

# Northwest Region Scoping Assessment Outcome Report

**Prepared by: Northwest Regional Planning Working Group**

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# 1 Introduction

Northwestern Ontario (“The Northwest”) is a complex and varied region, encompassing a vast geographic area and a diversity of economic and social factors unique within Ontario. Electricity system planning in the Northwest must plan for uncertainties and challenges not normally seen in other parts of the province. Uncertainty in the timing, size and location of forecast electricity demand in this region is much greater than in Southern Ontario, as demand is primarily driven by large resource-based industrial developments, such as mines and forestry operations. When these types of loads are developed, they add large blocks of load to the system, often with short lead time. Their development is also highly dependent on difficult-to-predict factors such as commodity prices and access to financing. When system reinforcement is required, the long distances that must be covered in the Northwest contribute to longer lead times for developing and constructing electricity infrastructure. The Northwest also is home to more than half of the First Nation communities in Ontario and many Métis communities who must be included throughout the planning process.

This Scoping Assessment Outcome Report was prepared in collaboration with the Northwest Regional Planning Working Group, consisting of the region’s Local Distribution Companies (“LDCs”), Hydro One, the Independent Electricity System Operator (“IESO”) and the former Ontario Power Authority (“OPA”)<sup>1</sup>, to meet the requirements of the Ontario Energy Board’s (“OEB”) formalized Regional Planning Process (“RPP”). The Need Screening portion of the RPP for the Northwest Region was initiated by Hydro One on February 24, 2014. Following initial discussion among the Working Group, the Working Group agreed that the primary objective of the Needs Screening process, which is to determine if coordinated regional planning is required, had been already established in this region. The Working Group decided that the best course of action was to continue to collect LDC data and to use it to augment studies as part of the Scoping Assessment phase of the RPP. This was outlined in a letter prepared by Hydro One dated April 9, 2014 that can be found here:

<http://www.hydroone.com/RegionalPlanning/NWOntario/Documents/Letter%20to%20NW%20Region%20Participants.pdf>.

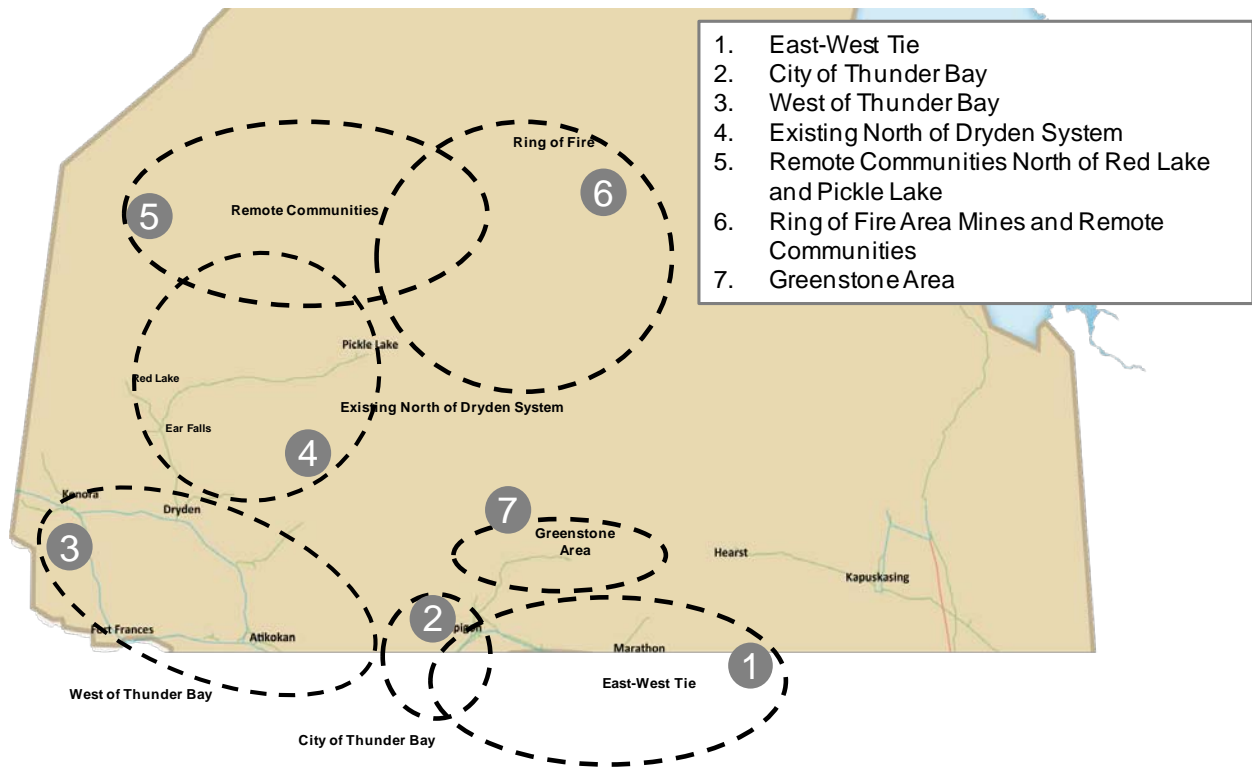
The Scoping Assessment Process step of the RPP was initiated upon completion of the data gathering phase, on June 27, 2014. The Scoping Process is intended to determine which regional planning approach will be adopted to address identified needs—an Integrated Regional Resource Plan (“IRRP”), or a Regional Infrastructure Plan (“RIP”)—and to develop the Terms of Reference for the IRRPs or RIPs to be initiated. In preparing this report, the unique attributes of the Northwest described above were taken into consideration. In addition, as regional planning was already underway in parts of the Northwest prior to the adoption of the OEB’s formalized process, this report transitions these activities into the new process, and provides context for how these and other planning activities in the Northwest fit together.

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<sup>1</sup> As a result of a government decision in 2014, the OPA and the IESO were merged into one agency, effective January 1, 2015, The merged agency is known as the Independent Electricity System Operator (IESO).

The former OPA has been leading a number of planning activities in the Northwest in recent years, some of which address overall supply needs of the area (e.g., the East-West Tie project), and others that address local needs in specific areas of the Northwest through regional planning processes (e.g., North of Dryden, Remote Community Connections). In addition to ongoing planning activities, the former OPA has identified several sub-regions for future planning. In total, seven planning activities have been identified for the Northwest, which are described conceptually in Figure 1.

**Figure 1. Northwest Ontario Planning Activities**



Source: IESO

These planning activities are summarized in Table 1 below, along with their scope, major drivers, and current status. The first of these, the East-West Tie, is exceptional in that it refers to a transmission expansion project whose development is underway, rather than an active planning process. The purpose of this project is to address the power system needs of the Northwest Region as a whole, and the geographic area identified for the East-West Tie in Figure 1 indicates the location of the proposed transmission line infrastructure, rather than the area that it is supplying. The East-West Tie, by expanding the transmission link between the Northwest Region and the rest of Ontario, would provide capacity to enable overall regional growth resulting from the combined drivers identified by the other six planning activities.

The other six planning activities address localized needs within the Northwest that were identified in recognition of transmission system characteristics, as well as the unique circumstances driving planning.

Planning in these areas is being accomplished through the identification of four regional planning sub-regions, as well as a Remote Communities Connection Plan. The regional planning sub-regions were defined to enable plans to focus on the specific needs in these areas within a manageable scope. At the same time, it is important to recognize that there are linkages between these sub-regions that arise from shared electricity infrastructure, overlapping needs, and the potential for common solutions that meet the needs of multiple sub-regions together. Thus, while these sub-regions are being addressed through individual plans, the plans are being developed with reference to their interdependencies. The Remote Community Connection Plan is a technical report and business case for grid connection of remote First Nation communities developed by the former OPA in conjunction with and for the Northwest Ontario First Nation Transmission Planning Committee. Due to the unique nature of the electricity service needs and opportunities in the area, as well as the joint Provincial/Federal Government cost responsibilities, the IESO does not consider this planning activity a regional plan as defined by the OEB process. The approximate geographic boundaries of the four regional planning sub-regions and the Remote Communities Connection Plan are shown in Figure 2 on page 6. It should be noted that the Greenstone area identified in Figure 1 has been expanded to include the Marathon area, as shown in Figure 2.

**Table 1. Summary of Northwest Planning Activities**

<b>Planning Activity</b>	<b>Scope</b>	<b>Major Drivers</b>	<b>Current Status</b>
1. East-West Tie	Northwest Region	<ul style="list-style-type: none"> <li>• Load growth in the Northwest as a whole</li> <li>• Changes to the supply mix in the Northwest</li> </ul>	<ul style="list-style-type: none"> <li>• East-West Tie expansion identified as a Priority Project in 2011 Long-Term Energy Plan</li> <li>• Transmission line development is underway by NextBridge Infrastructure (transmitter designated by the OEB)</li> </ul>
2. City of Thunder Bay  *NEW IRRP*	City of Thunder Bay and vicinity	<ul style="list-style-type: none"> <li>• Load growth in the City of Thunder Bay and vicinity</li> <li>• Integration with power requirements identified in the Greenstone-Marathon IRRP</li> </ul>	<ul style="list-style-type: none"> <li>• A need for coordinated regional planning has been identified by the Working Group</li> <li>• A Terms of Reference for an IRRP for this sub-region is included in this scoping report</li> </ul>

<b>Planning Activity</b>	<b>Scope</b>	<b>Major Drivers</b>	<b>Current Status</b>
3. West of Thunder Bay  *NEW IRRP*	The area between the US and Manitoba borders, extending north to include Kenora, Dryden and Sioux Lookout, and east toward (but not including) the City of Thunder Bay	<ul style="list-style-type: none"> <li>• Potential for renewed growth associated with forecasted mining activities and resources development</li> <li>• Potential need to increase power transfers into the North of Dryden sub-region</li> </ul>	<ul style="list-style-type: none"> <li>• A need for coordinated regional planning has been identified by the Working Group</li> <li>• A Terms of Reference for an IRRP for this sub-region is included in this scoping report</li> </ul>
4. North of Dryden	The area north of, but not including, Dryden; broadly defined as the Pickle Lake and Red Lake areas and vicinity	<ul style="list-style-type: none"> <li>• Load growth in the Pickle Lake and Red Lake areas, primarily driven by mine expansion</li> <li>• Providing adequate supply to enable transmission connection of Remote Communities</li> <li>• Possible alternative route for connecting Ring of Fire</li> </ul>	<ul style="list-style-type: none"> <li>• Draft IRRP posted for comment in August 2013</li> <li>• Municipal engagement conducted December 2013-February 2014</li> <li>• First Nations and Métis Consultation conducted</li> <li>• IRRP posted in January 2015</li> </ul>
5. Remote Communities	Remote First Nations communities currently not connected to the provincial transmission grid	<ul style="list-style-type: none"> <li>• Providing cost-effective, reliable, clean electricity supply to remote First Nations communities</li> </ul>	<ul style="list-style-type: none"> <li>• A Technical Plan and Business Case for the Connection of Remote Communities been under development since 2010</li> <li>• Remote community connection was identified as a priority project in the 2013 Long-Term Energy Plan</li> <li>• To date, a majority of the communities have been engaged on the planning work. Work to engage the remaining communities prior to the finalization of the Plan is ongoing.</li> <li>• Former OPA released an updated draft report in August 2014</li> </ul>

Planning Activity	Scope	Major Drivers	Current Status
6. Ring of Fire	Site of mineral deposits identified for future mining development. Not currently connected to the grid	<ul style="list-style-type: none"> <li>• Providing electricity supply to support development of Ring of Fire area mining activities</li> </ul>	<ul style="list-style-type: none"> <li>• Options for supplying Ring of Fire included in the North of Dryden IRRP</li> <li>• Additional transmission route options will be considered as part of the Greenstone-Marathon IRRP</li> </ul>
7. Greenstone-Marathon  *NEW IRRP*	The area extending from the eastern shore of Lake Nipigon, including the Municipality of Greenstone up to and including Marathon and the surrounding area	<ul style="list-style-type: none"> <li>• Load growth due to mining expansion in the Greenstone and Marathon areas</li> <li>• Possible alternative route for connecting Ring of Fire and Matawa communities</li> <li>• Reliability performance of the existing system</li> </ul>	<ul style="list-style-type: none"> <li>• A need for coordinated regional planning has been identified by the Working Group</li> <li>• A Terms of Reference for an IRRP for this sub-region is included in this scoping report</li> </ul>



Figure 2. IRRP Sub-Regions in the Northwest



Source: IESO

## 2 Scoping Assessment Outcome

This Scoping Assessment Process takes into consideration the plans and activities already underway in the Northwest, and develops a Terms of Reference for a regional plan for each sub-region where a planning process has not yet begun. As indicated in Table 1, planning is already well underway for the North of Dryden sub-region and Remote Communities. In these areas, no new planning activities are being initiated as part of this Scoping Process as they are already being undertaken.

To ensure coverage of the remaining sub-regions of the Northwest through the RPP, this Scoping Assessment Outcome Report recommends that three new sub-regional IRRPs be initiated: Thunder Bay; West of Thunder Bay; and Greenstone-Marathon. (It should be noted that options for supplying the Ring of Fire sub-region are included within the North of Dryden Plan and these options will be assessed further in the Greenstone-Marathon IRRP.) In each of these sub-regions, the Working Group, through the Scoping Process, has identified that integrated solution options are possible, including wires (transmission and distribution) and non-wires (e.g., generation, CDM) options. This is supported by responses received to a recent Request for Information on potential supply and demand resources within the Northwest. For this reason, the Working Group recommends that these sub-regions be addressed through the IRRP, rather than the RIP, process.

Upon completion of the sub-regional IRRPs in the Northwest, there will be a need for integration of the plans to ensure consistency in the overall development of the electricity system in the Northwest and to avoid redundancies. In particular, there may be options identified in the IRRPs that have implications for the Northwest bulk system as well as the sub-region in which they are located. Therefore, as part of the conclusion of the RPP for the Northwest, the recommendations of the four IRRPs and the Remote Communities Connection Plan will be consolidated into a single, coherent plan that addresses the sub-regions' needs, while maintaining sight of the bigger picture in the Northwest.

A key component in developing the plan will be stakeholder and community engagement. In August 2013, the former Ontario Power Authority and Independent Electricity System Operator prepared a report entitled "Engaging Local Communities in Ontario's Electricity Planning Continuum" that presented 18 recommendations to enhance the regional energy planning process and the siting of large energy infrastructure. The report includes several mechanisms for enhancing public engagement including the creation of a Local Advisory Committee ("LAC") as part of a regional electricity planning process. It is envisioned that one LAC will be created for each of the Northwest IRRPs and will be comprised of local representatives who will provide advice on regional planning and the siting of large energy infrastructure. In addition, recognizing that a large share of the electricity demand in the Northwest is comprised of transmission-connected industrial facilities, each sub-regional IRRP will be developed with input from local industry representatives, as described in the attached Terms of Reference. The IESO will also work with the Ministry of Energy to determine whether the Duty to Consult is triggered for each IRRP. Dependent on the outcome of that decision, the IESO will carry out any procedural aspects of the Duty to Consult that are delegated by the Crown.

The Terms of Reference for the Thunder Bay, West of Thunder Bay, and Greenstone-Marathon IRRPs are provided below.

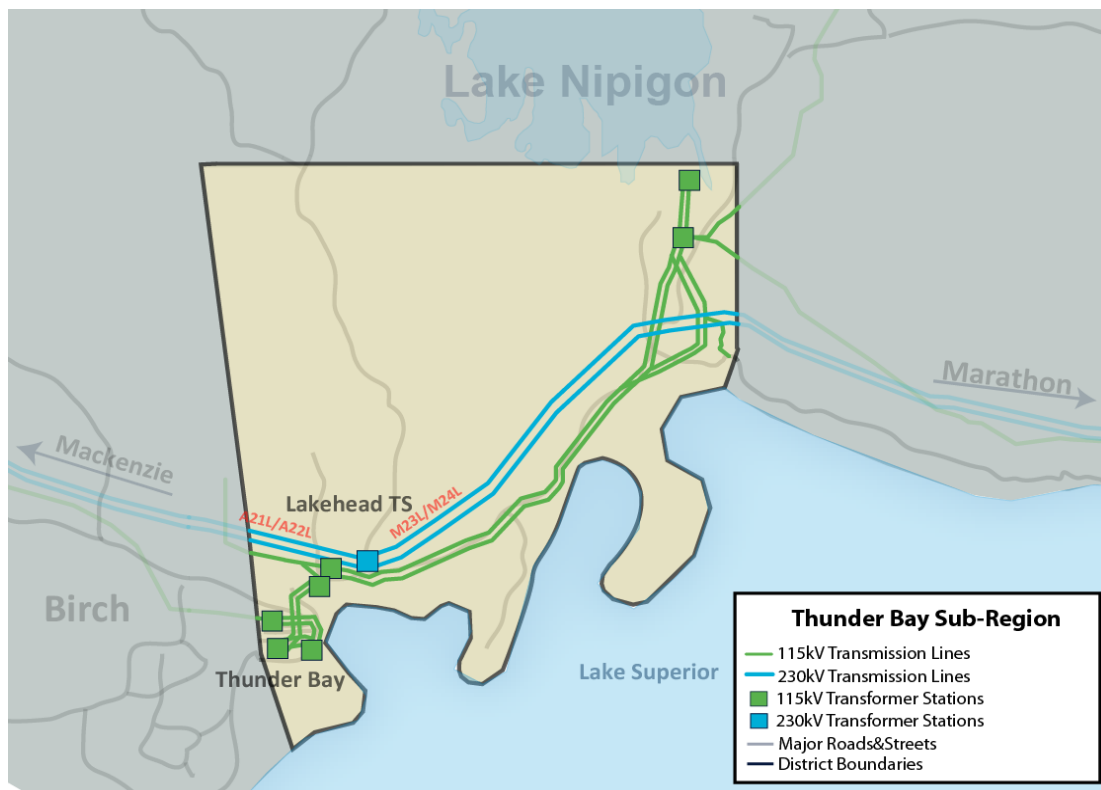
### 3 Thunder Bay IRRP Terms of Reference

#### 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 (“IRR”) of the Thunder Bay sub-region.

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 for a number of existing and potential customers, an integrated regional resource planning approach is recommended.

Figure 3. Thunder Bay Sub-Region



Source: IESO

#### Thunder Bay Sub-Region

The Thunder Bay sub-region includes the City of Thunder Bay and surrounding communities located in the area stretching from the north shore of Lake Superior to the southern shore of Lake Nipigon, and from the Township of Nipigon to Kakabeka Falls. The approximate geographical boundaries of the sub-region are shown in Figure 3.

The sub-region includes the following municipalities:

- City of Thunder Bay
- Township of Red Rock
- Township of Nipigon
- Municipality of Neebing
- Municipality of Oliver Paipoonge
- Municipality of Shuniah
- Township of O'Connor
- Township of Conmee
- Township of Dorion
- Township of Gillies

In addition, there are communities in a number of un-organized districts within the sub-region.

The sub-region also includes the Fort William and Red Rock First Nations communities.

The Greenstone-Marathon sub-region, located to the east of the Thunder Bay sub-region, shares electricity infrastructure with the Thunder Bay sub-region, and there is some overlap in the geographical scope of these sub-regions. Therefore, while Greenstone-Marathon is being studied through a separate IRRP, any electricity requirements identified through the Greenstone-Marathon IRRP will be included for planning purposes in the Thunder Bay sub-region.

Engagement on this regional plan may be extended to include additional communities outside of the IRRP area boundaries.

#### *Thunder Bay Sub-Region Electrical System*

The Thunder Bay sub-region is a large load centre located in northwestern Ontario. In addition to being the largest population centre in the Northwest, the area hosts several large paper and primary resource industries. Electricity demand in the area peaks during the winter months. Historically, peak demand in this area was approximately 420 MW. However, a decline in the forestry sector has reduced the area's peak demand, with the lowest demand, around 350 MW, observed in 2010. In the last three years, peak demand for the area has hovered around 380 MW.

Going forward, there is potential for renewed growth in this area associated with forecast mining and other industrial development throughout the Northwest, including a large pipeline project, due to the area's position as a regional hub. The transmission system supplying the Thunder Bay area consists of a 115 kV network tied to the bulk 230 kV system at the Lakehead Transformer Station ("TS"), just east of Thunder Bay. The two 230/115 kV autotransformers at Lakehead TS provide the major transmission supply to the area, making up any imbalances between local demand and generation output.

Loads in the area, including those supplied by the two area local distribution companies ("LDC's"), Thunder Bay Hydro and Hydro One Distribution, as well as several transmission connected customers,

are supplied by several step-down transformer stations connected to the 115 kV system. This network also integrates several hydroelectric and thermal generating stations and provides links to the West of Thunder Bay sub-region (through the circuit B6M) and to the Greenstone-Marathon sub-region (at Alexander switching station (“SS”)).

Thermal and hydroelectric generation located within the sub-region also provide supply to the area. The Thunder Bay Generating Station (“GS”) is a thermal station with two generating units, each nominally rated at approximately 150 MW. The station has ceased coal-fired operation and one of the units is being converted to advanced biomass operation. The conversion is anticipated to be completed by the end of 2014, and is planned to operate under its current contractual agreement until the end of 2019. The converted unit will be energy limited, affecting its capacity contribution to the system. Hydroelectric generation plants located within the Thunder Bay sub-region include Kakabeka Falls GS, Silver Falls GS, Alexander GS, Cameron GS, and Pine Portage GS. Their combined installed capacity is over 350 MW. Additionally, behind-the-meter thermal generation at industrial customer sites also provide capacity to the area.

Due to shared electricity infrastructure, generation plants, potential load growth, and potential future system augmentations within the Greenstone-Marathon sub-region may also impact the supply capability of the Thunder Bay area. Generation plants within the scope of the Greenstone-Marathon IRRP include the Nipigon Customer Generating Station (“CGS”), and the potential future development of the Little Jackfish hydroelectric facility.

In 2005, the former OPA examined the supply adequacy of the Thunder Bay area in anticipation of the shutdown of coal-fired generation in the area as part of the first Integrated Power System Plan. At that time, the former OPA identified a transmission option that could be implemented pending recovery of the load in the area. Since that time, the supply to the city and vicinity has been adequate and no expansion has been necessary.

## **2. Objectives**

1. To assess the adequacy of electricity supply to customers in Thunder Bay sub-region over the next 20-year period.
2. To develop a flexible, comprehensive, integrated plan in anticipation of potential demand growth scenarios and varying supply conditions in the Thunder Bay sub-region.
3. To develop an implementation plan for the recommended options, while maintaining flexibility in order to accommodate changes in key assumptions over time.

## **3. Scope**

This IRRP will develop and recommend options to meet the needs of Thunder Bay sub-region while maintaining flexibility in options for a wide range of future potential demand scenarios. The plan is a joint initiative involving Thunder Bay Hydro, Hydro One Distribution, Hydro One Transmission, and the IESO, and will incorporate input from stakeholders and First Nations and Métis communities. The plan will integrate scenarios of projected load growth, conservation and demand management (“CDM”) in

the area with transmission and distribution system capability, 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 Thunder Bay area. The adequacy of the bulk system supplying the area (i.e., the 230 kV network) is being assessed through a separate planning process and is assumed to be addressed for purposes of this study. The specific infrastructure considered to be in scope for this study is as follows:

- Lakehead TS 115/230 kV autotransformers
- 115 kV circuits: B6M, R1LB, R2LB, P7B, A6P, L3P, L4P, S1C, P5M, P1T, P1P, P3B, Q4B, Q5B, Q8B, Q9B, A7L, A8L, 56M1, and 57M1
- Stations: Birch TS, Port Arthur TS, Lakehead TS, Fort William TS, Thunder Bay GS, Alexander SS, Pine Portage GS, and several stations supplying transmission-connected industrial customers
- All customers and generation facilities connected to the above infrastructure.

The Thunder Bay IRRP will:

- Examine the Load Meeting Capability and reliability of the existing transmission system supplying the Thunder Bay sub-region, taking into account:
  - Facility ratings and performance of transmission elements, transformers, local generation, and other facilities such as reactive power devices
- Examine the forecasted electricity demand requirements under a range of potential demand growth scenarios agreed upon by the Working Group, and establish needs based on these scenarios
- Establish feasible integrated alternatives including one or a mix of CDM, generation, transmission and distribution facilities, and other electricity system initiatives in order to address the needs of the Thunder Bay sub-region
- Evaluate options using decision-making criteria including but not limited to: technical feasibility, economic, reliability performance, environmental, and social factors
- Key factors to be considered in the study include:
  - Local aspects of the new Conservation First framework
  - Availability of local thermal generation, including but not limited to Thunder Bay GS and customer-based generation
  - Capability of the hydroelectric fleet in the sub-region
  - Transmission facility rating and performance
  - Integration with other adjacent IRRPs in the Northwest, in particular requirements identified through the Greenstone-Marathon IRRP

Upon completion, the Thunder Bay and other sub-regional IRRPs in the Northwest will be consolidated into a single, coherent plan that makes recommendations that address the sub-regions' needs, while maintaining sight of the bigger picture in the Northwest.

#### 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
  - Incorporation of verified LDC results and progression towards OEB targets, and any other CDM programs in the area
  - Long-term conservation forecast for LDC loads, based on sub-region's share of the 2013 Long-Term Energy Plan target
  - LDC conservation implementation plans, once available in 2015
  - 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
  - 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
  - Potential local demand or supply resources, such as those identified in the submissions to the 2014 Northwest Request for Information
- Relevant community 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
  - Transmission System Code
  - 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
  
- Bulk System considerations to be applied to the existing area network
  - Transmission-connected generation
  
- End-of-life asset considerations/sustainment plans
  - Transmission assets
  - Distribution assets
  - Generation assets
  
- Other considerations, as applicable

## 5. Working Group

The core Working Group will consist of planning representative/s from the following organizations that have an obligation to participate in the OEB's regional planning process based on codes or licenses:

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

Since the electricity demand in the Thunder Bay sub-region is largely driven by existing and potential transmission-connected customers, the Working Group will seek input from local industrial customers to better understand electricity needs beyond those that have been identified by the local utilities. Existing and potential future industrial customers in the area will be engaged to obtain information on project developments to supplement the demand forecast.

In addition, existing and potential generation proponents in the area will be engaged to provide information on existing generation facility capability and operational characteristics, as well as information on potential generation options in the area.

### 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. Activities, Timeline and Primary Accountability

	Activity	Lead Responsibility	Deliverable(s)	Timeframe
1	<b>Prepare Terms of Reference based on stakeholder input</b>	<i>IESO</i>	- Finalized Terms of Reference	Q4 2014
2	<b>Develop the Planning Forecast for the sub-region</b>		- Long-term planning forecast scenarios	Q4 2014- Q1 2015
	- Establish historical coincident peak demand information	<i>IESO</i>		
	- Establish historical weather correction, median and extreme conditions	<i>IESO</i>		
	- Establish existing and potential future transmission-connected customer demand forecasts	<i>IESO/Hydro One Transmission/Transmission-connected customers</i>		
	- Establish gross peak demand forecast for LDC service areas	<i>LDCs</i>		
	- Establish existing, committed and potential DG	<i>LDCs</i>		
	- Establish long-term conservation forecast-based on sub-region's share of LTEP 2013 target	<i>IESO</i>		
	- Develop net forecast scenarios – including the impact of CDM	<i>IESO</i>		
	- Develop planning forecast scenarios - including the impact of the DG and weather conditions in addition to CDM	<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	Q4 2014- Q1 2015
4	<b>Provide relevant community plans, if applicable</b>	<i>LDCs, First Nations and IESO</i>	- Relevant community plans	Q4 2014- Q1 2015
5	<b>Complete system studies to identify needs</b> <ul style="list-style-type: none"> <li>- Obtain PSS/E base case from IESO</li> <li>- Include bulk system assumptions as identified in Key Assumptions</li> <li>- Apply reliability criteria as defined in ORTAC to demand forecast scenarios</li> <li>- Confirm and refine the need(s) and timing/load levels</li> </ul>	<i>IESO, Hydro One Transmission</i>	- Summary of needs based on demand forecast scenarios for the 20-year planning horizon	Q1 –Q2 2015
6	<b>Develop Options and Alternatives</b>		- Develop flexible planning options for forecast scenarios	Q2-Q4 2015
	- Identify solutions for 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 or distribution options including maximizing existing infrastructure capability	<i>IESO, Hydro One Transmission and LDCs</i>		
	- Develop options of other electricity initiatives including smart grid and 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>Community &amp; Stakeholder Engagement</b>		- Community and Stakeholder Engagement Plan - Input from local communities, First Nations and Métis communities	On-going
	- Establish engagement subcommittee of the Working Group (if required)	<i>All</i>		
	- Meeting with local municipalities, First Nations and Métis communities within study area	<i>All</i>		
	- Develop engagement plan with LAC input	<i>All</i>		
	- Develop communications materials	<i>All</i>		
	- Engage with municipalities, First Nations and Métis communities	<i>All</i>		
	- Carry out Duty to Consult (if applicable)	<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 and outcome of Consultation, if applicable</b>	<i>IESO</i>	- Implementation plan - Monitoring activities and identification of decision triggers - Hand-off letters - Procedures for annual review	Q4 2015
<b>9</b>	<b>Prepare the IRRP report detailing the recommended near, medium and long-term plan for approval by all parties (<i>IESO</i>)</b>	<i>IESO</i>	- IRRP report	Q1 2016
<b>10</b>	<b>Prepare Northwest-wide IRRP, providing overarching plan for the Northwest, consistent with recommendations of the Thunder Bay and other IRRPs</b>	<i>IESO</i>	- Northwest IRRP report	Q2 2016

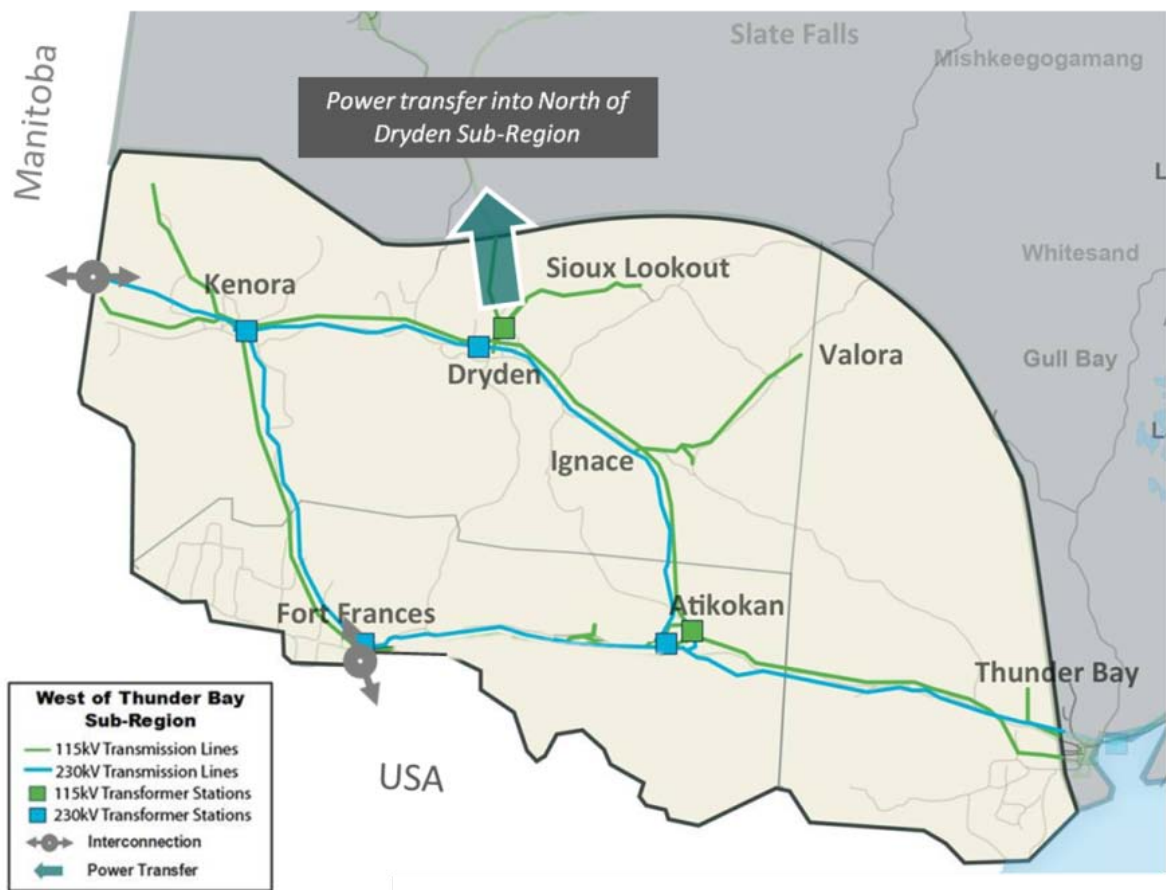
## 4 West of Thunder Bay IRRP Terms of Reference

### 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 of the West of Thunder Bay sub-region.

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

Figure 4. West of Thunder Bay Sub-Region



Source: IESO

### West of Thunder Bay Sub-Region

The West of Thunder Bay sub-region is defined as the area bordered to the south and west by the United States and Manitoba borders, and extending north to include Kenora, Dryden and Sioux Lookout, and east as far as (but not including) the City of Thunder Bay. The approximate geographical boundaries of the sub-region are shown in Figure 4.

The sub-region includes the following municipalities:

- Township of Alberton
- Town of Atikokan
- Township of Chapple
- Township of Dawson
- Township of Emo
- Town of Fort Frances
- Township of Lake of the Woods
- Township of La Vallee
- Township of Morley
- Town of Rainy River
- City of Dryden
- City of Kenora
- Municipality of Machin
- Municipality of Sioux Lookout
- Township of Ignace
- Township of Sioux Narrows-Nestor Falls

In addition, there are communities in a number of un-organized districts within the sub-region.

The West of Thunder Bay sub-region also includes the following First Nations:

- Anishinabe of Wauzhushk Onigum
- Anishinaabeg of Naongashiing
- Big Grassy
- Couchiching
- Eagle Lake
- Grassy Narrows
- Iskatewizaagegan #39
- Lac Des Mille Lacs
- Lac La Croix
- Lac Seul
- Mitaanjigamiing

- Naicatchewenin
- Naotkamegwanning
- Nigigoonsiminikaaning
- Northwest Angle #33
- Northwest Angle #37
- Obashkaandagaang
- Ochiichagwe’Babigo’Ining
- Ojibway Nation of Saugeen
- Ojibways of Onigaming
- Rainy River
- Seine River
- Shoal Lake #40
- Wabaseemoong
- Wabauskang
- Wabigoon Lake Ojibway

In planning for this sub-region, it is necessary to consider the power transfer requirements to the North of Dryden sub-region, primarily from the Dryden Transmission Station. This sub-region is also interconnected with Manitoba at Kenora and Minnesota at Fort Frances.

Engagement on this regional plan may be extended to include additional communities outside of the IRRP area boundaries.

#### *West of Thunder Bay Sub-Region Electrical System*

At present, peak electricity demand in the West of Thunder Bay area defined above totals 210 MW in the winter and 145 MW in the summer. In addition, the West of Thunder Bay system also currently transfers up to 80 MW to the area north of Dryden. Going forward, there is potential for renewed growth across this sub-region associated with forecasted mining activities and a large pipeline project. Furthermore, as the electricity system in this area is a source of supply to the North of Dryden sub-region, the sub-region’s electricity requirements are also affected by the significant potential for development in the area north of Dryden.

The transmission system within the West of Thunder Bay sub-region consists of 230 kV and 115 kV lines and stations. Between Thunder Bay and Atikokan, the system consists of a double circuit 230 kV line and a single circuit 115 kV line. These lines bring power into the West of Thunder Bay area to supplement local generation resources. To the west of Atikokan, a diamond-shaped, 230 kV single-circuit network connects to Fort Frances, Dryden and Kenora. There are step-down stations that connect to local 115 kV networks at Kenora, Fort Frances, Dryden and Atikokan. Transformer stations connected to these 115 kV networks supply the municipalities Kenora, Fort Frances, Dryden, Atikokan and Sioux Lookout. The West of Thunder Bay transmission system is also interconnected with Manitoba at Kenora and Minnesota at

Fort Frances. The interconnections with Manitoba and Minnesota handle transfers scheduled on an economic basis and are not relied upon for supply adequacy.

Local generation in the West of Thunder Bay area provides about 270 MW of dependable peak capacity – about 70 MW from run-of-river hydroelectric plants and 200 MW from the biomass-fueled unit at the Atikokan Generating Station (“GS”) (contracted to 2024). The converted Atikokan unit is energy limited, affecting its capacity contribution to the system.

## **2. Objectives**

1. To assess the adequacy of electricity supply to customers in the West of Thunder Bay sub-region over the next 20-year period.
2. To develop a flexible, comprehensive, integrated plan in anticipation of potential demand growth scenarios and varying supply conditions in the West of Thunder Bay sub-region.
3. To identify near-term investments (if applicable) and required actions and preliminary work to ensure that options remain available to address future needs if and when they arise.

## **3. Scope**

This IRRP will develop and recommend options to meet supply needs of West of Thunder Bay sub-region. The plan is a joint initiative involving the IESO, Sioux Lookout Hydro, Fort Frances Power Corporation, Atikokan Hydro, Kenora Hydro, Hydro One Distribution, and Hydro One Transmission, and will seek input from stakeholders, First Nations and Métis communities. The plan will integrate load growth projections, conservation and demand management (“CDM”), transmission and distribution system capability, relevant community plans, renewable energy development and other generation uptake.

This IRRP will address regional needs in the West of Thunder Bay area. The adequacy of the bulk system outside the West of Thunder Bay area (i.e., the 230 kV network supply from Lakehead) is being addressed through a separate planning process and it is assumed to be addressed for purposes of this study. The specific infrastructure considered to be in scope for this study is as follows:

- 115/230 kV autotransformers at Dryden Transformer Station (“TS”), Kenora TS, Fort Frances TS and MacKenzie TS
- 230 kV circuits - D26A, F25A, K24F, K23D, A21/22L
- 115 kV circuits – 29M1, M2D, M1S, D5D, A3M, B6M, W3C, K4/5W, K2M, SK1, K7K, K6F, F3M, F2B, F1B, and K3D
- All customers and generation facilities connected to the above infrastructure

The West of Thunder Bay IRRP will:

- Examine the Load Meeting Capability and reliability of the existing 115 kV networks supplying Kenora, Fort Frances, Dryden, Atikokan, and Sam Lake/Sioux Lookout, taking into account:
  - Facility ratings and performance of transmission elements, transformers, local generation, and other facilities such as reactive power devices

- Examine the westbound transfer capability from the Thunder Bay area and the transfer capability into the Dryden TS on the existing 230 kV network in the West of Thunder Bay area, taking into account:
  - Power transfer requirements into the 115 kV networks supplying Kenora, Fort Frances, Dryden, Atikokan, Sam Lake/Sioux Lookout and the North of Dryden sub-region
- Examine forecast electricity demand requirements under a range of potential demand growth scenarios agreed upon by the Working Group, and establish needs based on these scenarios
- Establish feasible integrated alternatives including one or a mix CDM, generation, transmission and distribution facilities, and other electricity system initiatives in order to address the needs of the West of Thunder Bay sub-region
- Evaluate options using decision-making criteria including but not limited to: technical feasibility, economic, reliability performance, environmental, and social factors
- Key factors to be considered in the study include:
  - Local aspects of the new Conservation First framework
  - Availability of local thermal generation, including but not limited to Atikokan GS and customer-based generation
  - Capability of the hydroelectric fleet in the sub-region
  - Transmission facility rating and performance
  - Integration with other adjacent IRRPs in the Northwest, in particular requirements identified through the North of Dryden IRRP

Upon completion, the West of Thunder Bay and other sub-regional IRRPs in the Northwest will be consolidated into a single, coherent plan that makes recommendations that address the sub-regions' needs, while maintaining sight of the bigger picture in the Northwest.

#### **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
  - Incorporation of verified local distribution company ("LDC") results and progression towards OEB targets, and any other CDM programs in the area
  - Long-term conservation forecast for LDC loads, based on sub-region's share of the 2013 Long-Term Energy Plan target
  - LDC Conservation implementation plans, once available in 2015
  - 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
  - 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
  - Potential local demand or supply resources, such as those identified in the submissions to the 2014 Northwest Request for Information
  
- Relevant community 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
  - Transmission System Code
  - 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
  
- Bulk System considerations to be applied to the existing area network
  - Transmission-connected generation
  - Intertie flows
  
- End-of-life asset considerations/sustainment plans
  - Transmission assets
  - Distribution assets
  - Generation assets
  
- Other considerations, as applicable

## 5. Working Group

### Working Group

The core Working Group will consist of planning representative(s) from the following organizations that have an obligation to participate in the OEB's regional planning process based on codes or licenses:

- Independent Electricity System Operator (*Team Lead for IRRP*)
- Hydro One Transmission
- Hydro One Distribution
- Sioux Lookout Hydro
- Fort Frances Power Corporation
- Atikokan Hydro
- Kenora Hydro
- Hydro One Distribution

Since the electricity demand in the West of Thunder Bay sub-region is largely driven by existing and potential future transmission-connected customers, the Working Group will seek input from these customers to better understand the electricity needs beyond those that have been identified by the local utilities. Existing and potential future industrial customers in the area will be engaged to obtain information on project developments to supplement the demand forecast.

In addition, existing and potential generation proponents in the area will be engaged to provide information on existing generation facility capability and operational characteristics, as well as information on potential generation options in the area.

### 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. Activities, Timeline and Primary Accountability

	Activity	Lead Responsibility	Deliverable(s)	Timeframe
1	<b>Prepare Terms of Reference based on stakeholder input</b>	<i>IESO</i>	- Finalized Terms of Reference	Q4 2014
2	<b>Develop the Planning Forecast for the sub-region</b>		- Long-term planning forecast scenarios	Q4 2014- Q1 2015
	- Establish historical coincident peak demand information	<i>IESO</i>		
	- Establish historical weather correction, median and extreme conditions	<i>IESO</i>		
	- Establish existing and potential future transmission-connected customer demand forecasts	<i>IESO/Hydro One Transmission/Transmission-connected customers</i>		
	- Establish gross peak demand forecast for LDC service areas	<i>LDCs</i>		
	- Establish existing, committed and potential DG	<i>LDCs</i>		
	- Establish long-term conservation forecast-based on sub-region's share of LTEP 2013 target	<i>IESO</i>		
	- Develop net forecast scenarios – including the impact of CDM	<i>IESO</i>		
	- Develop planning forecast scenarios - including the impact of the DG and weather conditions in addition to CDM	<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	Q4 2014- Q1 2015
4	<b>Provide relevant community plans, if applicable</b>	<i>LDCs, First Nations and IESO</i>	- Relevant community plans	Q4 2014- Q1 2015
5	<b>Complete system studies to identify needs</b> - Obtain PSS/E base case from IESO - 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	Q1 –Q2 2015
6	<b>Develop Options and Alternatives</b>		- Develop flexible planning options for forecast scenarios	Q2-Q4 2015
	- Identify solutions for 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 or distribution options including maximizing existing infrastructure capability	<i>IESO, Hydro One Transmission and LDCs</i>		
	- Develop options of other electricity initiatives including smart grid and 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>Community &amp; Stakeholder Engagement</b>		- Community and Stakeholder Engagement Plan - Input from local communities, First Nations and Métis communities	On-going
	- Establish engagement subcommittee of the Working Group (if required)	<i>All</i>		
	- Meeting with local municipalities, First Nations and Métis communities within study area	<i>All</i>		
	- Develop engagement plan with LAC input	<i>All</i>		
	- Develop communications materials	<i>All</i>		
	- Engage with municipalities, First Nations and Métis communities	<i>All</i>		
	- Carry out Duty to Consult (if applicable)	<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 and outcome of Consultation, if applicable</b>	<i>IESO</i>	- Implementation plan - Monitoring activities and identification of decision triggers - Hand-off letters - Procedures for annual review	Q4 2015
<b>9</b>	<b>Prepare the IRRP report detailing the recommended near, medium and long-term plan for approval by all parties (<i>IESO</i>)</b>	<i>IESO</i>	- IRRP report	Q1 2016
<b>10</b>	<b>Prepare Northwest-wide IRRP, providing overarching plan for the Northwest, consistent with recommendations of the West of Thunder Bay and other IRRPs</b>	<i>IESO</i>	- Northwest IRRP report	Q2 2016

## 5 Greenstone-Marathon 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 for the Greenstone-Marathon sub-region.

Based on the potential for high growth within this sub-region, the limited transmission capacity supplying the area, and opportunities for coordinating demand and supply options with a number of existing and potential customers, an integrated regional resource planning approach is recommended.

**Figure 5. Greenstone-Marathon Sub-Region**



Source: IESO

### Greenstone-Marathon Sub-Region

The Greenstone-Marathon sub-region is defined as the area extending east from Lake Nipigon, including the Municipality of Greenstone up to and including the Town of Marathon and the surrounding area. The approximate geographical boundaries of the sub-region are shown in Figure 5. The sub-region includes the following municipalities:

- Town of Marathon
- Municipality of Greenstone
- Township of Nipigon
- Township of Manitowadge
- Township of Schreiber
- Township of Terrace Bay
- Township of White River

In addition, there are communities in a number of un-organized districts within the sub-region.

The sub-region also includes the following First Nations:

- Red Rock
- Bingwi Neyaashi Anishinaabek (“BNA”)
- Biinjitiwaabik Zaaging Anishinaabek (“BZA”)
- Animbiigoo Zaagi’igan Anishinaabek (“AZA”)
- Long Lake #58
- Ginoogaming
- Aroland
- Pays Plat
- Ojibways of the Pic River
- Pic Mobert

Engagement on this regional plan may be extended to include additional communities outside of the IRRP area boundaries.

### Greenstone-Marathon Sub-Region Electrical System

From data submitted by Hydro One Distribution, local distribution company (“LDC”) customer demand is forecasted to experience modest growth of about 1.0% per year over the next 10 years.

In addition to LDC demand growth, a substantial amount of new transmission-connected demand may be realized by potential new industrial loads, primarily in the mining and forestry sectors, along with a large pipeline project. Together, these industrial projects could add upward of 150 MW of new demand to the system.

The Greenstone-Marathon sub-region is currently serviced by the 115 kV system emanating from Alexander Switching Station (“SS”) near Nipigon and Marathon Transformer Station (“TS”) in the Town

of Marathon. The Greenstone-Marathon 115 kV system consists of five single-circuit 115 kV lines: A4L, A5A, A1B, T1M, and M2W. Hydro One Transmission owns and operates the transmission facilities in the sub-region and Hydro One Distribution, the Local Distribution Company, services the distribution-connected loads in the sub-region.

Local generation provides additional supply to the area. There is a local transmission-connected generating facility at Nipigon Customer Generating Station (“CGS”). Nipigon CGS is a 40 MW gas-fired combined-cycle generating facility with a Non-utility Generator contract for its output. This contract is due to expire in December 2022. There is also a transmission-connected generating facility at Aguasabon Generating Station (“GS”). Aguasabon GS is a hydroelectric plant with an installed capacity of 47 MW.

## **2. Objectives**

1. To assess the adequacy of electricity supply to customers in Greenstone-Marathon sub-region over the next 20-year period.
2. To develop a flexible, comprehensive, integrated plan in anticipation of potential demand growth scenarios and varying supply conditions in the Greenstone-Marathon sub-region.
3. To develop an implementation plan for the recommended options, while maintaining flexibility in order to accommodate changes in key assumptions over time.

## **3. Scope**

This IRRP will develop and recommend options to meet supply needs of Greenstone-Marathon sub-region, while maintaining flexibility in options for a wide range of future potential demand scenarios. The plan is a joint initiative involving Hydro One Transmission, Hydro One Distribution, and the IESO, and will seek input from stakeholders, First Nations and Métis communities. The plan will integrate load growth projections, conservation and demand management (“CDM”) in the area, transmission and distribution system capability, other infrastructure development, relevant community plans, renewable energy development and other generation uptake.

This IRRP will address regional needs in the Greenstone-Marathon area. The adequacy of the bulk system supplying the area (i.e., the 230 kV network) is being assessed through a separate planning process and it is assumed to be addressed for purposes of this study. The specific infrastructure considered to be in scope for this study is as follows:

- 115 kV circuits – A4L, A5A, A1B, T1M, and M2W
- Step-down transformer stations – Beardmore Distribution Station (“DS”), Jellicoe DS, Longlac TS, Schreiber Winnipeg DS, Marathon DS, Pic DS, Manitouwadge DS, Manitouwadge TS, and White River DS
- All customers and generation facilities connected to the above infrastructure.

The Greenstone-Marathon IRRP will:

- Examine the Load Meeting Capability (“LMC”) and reliability of the existing transmission system supplying the Greenstone-Marathon sub-region, taking into account:
  - Facility ratings and performance of transmission circuits, transformers, local generation, and other facilities such as reactive power devices
- Examine the forecasted electricity demand requirements under a range of potential demand scenarios, which considers potential new industrial load, agreed upon by the Working Group and establish the magnitude of the need for incremental LMC
- Establish feasible integrated alternatives including one or a mix of CDM, generation, transmission and distribution facilities, and other electricity system initiatives in order to address the electricity needs of the Greenstone-Marathon sub-region
- Evaluate options using decision-making criteria including but not limited to: technical feasibility, economic, reliability performance, environmental, and social factors.

The Greenstone-Marathon IRRP will also consider factors that extend beyond the described boundary. External factors for consideration will include, but are not limited to, supply options for the Ring of Fire mining development and the Little Jackfish hydroelectric project.

The Ring of Fire is a mining development area located in an area of the Hudson Bay lowlands. The Ring of Fire area is currently remote from the provincial transmission grid. The North of Dryden IRRP highlights that there is a potential to use a north-south corridor, which aligns with a transportation corridor option being looked at by developers, to supply the Ring of Fire mining development. The Greenstone-Marathon sub-region IRRP will expand on the potential north-south transmission options to supply the Ring of Fire area, including supply to the Matawa communities in accordance with the Remote Communities Connection Plan, and will consider the possible cost sharing with potential customers in the sub-region when performing economic evaluations. This analysis will not replace the Ring of Fire analysis performed as part of the North of Dryden IRRP, but will supplement it by providing additional details of the Greenstone-Marathon sub-region.

The Little Jackfish Project is a 78 MW hydroelectric proposal by Ontario Power Generation, in partnership with the Lake Nipigon First Nations, located on the Little Jackfish River. The Little Jackfish Project is currently in Phase 4 out of 5 of the Class Environmental Assessment process and is on hold as the 2013 LTEP does not identify a need for this facility. As the Greenstone-Marathon sub-region IRRP will have a time horizon of 20 years, a review of the economics of integrating the Little Jackfish Project given the potential for this IRRP to develop plans for the long-term expansion of the transmission system to meet the load growth needs of the Greenstone-Marathon sub-region, and potentially the Ring of Fire, should be considered.

Upon completion, the Greenstone-Marathon and other sub-regional IRRPs in the Northwest will be consolidated into a single, coherent plan that makes recommendations that address the sub-regions’ needs, while maintaining sight of the bigger picture in the Northwest.



#### 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
  - Incorporation of verified LDC results and progression towards OEB targets, and any other CDM programs in the area
  - Long-term conservation forecast for LDC loads, based on sub-region's share of the 2013 Long-Term Energy Plan target
  - LDC conservation implementation plans, once available in 2015
  - 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
  - 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
  - Potential local demand or supply resources, such as those identified in the submissions to the 2014 Northwest Request for Information
- Relevant community 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
  - Transmission System Code
  - 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
- Bulk System considerations to be applied to the existing area network
  - Transmission-connected generation
- End-of-life asset considerations/sustainment plans
  - Transmission assets
  - Distribution assets
  - Generation assets
- Other considerations, as applicable

## 5. Working Group

The core Working Group will consist of planning representative(s) from the following organizations that have an obligation to participate in the OEB's regional planning process based on codes or licenses:

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

Since the electricity demand in the Greenstone-Marathon sub-region is largely driven by existing and potential future transmission-connected customers, the Working Group will seek input from these customers to better understand the electricity needs beyond those that have been identified by the local utilities. Existing and potential future industrial customers in the area will be engaged to obtain information on project developments to supplement the demand forecast.

In addition, existing and potential generation proponents in the area will be engaged to provide information on existing generation facility capability and operational characteristics, as well as information on potential generation options in the area.

### Authority

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.

### Funding

For the duration of the study process, each participant is responsible for their own funding.

## 6. Activities, Timeline and Primary Accountability

	Activity	Lead Responsibility	Deliverable(s)	Timeframe
1	<b>Prepare Terms of Reference based on stakeholder input</b>	<i>IESO</i>	- Finalized Terms of Reference	Q4 2014
2	<b>Develop the Planning Forecast for the sub-region</b>		- Long-term planning forecast scenarios	Q4 2014- Q1 2015
	- Establish historical coincident peak demand information	<i>IESO</i>		
	- Establish historical weather correction, median and extreme conditions	<i>IESO</i>		
	- Establish existing and potential future transmission-connected customer demand forecasts	<i>IESO/Hydro One Transmission/Transmission-connected customers</i>		
	- Establish gross peak demand forecast for LDC service areas	<i>Hydro One Distribution</i>		
	- Establish existing, committed and potential DG	<i>Hydro One Distribution</i>		
	- Establish long-term conservation forecast-based on sub-region's share of LTEP 2013 target	<i>IESO</i>		
	- Develop net forecast scenarios – including the impact of CDM	<i>IESO</i>		
	- Develop planning forecast scenarios - including the impact of the DG and weather conditions in addition to CDM	<i>IESO</i>		
3	<b>Provide information on load transfer capabilities under normal and emergency conditions</b>	<i>Hydro One Distribution</i>	- Load transfer capabilities under normal and emergency conditions	Q4 2014-Q1 2015
4	<b>Provide relevant community plans, if applicable</b>	<i>LDCs, First Nations and IESO</i>	- Relevant community plans	Q4 2014-Q1 2015
5	<b>Complete system studies to identify needs</b> <ul style="list-style-type: none"> <li>- Obtain PSS/E base case from IESO</li> <li>- Include bulk system assumptions as identified in Key Assumptions</li> <li>- Apply reliability criteria as defined in ORTAC to demand forecast scenarios</li> <li>- Confirm and refine the need(s) and timing/load levels</li> </ul>	<i>IESO and Hydro One Transmission</i>	- Summary of needs based on demand forecast scenarios for the 20-year planning horizon	Q1 2015
6	<b>Develop Options and Alternatives</b>		- Develop flexible planning options for forecast scenarios	Q1 –Q2 2015
	- Identify solutions for immediate implementation and prepare hand-off letters to responsible parties (if applicable)	<i>IESO</i>		

	- Develop conservation options	<i>IESO and Hydro One Distribution</i>		
	- Develop local generation options	<i>IESO and Hydro One Distribution</i>		
	- Develop transmission or distribution options including maximizing existing infrastructure capability	<i>IESO, Hydro One Transmission and Hydro One Distribution</i>		
	- Develop options of other electricity initiatives including smart grid and storage	<i>IESO/ Hydro One Distribution with support as needed</i>		
	- Develop portfolios of integrated alternatives	<i>All</i>		
	- Technical comparison and evaluation	<i>All</i>		
<b>7</b>	<b>Issue Report on Near-Term Plan (0-5 years)</b>	<i>All</i>	- Publish a Report focusing on near-term plan elements, in order to facilitate critical decision making	Q2 2015
<b>8</b>	<b>Community &amp; Stakeholder Engagement</b>		- Community and Stakeholder Engagement Plan - Input from local communities, First Nations and Métis communities	On-going
	- Establish engagement subcommittee of the Working Group (if required)	<i>All</i>		
	- Meeting with local municipalities, First Nations and Métis communities within study area	<i>All</i>		
	- Develop engagement plan with LAC input	<i>All</i>		
	- Develop communications materials	<i>All</i>		
	- Engage with municipalities, First Nations and Métis communities	<i>All</i>		
	- Carry out Duty to Consult (if applicable)	<i>All</i>		
	- Summarize input and incorporate feedback	<i>All</i>		
<b>9</b>	<b>Develop long-term recommendations and implementation plan based on community and stakeholder input and outcome of Consultation, if applicable</b>	<i>IESO</i>	- Implementation plan - Monitoring activities and identification of decision triggers - Hand-off letters - Procedures for annual review	Q4 2015
<b>10</b>	<b>Prepare the IRRP report detailing the recommended near, medium and long-term plan for approval by all parties (IESO)</b>	<i>IESO</i>	- IRRP report	Q1 2016
<b>11</b>	<b>Prepare Northwest-wide IRRP, providing overarching plan for the Northwest, consistent with recommendations of the Greenstone-Marathon and other IRRPs</b>	<i>IESO</i>	- Northwest IRRP report	Q2 2016

## 6 List of Acronyms

CDM	Conservation and Demand Management
CGS	Customer Generating Station
DG	Distributed Generation
DS	Distribution Station
FIT	Feed-in-Tariff
GS	Generating Station
IESO	Independent Electricity System Operator
IRRP	Integrated Regional Resource Plan
kV	kilovolt
LAC	Local Advisory Committee
LDC	Local Distribution Company
LMC	Load Meeting Capability
MW	Megawatt
NERC	North American Electric Reliability Corporation
NPCC	Northeast Power Coordinating Council
OEB	Ontario Energy Board
OPA	Ontario Power Authority
ORTAC	Ontario Resource and Transmission Assessment Criteria
RIP	Regional Infrastructure Plan
RPP	Regional Planning Process
SS	Switching Station
TS	Transformer Station