

NPCC
2015 Québec Balancing Authority Area
Interim Review of
Resource Adequacy

Prepared by
Planification et fiabilité
Direction Approvisionnement en électricité
Hydro-Québec Distribution

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1. EXECUTIVE SUMMARY

The Québec Balancing Authority Area submits this assessment of resource adequacy to comply with the Reliability Assessment Program established by the Northeast Power Coordinating Council (NPCC). The guidelines for the review are specified in Appendix D of the NPCC Regional Reliability Reference Directory #1, “*Guidelines for Area Review of Resource Adequacy*” (Adopted in December 1, 2009).

This 2015 Interim Review of Resource Adequacy covers the study period from winter 2015-2016 through winter 2018-2019. Changes in assumptions since the last Comprehensive Review, and the impact of these changes on the overall reliability of the Québec electricity system, are highlighted therein.

The internal demand forecast has been revised slightly downward since the last Comprehensive Review due mainly to a decrease in the expected load from the industrial sector. Planned resources have been generally revised upward due to higher firm capacity import in 2015-2016 and 2016-2017 and the restarting, for peaking purposes, of TransCanada Energy power plant for winter 2018-2019.

Results of this Interim Review show that the loss of load expectation (LOLE) for the Québec area is below the NPCC reliability criterion of not more than 0.1 day per year for all years of this assessment under the base case scenario. Under the high case scenario of demand forecast, the area would need additional capacity for the winter 2016-2017 and 2017-2018.

Table 1 - Summary of LOLE Results

Winter Peak	Base case scenario (days / year)	High case scenario (days / year)
2015-2016	0.049	0.078
2016-2017	0.069	0.129
2017-2018	0.070	0.173
2018-2019	0.051	0.082

2. INTRODUCTION

This 2015 Interim Review is the first update of the 2014 Québec Balancing Authority Area Comprehensive Review of Resource Adequacy approved by the Reliability Coordinating Committee (RCC) in December 2014. This review covers the period from November 2015 through October 2019. The Québec Area is a winter peaking area with the peak load occurring generally in January. Major assumptions of this review are consistent with the second Progress Report of the Hydro-Québec Distribution (HQD) 2014-2023 Supply Plan, which will be filed with the Québec Energy Board on November 1st, 2015¹.

3. ASSUMPTION CHANGES

3.1 Base Case Demand Forecast

The Québec area's peak load forecast over the period of this review has slightly decreased in comparison to the load forecast presented in the 2014 Comprehensive Review. This reduction in the load is mainly attributed to a decrease in the expected demand from the industrial sector. Table 2 below compares the peak load forecast between the two reviews.

Table 2 - Base Case Load Forecast Comparison (MW)

Base case Scenario			
Winter Peak	2015 Interim Review	2014 Comprehensive Review	Difference
2015-2016	39,220	39,451	-231
2016-2017	39,715	39,791	-76
2017-2018	39,707	39,789	-81
2018-2019	39,482	39,489	-8
Average Growth Rate	0.2%	0.0%	

¹http://www.regie-energie.qc.ca/audiences/TermElecDistrPlansAppro_Suivis.html

3.1.1 Load Forecast Uncertainty

Load forecast uncertainty is derived from the load sensitivity to weather conditions and the variation of economic and demographic variables affecting the load forecast. In this review, load forecast uncertainty has been revised upward in comparison to what was used in the last Comprehensive Review. This change reflects mostly the revision of economic uncertainty.

Table 3 - Load Forecast Uncertainty between the two Reviews

Review of Resource Adequacy	Current year	+1 year	+2 years	+3 years
2015 Interim Review	4.30%	4.55%	4.68%	4.86%
2014 Comprehensive Review	4.20%	4.48%	4.65%	4.84%
Difference	0.10%	0.07%	0.03%	0.02%

3.2 High Case Demand Forecast

The high case load forecast levels presented in Table 4 have a 10% probability of being exceeded (about 1.3 standard deviations of economic uncertainty over the base case load forecast levels). When simulating LOLE for the high case scenario, the load forecast uncertainty is limited to weather conditions.

Table 4 - High Case Load Forecast Comparison (MW)

High case Scenario			
Winter Peak	2015 Interim Review	2014 Comprehensive Review	Difference
2015-2016	40,231	40,491	-261
2016-2017	40,815	41,011	-196
2017-2018	40,901	41,170	-269
2018-2019	40,807	41,118	-311
Average Growth Rate	0.5%	0.5%	

3.3 PLANNED RESOURCES

In this review, planned resources are consistent with the most recent updates of available capacity data in the area. The differences in planned resources since the 2014 Comprehensive review are mainly explained by:

- Higher firm capacity import due to a new capacity sharing agreement between Québec and Ontario (500 MW for winter 2015-2016 and 2016-2017);
- The restarting, for peaking purposes, of the mothballed natural gas unit operated by TransCanada Energy (570 MW for winter 2018-2019);
- The reduction of expected interruptible load (about -150 MW for winter 2016-2017 through winter 2018-2019);

Table 4 - Planned Resources Comparison (MW)

Winter Peak	2015 Interim Review	2014 Comprehensive Review	Difference
2015-2016	44,817	44,375	442
2016-2017	45,062	44,710	352
2017-2018	45,065	45,169	-104
2018-2019	45,674	45,268	406

3.4 TRANSMISSION AND INTERFACE LIMITS

Internal transfer capability assumptions are identical to those presented in the 2014 Comprehensive Review.

Table 5 presents the internal interface limits in MW.

Table 5 - Internal Interface Limits (MW)

Sub area		2015 Interim Review	
From	To	2015-16 winter peak period	2018-19 winter peak period
Churchill Falls	Manicouagan	5,200	5,200
Manicouagan	Québec Centre	12,500	13,200
Québec Centre	Montréal	21,800	23,200
Baie James	Québec Centre	15,000	15,000
Baie James	Nicolet (CC)	2,250	2,250
Nicolet (CC)	Montréal	2,138	2,138

4. LOLE RESULTS

4.1 Base Case Demand Scenario

Results shown in Table 6 indicate that the Québec Area will meet the NPCC resource adequacy criterion that requires a loss of load expectation value not more than one day per ten years or 0.1 day per year for all the years covered by this review. In comparison to the LOLE values of the 2014 Comprehensive Review, these LOLE values are lower mostly due to load forecast decrease and higher planned resources.

Table 6 - Planned Reserve and LOLE Results

Winter Peak	Planned Reserve (MW)		LOLE (Day / year)	
	2015 Interim Review	2014 Comprehensive Review	2015 Interim Review	2014 Comprehensive Review
2015 / 2016	5,597	4,924	0.049	0.074
2016 / 2017	5,347	4,918	0.069	0.086
2017 / 2018	5,358	5,380	0.070	0.071
2018 / 2019	6,193	5,779	0.051	0.068

The Québec Balancing Authority Required Reserve Margin is determined by using the NPCC resource adequacy criterion which requires that the loss of load expectation (LOLE) due to resource deficiencies shall be not more than 0.1 day per year. For this review, results show that the Required Reserve Margins of the Québec area range from 11.6 percent for the 2015-2016 winter period to 12.7 percent for the winter 2018-2019. These Required Reserve Margins are similar or slightly lower than the Required Reserve Margin presented in the 2014 Comprehensive Review.

Table 7 - Required Reserve Margins at NPCC Criterion (LOLE = 0.1 days/year)

Winter Peak	Required Reserve (MW)		Required Reserve (%)		LOLE (Days/year)
	2015 Interim Review	2014 Comprehensive Review	2015 Interim Review	2014 Comprehensive Review	
2015 / 2016	4,562	4,564	11.6%	11.6%	0.100
2016 / 2017	4,717	4,758	11.9%	12.0%	0.100
2017 / 2018	4,838	4,920	12.2%	12.4%	0.100
2018 / 2019	5,003	5,049	12.7%	12.8%	0.100

4.2 High Case Demand Scenario

Results shown in Table 8 indicate that under the high case demand scenario, the Québec area would need additional capacity for the 2016-2017 and 2017-2018 winter peak periods to meet a LOLE of 0.1 day per year. The additional resources needed are estimated to be about 200 MW for winter 2016-2017 and 400 MW for winter 2017-2018. This could be achieved by additional purchases from neighboring areas or by the use, for peaking purposes, of TransCanada Energy's (TCE) unit earlier than expected.

Table 8 – Planned reserve and LOLE under the High Case Demand Forecast

Winter Peak	Planned Reserve (MW)		LOLE (Day / year)	
	2015 Interim Review	2014 Comprehensive Review	2015 Interim Review	2014 Comprehensive Review
2015 / 2016	4,586	3,884	0.078	0.242
2016 / 2017	4,247	3,698	0.129	0.323
2017 / 2018	4,164	3,999	0.173	0.279
2018 / 2019	4,867	4,150	0.082	0.270

5. CONCLUSION

The results of this review show that the Québec Balancing Authority Area will meet the NPCC resource adequacy criterion that requires a loss of load expectation (LOLE) value of not more than 0.1 day per year for all years of this review under the base case demand forecast scenario. As for meeting the criterion under the high case demand forecast scenario, the Québec area would need additional capacity for the 2016-2017 and 2017-2018 winter peak periods, which could be achieved by additional purchases or by the use, for peaking purposes, of TransCanada Energy's unit earlier than expected.