, to the City of Sarnia and City of Windsor in the west. The bulk plan ensured continued, reliable bulk supply to the London Area region, in light of the Firm Load[6] and potential economic development in the region. As a result, the bulk plan made the following two recommendations.

- Reconstruct the M31W circuit between Buchanan TS and the Firm Load tap point with higher capacity double circuit towers, strung with one circuit but capable of accommodating a second circuit in the future, if/when needed.
- Implement dynamic voltage devices at Ingersoll TS, as well as across the Central-West area as demand grows. Since this is a long-term need, firm recommendations were not made as part of the Plan, so as to be responsive to when and where load materializes.

The third cycle of regional planning was triggered one year ahead of its typical 5-year period, due to significant load growth in the region. The third Needs Assessment was completed in November 2024, with the needs identified forming the basis of the analysis for this Scoping Assessment. These needs are discussed in the following Section 3.3.

3.3 Needs Identified

The 2024 Needs Assessment identified multiple needs in the London Area region using a 10-year station-level demand forecast provided by the local distribution companies ("LDCs"), updated end-of-life asset condition information from Hydro One, and conservation and demand management ("CDM")

[6] Such as the Volkswagen Electric Vehicle (EV) plant in St. Thomas

and distributed energy resources ("DERs") forecasts provided by the IESO. Table 1 below lists these regional needs and their timing. Their locations are shown in Figure 2.

Since the previous regional planning cycle, the following projects have also been implemented:

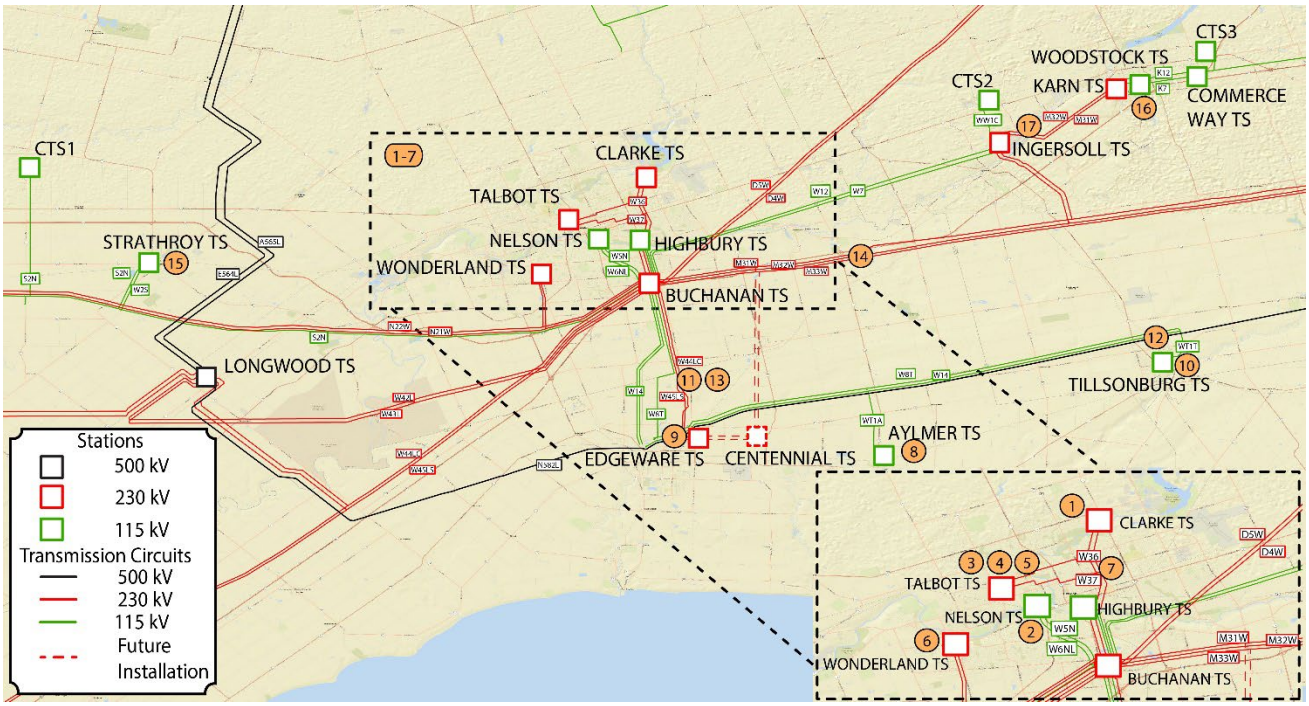
- Aylmer-Tillsonburg reinforcement to reverse the normally open point at Cranberry Junction, completed in 2024
- Nelson TS station refurbishment, completed in 2022
- Tillsonburg TS switchyard component replacement, completed in 2022
- Tillsonburg TS low voltage capacitor bank installation, completed in 2021

Table 1 | Needs to be Addressed in this Planning Cycle

Sub-Region	Need #	Need Description	Timing
Greater London	1	Clarke TS Station Capacity	Near-term
	2	Nelson TS Station Capacity	Medium-term
	3	Talbot TS T1/T2 Station Capacity	Near-term
	4	Talbot TS T3/T4 Station Capacity	Near-term
	5	Talbot TS T3/T4 Asset Renewal	Medium-term
	6	Wonderland TS Station Capacity	Near-term
	7	W36/W37 Load Restoration	Near-term
St. Thomas-Tillsonburg	8	Aylmer TS Station Capacity	Near-term
	9	Edgeware TS Station Capacity	Near-term
	10	Tillsonburg TS Station Capacity	Near-term
	11	Edgeware TS Supply Capacity (W44LC/W45LS)	Medium-term
	12	Tillsonburg TS Supply Capacity (WT1T)	Near-term
	13	W44LC/W45LS Load Restoration	Near-term
	14	M31W/M33W Load Restoration	Near-term
Strathroy	15	Strathroy TS Station Capacity	Near-term

Sub-Region	Need #	Need Description	Timing
Woodstock	16	Woodstock TS Station Capacity	Near-term
	17	M31W/M32W Load Restoration	Near-term

Figure 2 | Geographic Location of Needs Identified in the Needs Assessment



3.4 Analysis of the Needs and Identification of Region

The TWG has discussed the needs in the London Area region and potential planning approaches to address them. The preferred planning approach is generally informed by:

- Timing of the need, including lead time to develop solutions
- The potential linkages between needs and their required coordination, particularly if across overlapping LDC territories or planning regions
- The opportunity for public engagement to inform outcomes
- The potential for exploring multiple types of options to meet the needs (including non-wires alternatives)
- The potential for regional changes having implications on the upstream bulk power system

In general, the more complex a series of needs are and the greater the need for coordination and engagement, the more likely an IRRP will be selected. If needs have few available solutions, are relatively straight forward, and can be implemented without affecting neighbouring areas or the bulk power system, then a more streamlined planning approach with a narrower scope may be appropriate.

The TWG agreed that a range of alternatives including wires and non-wires solutions should be assessed to address the identified needs. Although Need #5 (Talbot TS T3/T4 Asset Renewal) does not generally require coordinated planning, and Need #7 (W36/W37 Load Restoration) was previously studied,[7] these needs should still be considered in the scope of further study. This is because the solutions for other needs in the region may impact these needs, and vice-versa.

To organize the scope of the further studies needed, the TWG reassessed the sub-regions of the London Area region. Based on the layout and location of the electricity infrastructure, and after considering the needs in Table 1, the TWG reorganized the region into four sub-regions: Greater London, St. Thomas-Tillsonburg, Strathroy, and Woodstock.

The sub-regions are largely characterized by their electrical supply in relation to Buchanan TS: Greater London from Buchanan TS northbound, St. Thomas-Tillsonburg from Buchanan TS southbound, Strathroy from Buchanan TS westbound, and Woodstock from Buchanan TS eastbound. The new sub-regions help organize interdependent needs into largely independent sub-regions for the purposes of regional planning[8]. However, solutions to Needs #14 and #17 (M31W/M33W Load Restoration, and M31W/M32W Load Restoration) will necessarily have impacts on both the St. Thomas-Tillsonburg and Woodstock sub-regions.

Due to the multiple complexities listed below, **the TWG agreed that an IRRP should be undertaken for the entire London Area region**. For these same reasons, the full 18-month IRRP timeline is expected to be required.

- Most needs are interdependent (i.e., solutions to one need will impact other needs), requiring coordination between solutions and consideration of benefit stacking when assessing solutions.
- Exploring multiple types of options to meet the needs (including both wires and non-wires alternatives) will be required.
- Almost all needs have a near-term timing, which re-emphasizes the need for coordination between solutions and an "all-of-the-above" approach for solutions.
- Needs #14 and #17 affect two sub-regions, requiring coordination between the sub-regions and multiple LDCs.
- The TWG expects that several options to be explored will have implications on the upstream bulk power system. These implications will also need to be assessed with each option.
- The large magnitude and number of needs, significant upcoming economic development, and municipally driven energy/climate action plans suggests that significant developments to the electricity infrastructure in the London Area region will be needed. The opportunity for public engagement to inform outcomes will be critical for developing successful solutions.

[7] See 2021 Greater London Sub-region Restoration Local Planning Report
[8] Note, bulk system impacts are still dependent on all sub-regions

3.5 Additional Considerations for the Region

The London Area region is one of the fastest growing urban centres in Canada, with its population increasing by 10 per cent between 2016 and 2021, through newcomers from other countries, as well as other Canadian cities.[9] With large industrial facilities both existing and planned in the area, including those for Volkswagen, Amazon and Maple Leaf Foods, employment opportunities and housing starts are projected to continue to grow, as is electrical demand. In addition, the City of London and Oxford County have released decarbonization plans,[10] which are expected to further drive demand growth, and have the potential to shift station peaks from summer to winter.

The forecasting phase of the IRRP will consider economic development and decarbonization initiatives to ensure these are fairly represented in the IRRP forecast. The TWG plans to address this through early engagement with municipalities, industrial customers, and other stakeholders.

[9] See https://www12.statcan.gc.ca/census-recensement/2021/as-sa/98-200-x/2021001/98-200-x2021001-eng.cfm

[10] See the City of London's Climate Emergency Action Plan and Oxford County's 100% Renewable Energy Plan

4. Conclusion and Next Steps

The Scoping Assessment concludes that an IRRP should be undertaken to identify, evaluate, and recommend solutions to address the needs identified for the entire London Area region.

The IRRP will include opportunities for engagement with local communities and stakeholders on the impacts of any initiatives focused on energy, economic development, and/or reducing greenhouse gas emissions, and how the IRRP can coordinate with these plans. This could include economic development plans, Community Energy Plans, net-zero strategies, or similar. Particular attention will be paid to opportunities for information sharing and/or coordination of goals and outcomes.

The draft Terms of Reference for the London Area region IRRP is attached in Appendix 2.

Appendix 1 – List of Acronyms

Acronym	Definition
APO	Annual Planning Outlook
CDM	Conservation and Demand Management
DER	Distributed Energy Resource
DESN	Dual Element Spot Network
DG	Distributed Generation
EV	Electric Vehicle
FIT	Feed-in-Tariff
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resource Plan
kV	Kilovolt
LDC	Local Distribution Company
MW	Megawatt
OEB	Ontario Energy Board
ORTAC	Ontario Resource and Transmission Assessment Criteria
RIP	Regional Infrastructure Plan
TS	Transformer Station
TWG	Technical Working Group

Appendix 2 – London Area IRRP Terms of Reference

1 Introduction and Background

Based on the near- and medium-term needs identified within the region, continued forecast growth, and opportunities to consider solutions in a coordinated manner, an IRRP is recommended for the London Area region.

These Terms of Reference establish the objectives, scope, key assumptions, roles and responsibilities, activities, deliverables, and timelines for the London Area IRRP.

1.1 London Area Region

The London Area region is located in southwestern Ontario and includes all or part of the following Municipalities: City of London, City of St. Thomas, City of Woodstock, Elgin County[11], Middlesex County[12], Norfolk County, and Oxford County[13]. The region also encompasses several Indigenous communities that are located in or near the Region, including:

- Aamjiwnaang First Nation;
- Caldwell First Nation;
- Chippewas of Kettle and Stony Point First Nation;
- Chippewas of the Thames First Nation;
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- Mississauga of the Credit First Nation;
- Munsee-Delaware Nation;
- Oneida Nation of the Thames;
- Six Nations of the Grand River; and,
- Walpole Island First Nation (Bkejwanong Territory).

For electricity planning purposes, the planning region is defined by electricity infrastructure boundaries, not municipal boundaries. The London Area is one of seven planning regions in Southwest Ontario, bounded by the: Chatham-Kent/Lambton/Sarnia region to the west, Greater Bruce/Huron region to the north, and Burlington to Nanticoke region to the east.

[11] Comprising Municipality of Town of Aylmer, Municipality of Bayham, Municipality of Central Elgin, Municipality of West Elgin, Municipality of Dutton/Dunwich, Township of Malahide, Township of Southwold

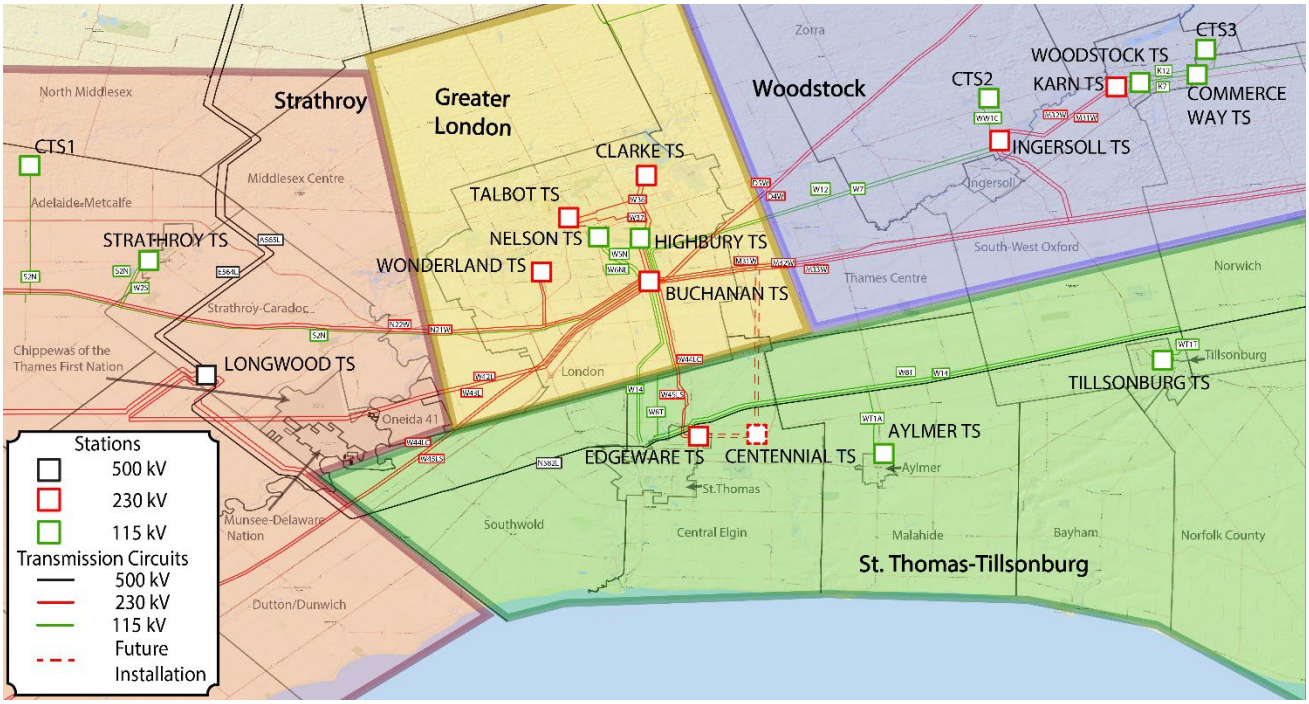
[12] Comprising Municipality of Adelaide Metcalfe, Municipality of Lucan Biddulph, Municipality of Middlesex Centre, Municipality of North Middlesex, Municipality of Southwest Middlesex, Municipality of Strathroy-Caradoc, Municipality of Thames Centre, Village of Newbury

[13] Comprising Township of Blandford-Blenheim, Township of East Zorra-Tavistock, Town of Ingersoll, Township of Norwich, Township of South-West Oxford, Town of Tillsonburg, Township of Zorra

The London Area region is supplied by a network of 230 kV and 115 kV circuits. The 230 kV network is supplied from the bulk transmission system primarily through Longwood TS, and in part through Middleport TS (east of the region). The 115 kV network is supplied through 230/115 kV autotransformers primarily from Buchanan TS and Ingersoll TS, and in part from Burlington TS (east of the region). The TWG has decided upon four sub-regions for the purposes of regional planning, each of which include both 230 kV and 115 kV subsystems. The four sub-regions are Greater London, St. Thomas-Tillsonburg, Strathroy, and Woodstock, and are described in the following subsections.

The electricity infrastructure supplying the region and the boundaries of the new sub-regions are shown in Figure 3.

Figure 3 | Geographic Location of Needs Identified in the Needs Assessment



1.2 Greater London Sub-region

The Greater London sub-region is geographically centred around the City of London, electrically centred around Buchanan TS, and includes all transformer stations which supply the City of London. Geographically, this covers the City of London and the southeast portion of Middlesex County. This sub-region is primarily supplied from Buchanan TS.

1.3 St. Thomas-Tillsonburg Sub-region

The St. Thomas-Tillsonburg sub-region combines the historically defined St. Thomas and Aylmer-Tillsonburg sub-regions, and includes the areas serviced by Aylmer TS, Edgeware TS (and the future Centennial TS), and Tillsonburg TS. Geographically, this covers the City of St. Thomas, most of Elgin County, the southern portion of Oxford County, and the western portion of Norfolk County. This sub-region is primarily supplied from Buchanan TS.

1.4 Strathroy Sub-region

The Strathroy sub-region has been extended to now include Longwood TS in addition to Strathroy TS[14]. Geographically, this covers the west portion of Middlesex County, the Chippewas of the Thames First Nation, the Munsee-Delaware Nation, and the Oneida Nation of the Thames. In this sub-region, the 230 kV subsystem is supplied primarily from Longwood TS and supported by Buchanan TS, while the 115 kV subsystem is supplied from Buchanan TS.

1.5 Woodstock Sub-region

The Woodstock sub-region is geographically centred around the City of Woodstock and electrically centred around Ingersoll TS. This sub-region includes Ingersoll TS and the 115 kV subsystem supplied by Karn TS[15]. Geographically, this covers the northern portion of Oxford County. In this sub-region, the 230 kV subsystem is supplied from both Buchanan TS and Middleport TS (east of the region), while the 115 kV subsystem is supplied from Karn TS and Burlington TS (east of the region).

1.6 Background

In November 2024, Hydro One completed the Needs Assessment report for the London Area region. Several needs were identified throughout the region, and a Scoping Assessment was subsequently commenced to determine the preferred planning approach. An IRRP is ultimately recommended on the basis of the: scale of load growth anticipated, requirement to coordinate solutions across multiple needs, potential for diverse types of solutions (including wires and non-wires), and long-term uncertainty associated with economic development and municipal policies.

2 Objectives

1. To assess the adequacy of electricity supply to customers in the London Area region over the next 20 years.
2. Account for major asset renewal needs, capacity needs, enhancing reliability and resilience, uncertainty in the outlook for electricity demand, and local priorities in developing a comprehensive plan.
3. Consider potential impacts of decarbonization targets and other policy decisions on needs identified and recommended outcomes, consistent with provincial direction.
4. Evaluate opportunities for cost effective non-wires alternatives, including CDM and DERs, as well as wires approaches for addressing the needs identified.
5. Develop an implementation plan that maintains flexibility in order to accommodate changes in key assumptions over time. The implementation plan should identify actions for near-term needs, preparation work for medium-term needs, and planning direction for the long-term.

[14] Industrial customer CTS1 is also considered within the Strathroy sub-region.
[15] Industrial customers CTS2 and CTS3 are also considered within the Woodstock sub-region.

3 Scope

3.1 Needs to be Addressed

This IRRP will develop and recommend an integrated plan to meet the needs of the London Area region. The plan is a joint initiative involving the Technical Working Group as defined in Appendix 2 Section 6. The plan will integrate electricity demand outlook scenarios with CDM and DER uptake in the region, transmission and distribution system capability, asset replacement plans, relevant community plans, bulk system developments, and policy direction as applicable.

The needs of the London Area region are listed in Table 2 below. These needs may be updated, expanded, or contracted during the needs assessment phase of the IRRP, resulting from refined demand forecasts which will be produced during the forecasting phase of the IRRP or from updated asset condition assessments.

Table 2 | Needs Identified in the Needs Assessment as Required Further Study

Sub-Region	Need #	Need Description	Timing
Greater London	1	Clarke TS Station Capacity	Near-term
	2	Nelson TS Station Capacity	Medium-term
	3	Talbot TS T1/T2 Station Capacity	Near-term
	4	Talbot TS T3/T4 Station Capacity	Near-term
	5	Talbot TS T3/T4 Asset Renewal	Medium-term
	6	Wonderland TS Station Capacity	Near-term
	7	W36/W37 Load Restoration	Near-term
St. Thomas-Tillsonburg	8	Aylmer TS Station Capacity	Near-term
	9	Edgeware TS Station Capacity	Near-term
	10	Tillsonburg TS Station Capacity	Near-term
	11	Edgeware TS Supply Capacity (W44LC/W45LS)	Medium-term
	12	Tillsonburg TS Supply Capacity (WT1T)	Near-term
	13	W44LC/W45LS Load Restoration	Near-term
	14	M31W/M33W Load Restoration	Near-term

Sub-Region	Need #	Need Description	Timing
Strathroy	15	Strathroy TS Station Capacity	Near-term
Woodstock	16	Woodstock TS Station Capacity	Near-term
	17	M31W/M32W Load Restoration	Near-term

3.2 Additional Considerations Associated with Economic Development and Decarbonization Initiatives

On April 21, 2023, Volkswagen Group and PowerCo SE announced that they had chosen St. Thomas to build the largest battery cell plant in North America: the St. Thomas Battery Cell Gigafactory ("Gigafactory"). As noted in the news release from the Ontario Office of the Premier: "The plant, Volkswagen's largest to date, will create up to 3,000 direct jobs and up to 30,000 indirect jobs. Once complete in 2027, the plant will produce batteries for up to one million electric vehicles per year". In particular, the City of St. Thomas, City of London, and Elgin County have noted the Gigafactory as an expected source of industrial development in their municipalities over the coming years.

In addition, in June 2018, Oxford County published its 100% Renewable Energy Plan whose goal is to ensure that by 2050, 100% of the annual energy consumed within Oxford County is either generated by renewable energy resources within Oxford County, or purchased from Ontario's transmission system (assumed to be supplied solely by renewable energy resources). Similarly, the City of London published its Climate Emergency Action Plan in April 2022, with a goal of achieving "Net-zero community greenhouse gas (GHG) emissions by 2050".

Both plans include decarbonization activities, such as switching from gasoline vehicles to EVs and switching from natural gas to electric heating, which are expected to have a significant increase on gross demand over the next 25 years. On the other hand, the Plans also include conservation and DER initiatives, which are expected to mitigate some of the growth in demand.

The two plans have unique strategies for implementation, and other municipalities do not have similar plans at this time. As a result, the magnitude of growth, the pacing of growth, and the overall evolution of electricity demand across the London Area region is expected to be unique in each sub-region.

The forecasting phase of the IRRP will need to give special attention to economic development and decarbonization initiatives to ensure that these additional considerations are fairly represented in the IRRP forecast. The TWG plans to address this through early engagement with municipalities, industrial customers, and other stakeholders. Once represented in the forecast, the TWG will then be able to identify what is needed from the electricity infrastructure in the region to support economic development and decarbonization initiatives.

3.3 South and Central Bulk Study

In March 2024, the IESO also published the 2024 Annual Planning Outlook (APO). The APO is an annual report that provides a long-term view of Ontario's electricity system, forecasting system needs and exploring the province's ability to meet them. The 2024 APO identified a need to "review the capability of the bulk system to support future generation connections and demand growth in key areas throughout southern and central Ontario, including the Greater Toronto Area, to enable a decarbonized power system in the future". To address this need, the 2024 APO indicated that the IESO would undertake a South and Central Ontario Bulk Study over 2024 to 2025, and that this study would also be a response to the Powering Ontario's Growth plan, which requires the coordination of studies that involve large changes to flows on the bulk system.

A key objective of the South and Central Bulk Study is to determine the transmission required to enable reliable supply under various long-term high growth, economic development, and electrification scenarios within the Windsor to Hamilton corridor: which includes the London Area region. As the South and Central Bulk Study is conducted in parallel with regional planning in the London Area, its findings (i.e. needs and recommended solutions) will be coordinated with the London Area IRRP.

4 Activities

The IRRP process will consist of the activities listed below. The activities and anticipated timelines are summarized in Section 8 of this document. The first major planning activity following preparation of this Terms of Reference is the development of the electricity demand forecast, which serves as the basis for system assessments. The timing for initiating the assessment (Activity 3) and all subsequent plan development activities will be contingent on the TWG first agreeing on the demand forecast to be used.

1. Develop an electricity demand forecast for the London Area region. This may be comprised of a number of electricity demand scenarios that account for uncertain elements that can affect (e.g., raise or lower) the need for electricity in the region.
2. Confirm baseline technical assumptions including infrastructure ratings, system topology and relevant base cases for simulating the performance of the electric power system. Collect information on:
    a. Transformer, line and cable continuous ratings, long-term and short-term emergency ratings;
    b. Known reliability issues and load transfer capabilities;
    c. Customer load breakdown by transformer station;
    d. Historical and present CDM peak demand savings and installed/effective DER capacity, by transformer station.
3. Perform assessments of the capacity, reliability, and security of the electric power system under each demand outlook scenario.
    a. Confirm and/or refine the needs listed earlier in this section using the demand outlook; establish the sensitivity of each need to different demand outlook scenarios.

b. Identify additional infrastructure capacity needs and any additional load restoration needs; if new needs are discovered, determine the appropriate planning approach for addressing them.

4. Identify options for addressing the needs, including, non-wires and wires alternatives. Where necessary, develop portfolios of solutions comprising a number of options that, when combined, can address a need or multiple needs.
    a. Collect information about the attributes of each option: cost, performance, timing, risk, etc.
    b. Develop cost estimates for all screened-in options as a means of informing further evaluations of alternatives.
    c. Seek cost-effective opportunities to manage growth, by identifying opportunities to reduce electricity demand.
5. Evaluate options using criteria including, but not limited to the areas of: technical feasibility and timing, economics, reliability performance, risk, environmental, regulatory, and social factors. Evaluation criteria will be informed through community engagement activities and reflect attributes deemed important to the community-at-large.
6. Develop recommendations for actions and document them in an implementation plan, to address needs in the near-term and medium-term.
7. Develop a long-term plan for the electricity system in the London Area to address the identified long-term needs, taking into account uncertainty inherent in long-term planning, local and provincial policy goals, commitments, and climate change action plans.
    a. Discuss possible ways the power system in the London Area could evolve to address potential long-term needs, support the achievement of local and provincial long-term policy goals and plans, and support the achievement of the long-term vision for the electricity sector.
    b. During the development of the plan, seek community and stakeholder input to confirm the long-term vision, expected impacts on the electricity system, and inform the recommended actions through engagement.
8. Complete an IRRP report documenting the near-term and medium-term needs, recommendations, and implementation actions; and long-term plan recommendations.

In order to carry out this scope of work, the TWG will consider the data and assumptions outlined in Section 5 below.

5 Data and Assumptions

The plan will consider the following data and assumptions:

Demand Data

- Historical coincident and non-coincident peak demand information by TS, including transmission-connected customers
- Historical weather correction, for median and extreme conditions
- Gross peak demand forecast scenarios by TS

- Identified potential future load customers
- Customer/load segmentation information (e.g. residential, commercial, industrial) by TS

Conservation and Demand Management

- Conservation forecast for LDC customers, based on region's share of current energy efficiency programs
- Potential for CDM at transmission-connected customers' facilities

Local Resources

- Existing local generation, including distributed generation, district energy, customer-based generation, Non-Utility Generators and hydroelectric facilities as applicable
- Existing or committed renewable generation from Feed-in-Tariff and non-Feed-in-Tariff procurements
- Future district energy plans, combined heat and power, energy storage, or other generation proposals

Relevant Local Plans, As Applicable

- LDC Distribution System Plans
- Community Energy Plans and Municipal Energy Plans
- Community Climate Action or Adaptation Plans
- Municipal Growth Plans
- Indigenous Community Energy Plans

Criteria, Codes, and Other Requirements

- Ontario Resource and Transmission Assessment Criteria (ORTAC)
- North American Electric Reliability Corporation and Northeast Power Coordinating Council 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 base cases
- Transformer station ratings (10-day long-term emergency rating) as per asset owner
- Load transfer capability
- Technical and operating characteristics of local generation

End-of-Life Asset Considerations/Sustainment Plans

- Transmission assets
- Distribution assets, as applicable

Other considerations, As Applicable

6 Technical Working Group

The TWG will consist of planning representative(s) from the following organizations:

- Independent Electricity System Operator (IESO)
- Hydro One Networks Inc. (Transmission)
- Hydro One Networks Inc. (Distribution)
- Entegrus Powerlines Inc.
- ERTH Power Inc.
- London Hydro Inc.
- Tillsonburg Hydro Inc.

7 Engagement

Integrating early and sustained engagement with communities and stakeholders in the planning process was recommended and adopted by the provincial government to enhance the regional planning and siting processes in 2013. The need for engagement was subsequently referenced in the formalized regional planning process. As such, the Technical Working Group is committed to conducting plan-level engagement throughout the development of the London Area IRRP.

The first step in engagement will consist of the development of a public engagement plan, which will be made available for comment before it is finalized. The data and assumptions as outlined in Section 5 will help to inform the scope of community and stakeholder engagement to be considered for this IRRP.

8 Activities, Timeline, and Primary Accountability

Table 3 | IRRP Timelines & Activities

Activity	Lead Responsibility	Deliverable(s)	Timeframe
1. Prepare Terms of Reference considering stakeholder input	IESO	Finalized Terms of Reference	February 2025
2. Provide and review relevant community plans, if applicable	LDCs, Indigenous communities, and IESO	Relevant community plans	Q1-Q2 2025

Activity	Lead Responsibility	Deliverable(s)	Timeframe
3. Develop the planning forecast scenarios	All	Long-term planning forecast scenarios	Q1-Q3 2025
a. Establish historical coincident and non-coincident peak demand information	IESO		
b. Establish historical weather correction, median and extreme conditions	IESO		
c. Establish gross peak demand forecast	LDCs		
d. Establish existing, committed, and potential DG	IESO, LDCs		
e. Establish near- and long-term conservation forecast based on planned electricity Demand Side Management and codes and standards	IESO		
4. Complete system studies to identify needs - Obtain IESO base case - Include bulk system assumptions as identified in Data and Assumptions - Apply reliability criteria as defined in ORTAC to demand forecast scenarios - Confirm and refine the need(s) and timing/load levels	IESO, Hydro One Transmission	Summary of needs based on demand forecast scenarios for the 20-year planning horizon	Q3-Q4 2025
5. Reconfirm load transfer capabilities for stations in the region	LDCs	Load transfer capabilities under normal and emergency conditions	Q4 2025
6. Develop options and alternatives	All	Develop flexible planning options for forecast scenarios	Q4 2025-Q2 2026
a. Conduct a screening to identify which wires and non-wires options warrant further analysis	IESO		
b. Verify the Load Meeting Capability of the system to better determine timing of needs and support options development	IESO		
c. Develop screened-in electricity Demand Side Management options	IESO and LDCs		

Activity	Lead Responsibility	Deliverable(s)	Timeframe
d. Develop screened-in local generation/demand management options	IESO and LDCs		
e. Produce hourly forecasts for each transformer station with screened-in local generation/demand management to enable detailed needs characterization and support options development	IESO		
f. Develop the screened-in transmission and distribution alternatives (i.e., alignment with end-of-life sustainment plans, load transfers)	All		
g. Develop portfolios of integrated alternatives	All		
h. Technical comparison and evaluation	All		
7. Plan and undertake community & stakeholder outreach and engagement	IESO	Community and Stakeholder Engagement Plan Input from local municipalities and Indigenous communities	Ongoing
a. Early engagement, including with local municipalities, Indigenous communities within study area, First Nation communities with an interest in the study area, and the Métis Nation of Ontario	All		
b. Develop communications materials	All		
c. Undertake community and stakeholder engagement	All		
d. Summarize input and incorporate feedback	All		

Activity	Lead Responsibility	Deliverable(s)	Timeframe
8. Develop long-term recommendations and implementation plan based on community and stakeholder input	IESO	Implementation plan Monitoring activities and identification of decision triggers Procedures for annual review	Q2 2026
9. Prepare the IRRP report detailing the recommended near-, medium-, and long-term plan for approval by TWG	IESO	IRRP Report	August 2026