

NEEDS ASSESSMENT REPORT

Western James Bay Territory

North of Moosonee

Revision: FINAL R1

Date: May 27, 2016

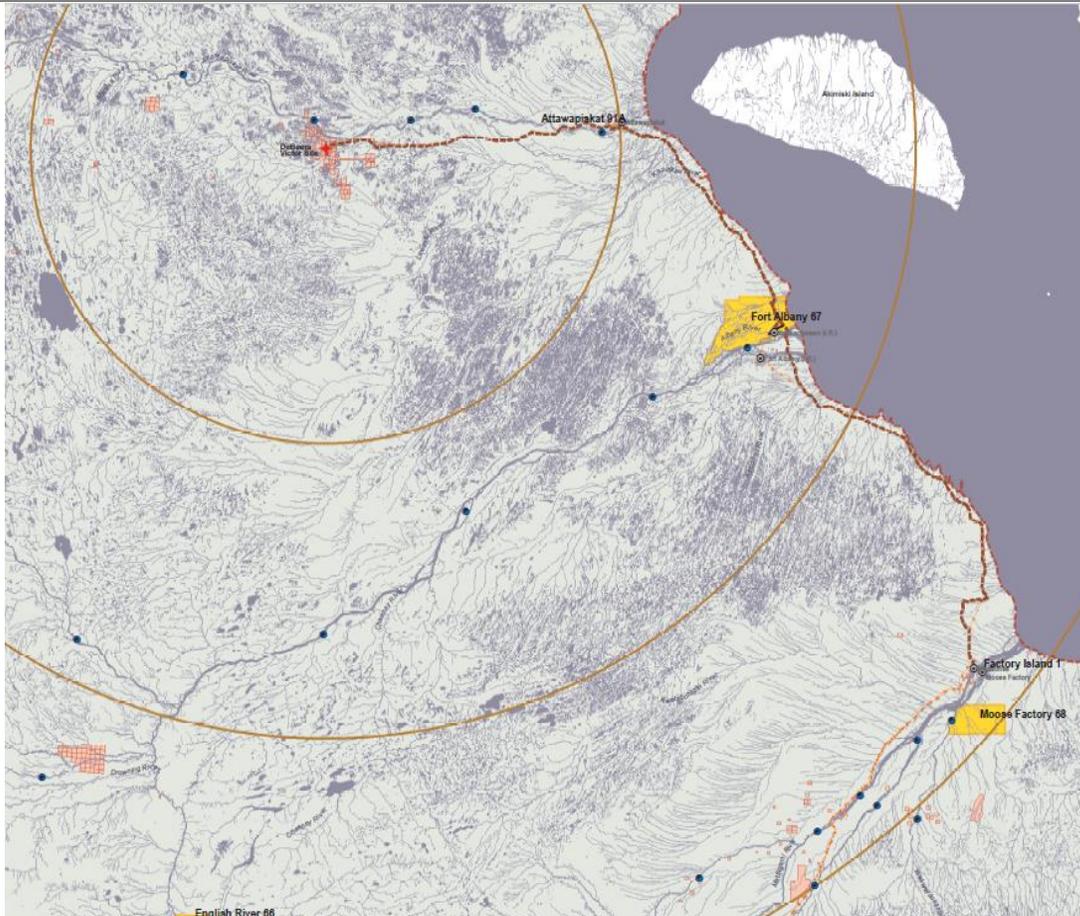


Prepared by: Five Nations Energy Inc. Operations Department

DISCLAIMER

This Needs Assessment Report was prepared for the purpose of identifying potential needs in the Western James Bay Region and to assess whether those needs require further coordinated regional planning. The potential needs that have been identified through this Needs Assessment Report may be studied further through subsequent regional planning processes and may be reevaluated based on the findings of further analysis. The load forecast and results reported in this Needs Assessment Report are based on the information and assumptions provided by study team participants.

Study team participants, their respective affiliated organizations, and Five Nations Energy Inc. (collectively, “the Authors”) make no representations or warranties (express, implied, statutory or otherwise) as to the Needs Assessment Report or its contents, including, without limitation, the accuracy or completeness of the information therein and shall not, under any circumstances whatsoever, be liable to each other, or to any third party for whom the Needs Assessment Report was prepared (“the Intended Third Parties”), or to any other third party reading or receiving the Needs Assessment Report (“the Other Third Parties”), for any direct, indirect or consequential loss or damages or for any punitive, incidental or special damages or any loss of profit, loss of contract, loss of opportunity or loss of goodwill resulting from or in any way related to the reliance on, acceptance or use of the Needs Assessment Report or its contents by any person or entity, including, but not limited to, the aforementioned persons and entities.



NEEDS ASSESSMENT SUMMARY REPORT

NAME	Western James Bay Region Study		
LEAD	Five Nations Energy Inc.,		
REGION	Group 3 - North of Moosonee		
START DATE	March 12, 2016	END DATE	May 27, 2016

1. INTRODUCTION

The purpose of this Needs Assessment report is to undertake an assessment of the Western James Bay Region (WJB-Region) to determine if there are regional needs that would lead to coordinated regional planning. Where regional coordination is not required and a “wires” only solution is necessary such needs will be addressed among the relevant Local Distribution Companies (LDCs), FNEI and other parties as required.

For needs that require further regional planning and coordination, the Independent Electricity System Operator (IESO) will initiate the Scoping process to determine whether an IESO-led Integrated Regional Resource Planning (IRRP) process or the transmitter-led Regional Infrastructure Plan (RIP) process (wires solution) is required, or whether both are required.

2. REGIONAL ISSUES/TRIGGER

The Needs Assessment for the Western James Bay Region was triggered in response to the Ontario Energy Board's (OEB) new Regional Planning process approved in August 2013. To prioritize and manage the regional planning process, Ontario's 21 regions were assigned to one of three groups, where Group 3 (North of Moosonee) Regions are to be reviewed in 2014. Western James Bay Region belongs to Group 3 (North of Moosonee) and the Needs Assessment for this Region was triggered on March 12, 2016 and was completed on May 4, 2016.

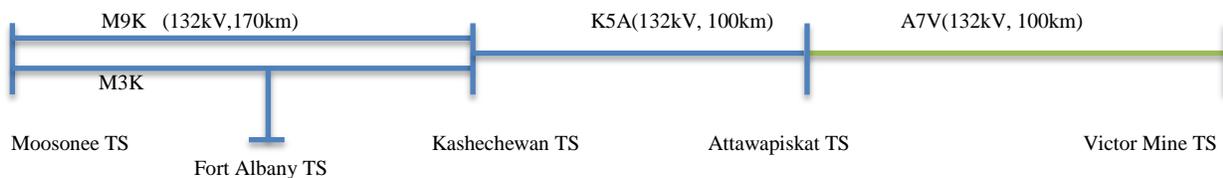
3. SCOPE OF NEEDS ASSESSMENT

The scope of this Needs Assessment was limited to the next 10 years because relevant data and information was collected up to the year 2025. Needs emerging over the near-term (0-5 years) and mid-term (6-10 years) that require coordinated regional planning should be further assessed as part of the IESO-led Scoping Assessment and/or IRRP, or in the next planning cycle to develop a 20-year plan and strategic direction for the Region.

The assessment included a review of transmission system connection facilities capacity which covers station loading, thermal and voltage analysis, system reliability, operational issues such as load restoration and asset sustainment plans.

The electricity supply to the Western James Bay region is via two single circuit 132 kV transmission lines from Moosonee TS to Kashechewan TS, Fort Albany TS tapped to one of those lines, from Kashechewan TS to Attawapiskat TS is single line. The lines are owned and operated by Five Nations Energy Inc. The area includes four transformer stations, Attiwapiskat TS (132/4.16kV), Kacheshwan TS, Fort Albany TS (132kV/8.32kV) as well as single transmission line and station to service the Victor mine on the western edge of the region owned and operated by De Beers Canada.

The area includes three LDCs, Attiwapiskat Power Corporation, Fort Albany Power Corporation, and Kashechewan Power Corporation as well as De Beers Victor Mine.



The only generation facilities of note are communities remaining diesel generators, which are on occasion used for backup purposes. These are two 1.285MW units at Attawapiskat TS, and three 1.1MW units at Kashechewan TS. Victor Mine backup generators, is 6MW in total.

4. INPUTS/DATA (INFORMATION REQUIRED TO COMPLETE ASSESSMENT)

Study team participants, the IESO, local LDCs and FNEI provided information and input to FNEI for the Western James Bay Region. The information provided includes the following:

- Actual 2015 regional coincident peak load and historical load;
- Community development plans and forecast;
- Conservation and Demand Management (CDM) and Distributed Generation (DG) data provided by IESO;
- Any known reliability and/or operating issues conditions identified by LDCs or the IESO;
- Planned transmission and distribution investments provided by the transmitter and LDCs, etc.

As per the data provided by the study team, the net load (after conservation adjustment) is expected to grow at an average rate of 5.% annually from 2015 to 2025.

5. ASSESSMENT

The assessment's primary objective over the study period (2015 to 2025) is to identify the electrical infrastructure needs in the region. The study reviewed available information; load forecast and conducted single contingency analysis to confirm need, if and when required.

The following methodology and assumptions are made in this Needs Assessment:

1. The region typically has a winter peak; therefore this assessment is based on a winter peak load. Non-coincident forecasts by station are assumed.
2. The gross demand is used to develop a worst case scenario to identify needs; gross demand and net demand (considering conservation) are both used to determine timing of needs. All assessments are made using the non-coincident peak load.
3. Consider impact of any planned developments, including planned work on the transmission system in the area.
4. Station capacity is assessed by comparing the non-coincident peak load with the station's normal planning supply capacity by assuming a 90% lagging power factor. Normal planning supply capacity is determined by the 10-Day Limited Time Rating (LTR).

5. Transmission adequacy assessment is primarily based on the following criteria:
 - a. With all elements in service, the system is to be capable of supplying forecast demand with equipment loading within continuous ratings and voltages within normal range.
 - b. With one element out of service, the system is to be capable of supplying forecast demand with circuit loading within their long-term emergency (LTE) ratings and transformers within their summer 10-Day LTR.
 - c. All voltages must be within pre- and post-contingency ranges as per Ontario Resource and Transmission Assessment Criteria (ORTAC).
 - d. The system is capable of meeting the load restoration time limits as per ORTAC criteria.

6. RESULTS

A. Connection Facilities

- Based on the demand forecast, there is sufficient capacity at all three 132kV connected load stations throughout the study period. No action is required at this time and the capacity needs will be reviewed in the next planning cycle. The 4.16kV distribution side in Attawapiskat will have to be upgraded by 2020 with an additional feeder and the 8.32 kV distribution side in Kashechewan will require an additional feeder by 2022.
- Based on the demand forecast over the study period, no overload or capacity need was identified for the loss of a single 132kV circuit in the region.
- The 132 kV side of the transformer stations in Kashechewan and Fort Albany require modifications to allow bypass options for required regular maintenance procedures. These modifications will reduce the frequency and duration of planned outages otherwise required for regular station maintenance work. These upgrades are planned to be completed in 2016.
- The secondary side of all FNEI stations also required related upgrades to reduce power outages for required regular maintenance work. These modifications included MV bus tie breaker installation as well as feeder tie disconnect switches. These feeder tie disconnect switches were installed by the respective LDC.

B. System Reliability, Operation and Restoration Review

- There are no significant system reliability and operating issues identified for one element out of service for the sections of the system where there are two or more parallel elements.
- In the case of a single line failure from Kashechewan TS to the Attawapiskat TS, the Ontario Resource and Transmission Assessment Criteria (ORTAC) restoration criteria of 8 hours (plus travel time) cannot always be met due to remoteness, lack of all-season road access and the often extreme weather conditions that accompany an unplanned outage.

C. Sustainment Replacement Plans

Sustainment activities are scheduled within the study period at the stations listed below. The new equipment ratings at these stations were considered in this need assessment. Plans to replace major equipment do not affect the needs identified based on the demand forecast.

FNEI Stations.

- Attawapiskat TS (equipment, relaying & communication)
- Kashechewan TS (equipment, relaying & communication)
- Fort Albany TS (equipment, relaying & communication)
- Moosonee Fiber shelter (communication equipment)

7. RECOMMENDATION

Based on the findings of the Needs Assessment, the study team's recommendations are that no further coordinated regional planning is required for this region at this time. FNEI will continue with planned upgrades to the transformer stations as well as planned sustainment work. The next regional planning cycle is expected to be undertaken in Q1 2021 or earlier if a new need emerges.

PREPARED BY: FNEI Operations Manager: Vladimir Govorov