

**NPCC**  
**2019 Québec Balancing Authority Area**  
**Interim Review of**  
**Resource Adequacy**

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*Approved by the RCC on December 3, 2019*

**November 13, 2019**

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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*”.

This 2019 Interim Review of Resource Adequacy is the second update from the last Comprehensive Review, and covers the study period from winter 2019-2020 through winter 2021-2022. 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 herein.

The internal demand forecast has been revised upward since the last Comprehensive Review due mainly to an increase in the residential and the commercial sectors sales. Planned resources were also revised upward due mostly to new demand response programs and to an increase in wind resources peak contribution.

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 the assessment in the Base case and the High case scenarios.

**Table 1 – Summary of LOLE Results**

Winter Peak	Base case scenario (days / year)	High case scenario (days / year)
2019-2020	0.000	0.004
2020-2021	0.010	0.024
2021-2022	0.013	0.039

## 2. INTRODUCTION

This Interim Review is the second update of the 2017 Québec Balancing Authority Area Comprehensive Review of Resource Adequacy approved by the Reliability Coordinating Committee (RCC) in December 2017. This review covers the period from November 2019 through October 2022. The Québec Area is a winter peaking system with the peak load generally occurring in January. Major assumptions of this review are consistent with the Hydro-Québec Distribution 2020-2029 Supply Plan, which was filed with the Québec Energy Board on November 1<sup>st</sup>, 2019.

## 3. ASSUMPTION CHANGES

### 3.1 Base Case Demand Forecast

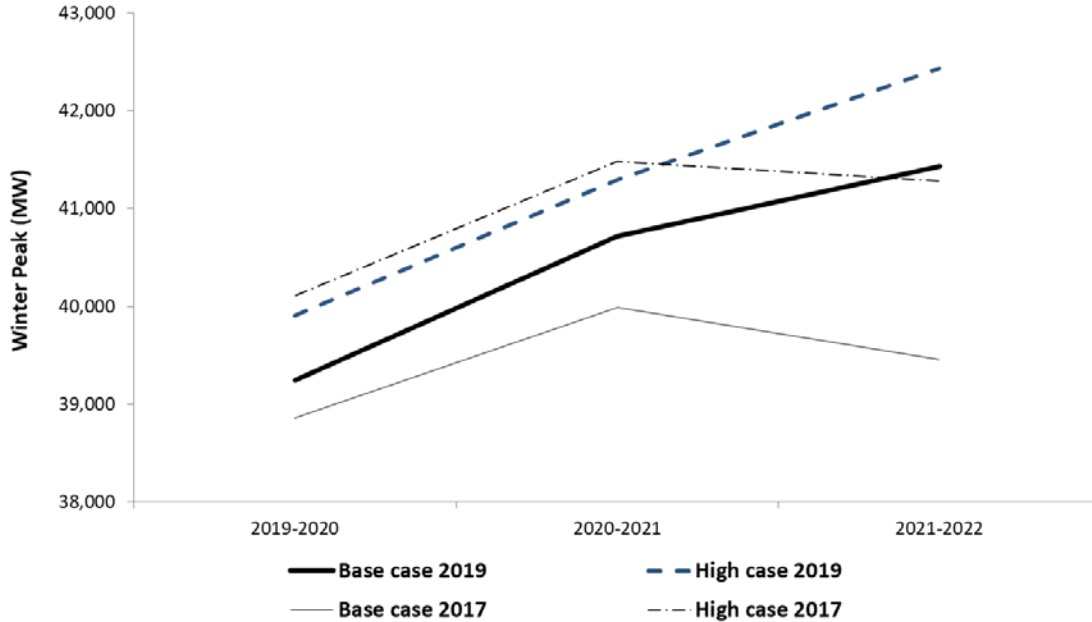
The Québec Area peak load forecast over the period of this review has increased in comparison to the load forecast presented in the 2017 Comprehensive Review. This growth in the load forecast is mainly attributed to an increase in sales in the residential and the commercial sectors. Table 2 below compares the peak load forecast between the two reviews.

**Table 2 – Base Case Load Forecast Comparison (MW)**

Base Case Scenario			
Winter Peak	2019 Interim Review	2017 Comprehensive Review	Difference
2019-2020	39,243	38,862	381
2020-2021	40,720	39,988	732
2021-2022	41,427	39,456 <sup>1</sup>	1 977
<b>Average Growth Rate</b>	<b>2.7%</b>	<b>0.8%</b>	

<sup>1</sup> : Does not include any commitment on the New England Forward Capacity Market.

**Figure 1 – Comparison of Demand Forecasts**



### 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. In this review, the load forecast uncertainty has been revised downward in comparison to what was used in the last Comprehensive Review. The difference between the two reviews is explained by lower weather and economic uncertainty forecasts.

**Table 3 – Load Forecast Uncertainty Comparison**

Review of Resource Adequacy	Current year	+1 year	+2 years
<b>2019 Interim Review</b>	4.2%	4.3%	4.4%
<b>2017 Comprehensive Review</b>	4.9%	5.1%	5.3%
<b>Difference</b>	-0.70%	-0.80%	-0.92%

### 3.2 High Case Demand Forecast

The High case load forecast levels presented in Table 4 have a 10% probability of being exceeded. 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 (MW)			
Winter Peak	2019 Interim Review	2017 Comprehensive Review	Difference
2019-2020	39,969	40,107	-138
2020-2021	41,607	41,478	129
2021-2022	42,436	41,279	1,157
Average Growth Rate	3.0%	1.5%	

### 3.3 PLANNED RESOURCES

In this review, planned resources are consistent with the most recent available capacity data updates for the Area. Planned resources at the end of the study period have been revised upward by 782 MW since the last Comprehensive Review. The differences in planned resources are mainly explained by:

- An increase in wind resources (+ 225 MW) due to the revision of the peak contribution for Hydro Quebec Distribution's units (3,667 MW) from 30% to 36%<sup>1</sup>.
- New demand response programs, including a program for data centers specialized in blockchain applications and other interruptible load programs (+ 648 MW).
- Capacity adjustments for other small power producers (-69 MW), and large hydro resources (-22 MW) which will reduce available capacity by 91 MW.

**Table 5 – Planned Resources Comparison (MW)**

Winter Peak	2019 Interim Review	2017 Comprehensive Review	Difference
2019-2020	45,806	46,114	-307
2020-2021	46,451	46,431	20
2021-2022	47,113	46,331	782

<sup>1</sup> Hydro-Québec's Wind Capacity Contribution Update was presented to the NPCC CP-8 Working group on July 31, 2019.

## 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 (LOLE) value not more than 0.1 day per year (or one day per ten years) for all the years covered by this review. These values are lower than the ones presented in the last Comprehensive Review, due to a decrease in load forecast uncertainty.

**Table 6 – Planned Reserve and LOLE Results**

Winter Peak	Planned Reserve (MW)		LOLE (Day / year)	
	2019 Interim Review	2017 Comprehensive Review	2019 Interim Review	2017 Comprehensive Review
<b>2019 / 2020</b>	6,564	7,252	0.000	0.001
<b>2020 / 2021</b>	5,731	6,444	0.010	0.055
<b>2021 / 2022</b>	5,686	6,875	0.013	0.019

The Québec Balancing Authority Reference Reserve Margin is determined by using the NPCC reliability criterion. For this review, results in Table 7 show that Required Reserve Margins for the Québec Area range from 9.8 percent for the 2019-2020 winter period to 10.1 percent for the 2021-2022 winter period. These Reference Reserve Margins are lower than the ones presented in the 2017 Comprehensive Review due to the reduction in load forecast uncertainty and to changes in the resource portfolio, with the addition of 225 MW of wind contribution and of 648 MW of new demand response resources.

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

Winter Peak	Required Reserve (MW)		Reference Reserve (%)		LOLE (Days/year)
	2019 Interim Review	2017 Comprehensive Review	2019 Interim Review	2017 Comprehensive Review	
<b>2019/2020</b>	3,837	5,037	9.8%	13.0%	0.100
<b>2020/2021</b>	4,151	5,284	10.2%	13.2%	0.100
<b>2021/2022</b>	4,181	5,275	10.1%	13.4%	0.100

#### 4.2 High Case Demand Scenario

Results shown in Table 8 indicate that, in the High case demand scenario, the Québec Area would be able to comply with the NPCC criterion for each year of the assessment using the resources planned.

**Table 8 – Planned reserve and LOLE - High Case Demand Forecast**

Winter Peak	Planned Reserve (MW)		LOLE (Day / year)	
	2019 Interim Review	2017 Comprehensive Review	2019 Interim Review	2017 Comprehensive Review
<b>2019/2020</b>	5,837	6,006	0.004	0.027
<b>2020/2021</b>	4,844	4,954	0.024	0.109
<b>2021/2022</b>	4,677	5,052	0.039	0.095

#### 4.3 “No Wind” Sensitivity Case

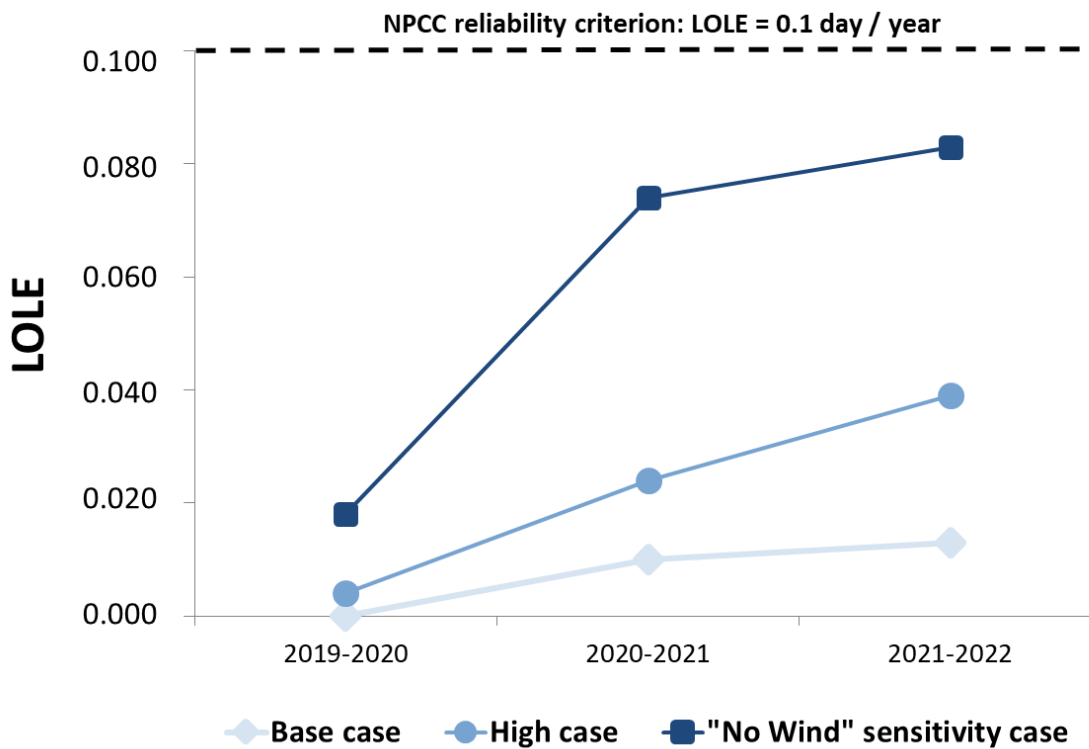
The Quebec Area developed a “No Wind” sensitivity case to assess the impacts of the absence of this resource on reliability. For this case, all wind resources in the Balancing Area (~3,800 MW installed capacity) were removed. Table 9 details results for this case and figure 2 illustrates the impact of wind resources removal on the LOLE, compared to the Base case and the High case scenarios. For each year of the assessment period, the LOLE remains below the NPCC reliability criterion in the “No Wind” sensitivity case.



**Table 9 – Planned reserve and LOLE – “No Wind” sensitivity case**

Winter Peak	Planned Reserve (MW)	LOLE (Day / year)
2019/2020	5,212	0.018
2020/2021	4,371	0.074
2021/2022	4,317	0.083

**Figure 2 – Comparison of LOLE: Base case, High case and “No wind” sensitivity case**



## 5. CONCLUSION

The results of this review show that the Québec Balancing Authority Area will meet the NPCC resource reliability (LOLE = 0.1 days / year) for all the years of the review, in both the Base case and the High case scenarios.