

# Greater London IRRP Terms of Reference

## 1. Introduction and Background

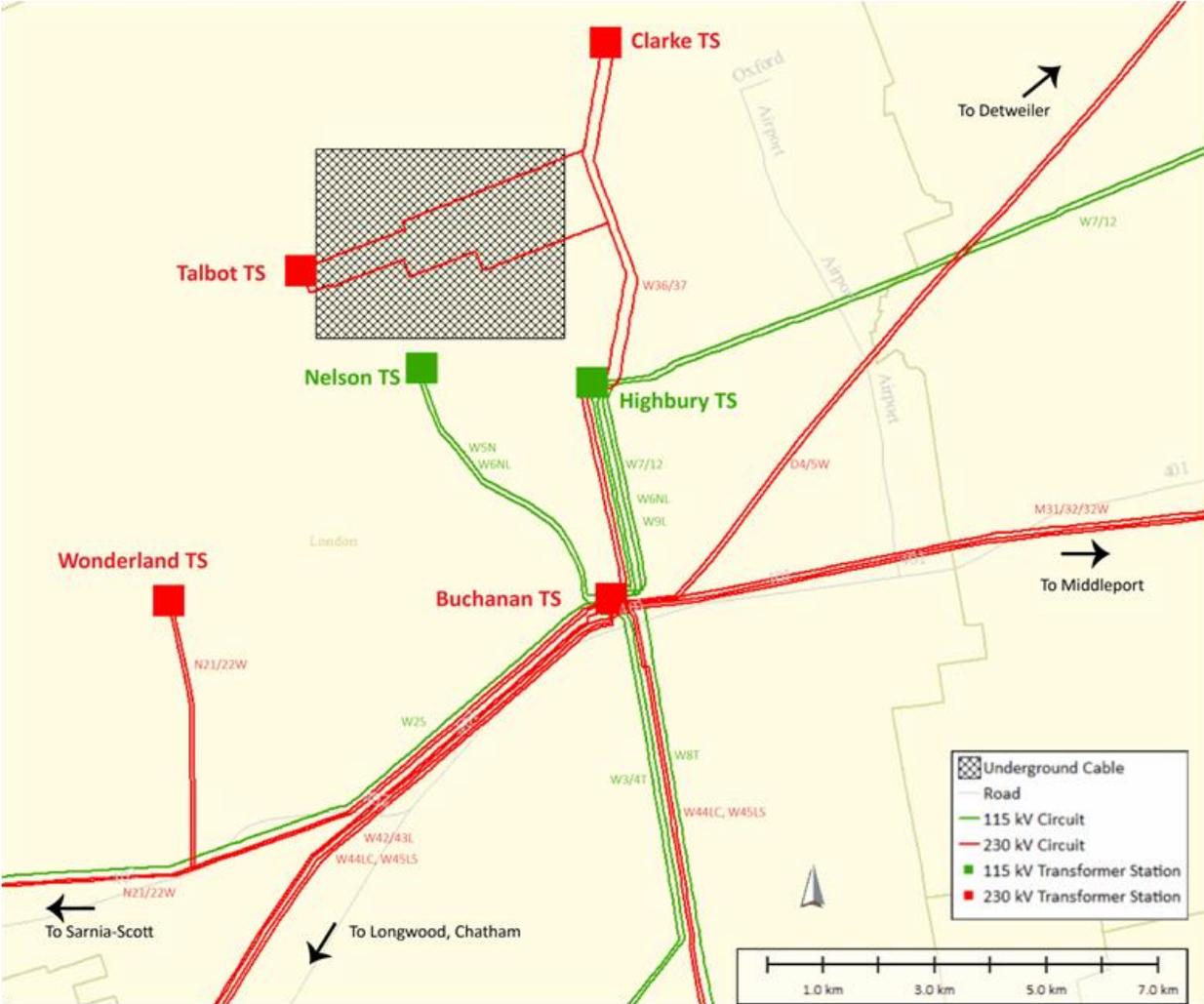
These Terms of Reference (ToR) establish the objectives, scope, key assumptions, roles and responsibilities, activities, deliverables and timelines for an Integrated Regional Resource Plan of the Greater London sub-region (to be referred to as the Greater London IRRP).

Based on the potential for demand growth within this sub-region, limits on the capability of the transmission capacity supplying the area, and opportunities for coordinating demand and supply options, an integrated regional resource planning approach is recommended.

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

Figure 1. Greater London Sub-Region



Source: IESO

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

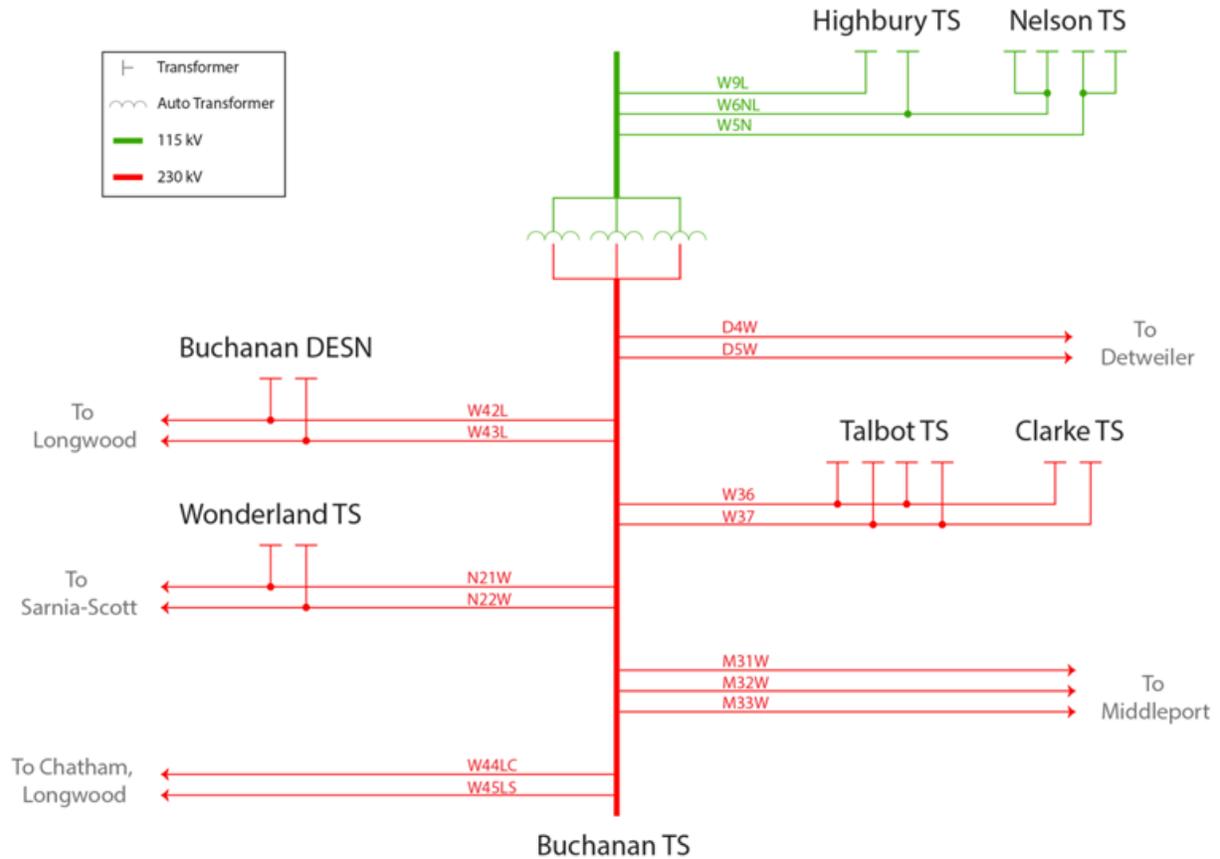
The sub-region includes all or part of the following municipalities:

- City of London
- London Township
- Nissouri Township
- Perth South Township
- Delaware Township
- Dorchester North Township

## Greater London Electricity System

The electricity system supplying the Greater London sub-region is shown in Figure 2.

**Figure 2. Greater London Electricity System**



Source: IESO

## 2. Objectives

1. To assess the adequacy of electricity supply to customers in the Greater London sub-region over the next 20 years.
2. To coordinate customer-driven electricity needs with major asset renewal needs, and develop a flexible, comprehensive, integrated electricity plan for the Greater London sub-region.
3. To develop an implementation plan, while maintaining flexibility in order to accommodate changes in key assumptions over time.

## 3. Scope

This IRRP will develop and recommend an integrated plan to meet the needs of the Greater London sub-region. The plan is a joint initiative involving London Hydro, Hydro One Distribution, Hydro One

Transmission, and the IESO, and will incorporate input from community engagement. The plan will integrate forecast electricity demand growth, conservation and demand management (“CDM”) in the area with transmission and distribution system capability, end-of-life of major facilities in the area, relevant community plans, other bulk system developments, and FIT and other generation uptake through province-wide programs, and will develop an integrated plan to address needs.

This IRRP will address regional needs in the Greater London area, including capacity, security, reliability and relevant end of life consideration of assets. The following existing infrastructure and assumptions are included in the scope of this study:

- Stations—Buchanan DESN, Clarke TS, Highbury TS, Talbot TS, Wonderland TS
- Transmission circuits—W36/37, N21/22W, W5N/W6NL/W9L
- 230/115 kV auto-transformers at Buchanan TS
- Nelson TS is assumed to be redeveloped with low side voltage at 27.6 kV and will be considered as an option of providing load transfer relief to other stations once redeveloped

The Greater London IRRP will:

- Prepare a 20-year electricity demand forecast and establish needs over this timeframe.
- Examine the Load Meeting Capability and reliability of the existing transmission system supplying the Greater London sub-region, taking into account facility ratings and performance of transmission elements, transformers, local generation, and other facilities such as reactive power devices.
- Establish feasible integrated alternatives to address remaining needs, including a mix of CDM, generation, transmission and distribution facilities, and other electricity system initiatives in order to address the needs of the Greater London sub-region.
- Evaluate options using decision-making criteria including but not limited to: technical feasibility, economics, reliability performance, environmental and social factors.

#### **4. Data and Assumptions**

The plan will consider the following data and assumptions:

- Demand Data
  - Historical coincident peak demand information for the sub-region
  - Historical weather correction, median and extreme conditions
  - Gross peak demand forecast scenarios by sub-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 LDC results and progression towards OEB targets, and any other CDM programs/opportunities in the area
  - Long-term conservation initiative

- Conservation potential studies, if available
- Potential for CDM at transmission-connected customers' facilities
- 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 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
- 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 Hydro One transmission 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
- Bulk System considerations to be applied to the existing area network
  - Buchanan auto transformer capability
  - NPLIP interface flow assumptions
- End-of-life asset considerations/sustainment plans
  - Transmission assets
  - Distribution assets
- Other considerations, as applicable

## 5. Working Group

The core Working Group will consist of planning representative/s from the following organizations:

- Independent Electricity System Operator (*Team Lead for IRRP*)
- Hydro One Transmission
- London Hydro
- Hydro One Distribution

### 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.

## 5. Engagement

Integrating early and sustained engagement with communities and stakeholders in the planning process was recommended to and adopted by the provincial government to enhance the regional planning and siting processes in 2013. These recommendations were subsequently referenced in the 2013 Long Term Energy Plan. As such, the Working Group is committed to conducting plan-level engagement throughout the development of the Greater London IRRP.

The first step in engagement will consist of meetings with municipalities and First Nation communities within the planning area, First Nation communities who may have an interest in the planning area and the Métis Nation of Ontario to discuss regional planning, the development of the Greater London plan, and integrated solutions.

Typically this will be followed by the establishment of a Local Advisory Committee for local community members to provide input and recommendations throughout the planning process, including information on local priorities and ideas on the design of community engagement strategies. Broad community engagement will be conducted to obtain public input in the development of the plan.

## 6. Activities, Timeline and Primary Accountability

	Activity	Lead Responsibility	Deliverable(s)	Timeframe
1	<b>Prepare Terms of Reference considering stakeholder input</b>	<i>IESO</i>	- Finalized Terms of Reference	Q3 2015
2	<b>Develop the Planning Forecast for the sub-region</b>		- Long-term planning forecast scenarios	Q3 2015
	- Establish historical coincident peak demand information	<i>IESO</i>		
	- Establish historical weather correction, median and extreme conditions	<i>IESO</i>		
	- Establish gross peak demand forecast	<i>LDCs</i>		
	- Establish existing, committed and potential DG	<i>IESO</i>		
	- Establish near- and long-term conservation forecast based on LDC CDM plans and LTEP target	<i>IESO</i>		
	- Develop planning forecast scenarios - including the impacts of CDM, DG and extreme weather conditions	<i>IESO</i>		
3	<b>Provide information on load transfer capabilities under normal and emergency conditions</b>	<i>LDCs</i>	- Load transfer capabilities under normal and emergency conditions	Q3 2015
4	<b>Provide and review relevant community plans, if applicable</b>	<i>LDCs First Nations and IESO</i>	- Relevant community plans	Q3 2015
5	<b>Complete system studies to identify needs</b> - Obtain PSS/E base case - Include bulk system assumptions as identified in Key Assumptions - Apply reliability criteria as defined in ORTAC to demand forecast scenarios - Confirm and refine the need(s) and timing/load levels	<i>IESO, Hydro One Transmission</i>	- Summary of needs based on demand forecast scenarios for the 20-year planning horizon	Q4 2015
6	<b>Develop Options and Alternatives</b>		- Develop flexible planning options for forecast scenarios	Q1 2016
	Identify solutions requiring immediate implementation and prepare hand-off letters to responsible parties (if applicable)	<i>IESO</i>		
	Develop conservation options	<i>IESO and LDCs</i>		
	Develop local generation options	<i>IESO and LDCs</i>		
	Develop transmission and/or distribution options including maximizing existing infrastructure capability	<i>IESO, Hydro One Transmission and LDCs</i>		
	Develop options involving other electricity initiatives (e.g., smart grid, storage)	<i>IESO/ LDCs with support as needed</i>		
	Develop portfolios of integrated alternatives	<i>All</i>		

	Technical comparison and evaluation	<i>All</i>		
<b>7</b>	<b>Plan and Undertake Community &amp; Stakeholder Engagement</b>		<ul style="list-style-type: none"> <li>- Community and Stakeholder Engagement Plan</li> <li>- Input from local communities, First Nation communities, and Métis Nation of Ontario</li> </ul>	
	- Establish engagement subcommittee of the Working Group	<i>All</i>		Q3 2015
	- Early engagement with local municipalities and First Nation communities within study area, First Nation communities who may have an interest in the study area, and the Métis Nation of Ontario	<i>All</i>		Q3- Q4 2015
	- Establish Local Advisory Committee and First Nations Local Advisory Committee and develop broader community engagement plan with LAC input	<i>All</i>		Q4 2015
	- Develop communications materials	<i>All</i>		Q1-Q2 2016
	- Undertake community and stakeholder engagement	<i>All</i>		
	- Summarize input and incorporate feedback	<i>All</i>		
<b>8</b>	<b>Develop long-term recommendations and implementation plan based on community and stakeholder input</b>	<i>IESO</i>	<ul style="list-style-type: none"> <li>- Implementation plan</li> <li>- Monitoring activities and identification of decision triggers</li> <li>- Hand-off letters</li> <li>- Procedures for annual review</li> </ul>	Q3 2016
<b>9</b>	<b>Prepare the IRRP report detailing the recommended near, medium and long-term plan for approval by all parties</b>	<i>IESO</i>	<ul style="list-style-type: none"> <li>- IRRP report</li> </ul>	Q4 2016