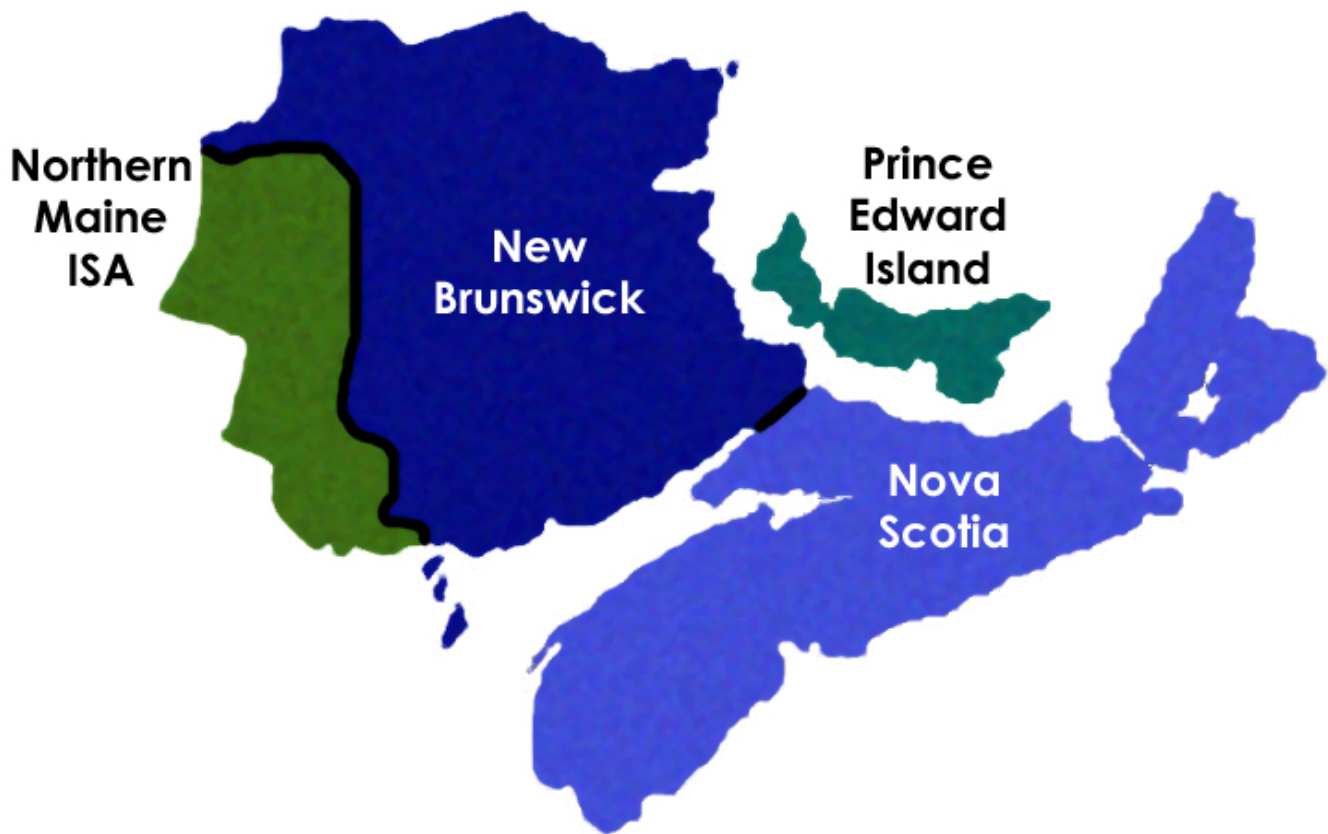


**NPCC
2014 MARITIMES AREA
INTERIM REVIEW OF RESOURCE
ADEQUACY**



**NEW BRUNSWICK POWER CORP.
NOVA SCOTIA POWER INC.
MARITIME ELECTRIC COMPANY, LIMITED
NORTHERN MAINE ISA, INC.**

Approved by the RCC

December 2, 2014

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1.0 EXECUTIVE SUMMARY

The 2014 Maritimes Area Interim Review of Resource Adequacy (2014 Interim Review), covering the period of January 2015 through December 2018, has been prepared to satisfy the Reliability Assessment Program as established by the Northeast Power Coordinating Council (NPCC). This 2014 Interim Review follows the resource adequacy review guidelines as specified in the *NPCC Regional Reliability Directory #1 Appendix D (Adopted: December 1, 2009)*.

The Maritimes Area will comply with the NPCC resource adequacy criterion that requires a loss of load expectation (LOLE) value of not more than 0.1 days/year for all years of this 2014 Interim Review. A summary of LOLE values for each year of the 2014 Interim Review and the 2013 Maritimes Area Comprehensive Review of Resource Adequacy (2013 Comprehensive Review) is shown in Table 1 below.

Table 1 – Maritimes Area LOLE Values from 2015 to 2018

Year	2014 Interim Review (days/year)	2013 Comprehensive Review (days/year)
2015	0.020	0.011
2016	0.007	0.007
2017	0.005	0.006
2018	0.004	0.005

LOLE results for the 2014 Interim Review are similar to the 2013 Comprehensive Review. The slight relative increase in LOLE for 2015 is due to changes to in-service dates for some wind resources.

There are no changes in this Interim Review with respect to fuel supplies, transfer capabilities, emergency operating procedures, or market rules.

Amalgamation of the NB Power group of companies, and the New Brunswick System Operator, into a single, vertically integrated Crown utility occurred on October 1, 2013. This utility restructuring has no effect on resource adequacy in the Maritimes Area.

2.0 INTRODUCTION

This 2014 Interim Review is the first update of the 2013 Comprehensive Review approved by the Reliability Coordinating Committee (RCC) in December 2013. The Maritimes Area is a winter peaking area with separate jurisdictions in New Brunswick, Nova Scotia, Prince Edward Island, and Northern Maine. New Brunswick Power Corp. is the Reliability Coordinator for the Maritimes Area,

with its system operator functions performed by its Transmission and System Operator division under a regulator approved Standard of Conduct.

3.0 ASSUMPTION CHANGES

No changes were made in this 2014 Interim Review with respect to fuel supplies, transfer capabilities, emergency operating procedures, or market rules.

3.1 Demand Forecast

The Maritimes Area coincident peak demand is forecast to occur during the month of January each year. Table 2 shows a comparison of the annual peak loads used in this 2014 Interim Review versus the 2013 Comprehensive Review.

Table 2 – Maritimes Area Peak Demand Forecast from 2015 to 2018

Year	2014 Interim Review (MW)	2013 Comprehensive Review (MW)	Difference (MW)
2015	5,321	5,286	+35
2016	5,322	5,267	+55
2017	5,328	5,267	+61
2018	5,322	5,253	+69
2015 to 2018 Compound Annual Growth Rate			
Growth Rate	0.0%	-0.2%	

Although demand in Nova Scotia is forecast to decrease slightly, the overall Maritimes Area demand forecast for this 2014 Interim Review is marginally higher compared to the demand forecast of the 2013 Comprehensive Review. The growth rate is flat over the period of this 2014 Interim Review, practically unchanged from the 2013 Comprehensive Review.

3.2 Resources Forecast

Significant resource changes for this 2014 Interim Review versus the 2013 Comprehensive Review include the following:

- Reductions of between 65 MW and 125 MW in Nova Scotia's on peak wind capacity due to removal of Energy Resource Interconnection Service connected wind generation from capacity calculation, as well as moving the South Canoe wind farm in-service date to April 2015.
- Retirement of one 153 MW coal fired Lingan generator in Nova Scotia planned for October of 2017. Impact on resource adequacy for this 2014 Interim Review is negligible because its capacity is replaced with the same amount of purchased capacity sourced from the Muskrat Falls hydro-

electric power project currently under construction in the Province of Newfoundland and Labrador. The output from Muskrat Falls will be transmitted to Nova Scotia via underwater cable from the planned +/- 200 kV Maritime Link HVDC project.

Table 3 shows the year by year January resources forecast for this 2014 Interim Review compared to the 2013 Comprehensive Review.

Table 3 – Maritimes Area Resources Forecast for 2013 to 2015

Year	2014 Interim Review (MW, with on-peak wind)			2013 Comprehensive Review (MW, with on-peak wind)			Difference (MW)
	Conventional	Wind	Total	Conventional	Wind	Total	Total
2015	6,814	398	7,212	6,825	522	7,347	-135
2016	6,847	466	7,313	6,858	532	7,390	-77
2017	6,847	476	7,323	6,858	545	7,403	-80
2018	6,847	476	7,323	6,858	559	7,417	-94

Conventional capacity in Table 3 is from the peak load month of January of each year and includes installed generation, contracted inter-area purchases (if any), and tie benefits of 300 MW (see Section 3.5 below). Wind capacity used in Table 3 is the total amount of wind generation forecast during the hour of the Maritimes Area coincident peak load. Wind generation capacity for LOLE analysis is netted against hourly loads.

3.3 Comparison of Forecast and Required Reserve

The Maritimes Area uses a 20% reserve criterion for planning purposes. A close correlation between this criterion and NPCC's LOLE criterion of not more than 0.1 days per year of load losses due to resource deficiencies was established in the 2013 Comprehensive Review. Table 4 shows annual values for the forecast, required, and minimum reserves. In each year of this 2014 Interim Review, the forecast reserve exceeds the 20% required reserve criterion.

Table 4 – Forecast, Minimum and Required Reserve - January 2015 to 2018

Year	Forecast Capacity (MW)	Peak Load (MW)	Inter. Load (MW)	Forecast Reserve		Required Reserve		Minimum Reserve	
				MW	%	MW	%	MW	%
2015	7,212	5,321	255	2,146	42	1,013	20	1,920	52
2016	7,313	5,322	264	2,255	45	1,012	20	1,489	40
2017	7,323	5,328	264	2,259	45	1,013	20	2,105	58
2018	7,323	5,322	264	2,265	45	1,012	20	1,919	53

$$\text{Forecast Reserve (\%)} = \frac{[\text{Forecast Capacity} - (\text{Peak Load} - \text{Inter. Load})] * 100\%}{(\text{Peak Load} - \text{Inter. Load})}$$

$$\text{Minimum Reserve (\%)} = \text{Minimum of hourly forecast reserves}$$

Forecast wind generation outputs during the Maritimes Area peak load hours are used for the forecast capacity totals in Table 4. Hour by hour forecast wind values are used for the minimum reserve calculations.

3.4 Interconnection Tie Benefits

In this 2014 Interim Review, 300 MW of interconnection tie benefits from external Areas are assumed. This is unchanged from the 2013 Comprehensive Review. In the CP-8 report *Review of Interconnection Assistance Reliability Benefits (June 1, 2011)* the range of estimated annual tie benefit potential for the Maritimes Area for 2015 was 1,252 – 1,536 MW. Based on this CP-8 report, the 300 MW of tie benefits assumed is conservative.

3.5 Interface Limits

With the exceptions of 300 MW of tie benefits from external Area interfaces for all years and 153 MW of new interface capacity from a new Maritimes Area HVDC link with Newfoundland and Labrador starting in 2017, no other external Area interfaces to the Maritimes Area were modeled.

3.6 New Brunswick Power Corp. Restructuring

Amalgamation of the NB Power group of companies, and the New Brunswick System Operator, into a single, vertically integrated Crown utility occurred on October 1, 2013. This utility restructuring has no effect on resource adequacy in the Maritimes Area.

4.0 FUEL SUPPLIES

The 2013 Comprehensive Review showed that the Maritimes Area has a diversified mix of resources such that there is not a high degree of reliance upon any one type or source of fuel. This diversified resource mix is unchanged for this 2014 Interim Review.

Generation fueled only by natural gas accounts for just 7% of Maritimes Area capacity resources with supply options that include local shale gas fields, eastern off-shore production, western pipelines, and a liquefied natural gas receiving and re-gasification terminal. These supply options help to significantly reduce the exposure of the Maritimes Area to natural gas fuel disruptions.

5.0 LOLE RESULTS

Despite slightly higher loads and slightly lower resource levels for the overall Maritimes Area, the effect of decreasing demand in Nova Scotia was enough to reduce the overall LOLE values for the Maritimes Area with the exception of 2015. The slight increase in LOLE for 2015 is mainly due to the reduction of 124 MW of proposed Nova Scotia wind resources compared to expectations in the 2013 Comprehensive Review for that year. This reduction is due in part to revisions to the in-service dates of some projects to later in the year and in part to the decision not to count Energy Resource Interconnection Service as capacity.

A summary of the Maritimes Area LOLE values from 2015 to 2018 is shown in Table 5 below. All LOLE values for this 2014 Interim Review meet the NPCC resource adequacy criterion.

Table 5 – Maritimes Area LOLE Values from 2015 to 2018

Year	2014 Interim Review (days/year)	2013 Comprehensive Review (days/year)
2015	0.020	0.011
2016	0.007	0.007
2017	0.005	0.006
2018	0.004	0.005

6.0 CONCLUSION

Results of this 2014 Interim Review show the Maritimes Area will comply with the NPCC resource adequacy criterion requiring a LOLE value of not more than 0.1 days/year for all years from 2015 to 2018.