QUÉBEC CONTROL AREA

2007 INTERIM REVIEW

OF

RESOURCE ADEQUACY

Approved by the RCC – March 5, 2008

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1. Executive Summary

This Québec Control Area 2007 Interim Assessment ("2007 Interim Review") covers the period between November 2007 and October 2010. The planning year corresponds to a hydraulic cycle beginning in November and ending in October of the following year. It is conducted to comply with the Reliability Assessment Program established by the Northeast Power Coordinating Council (NPCC) and the resource adequacy review guidelines as outlined in the NPCC B-8 Document "Guidelines for Area Review of Resource Adequacy".

The 2007 Interim Review underlines the changes in assumptions that have been made since the 2005 Triennial Review and assesses the impact of these changes on the reliability of the Québec Control Area.

The results of this 2007 Interim Review show that the Québec Control Area complies with the NPCC resource adequacy reliability criterion under both the base case and the high case scenarios of demand.

2. Introduction

This 2007 Interim Review is the second update of the 2005 Triennial Review of Resource Adequacy approved in March 2006. The major assumptions of this 2007 Interim Review are consistent with the Procurement Plan 2008-2017 of Hydro-Québec Distribution (HQD) filed with the Québec Energy Board in November 2007. [1]

3. Assumption Changes

3.1 Demand forecast

Base case scenario of demand

The observed internal peak load for last winter period was 36 251 MW as compared to 36 333 MW forecasted in the 2005 Triennial Review. At that time more than 2 100 MW were exported to neighbouring areas. Winter 2006-2007 had many relatively cold days without reaching any record cold temperatures. December 2006 and January 2007 were warmer than normal but February 2007 was colder than normal. The peak load occurred in February 2007 instead of occurring as usual in January. In Québec, the annual electricity peak load occurs in winter since more than 70 % of households use electricity for space heating.

[1] For the Procurement Plan of HQD see: http://www.regie-energie.qc.ca/audiences/3648-07/Requete3648/B-1-HQD-01-01_3648_01nov07.pdf

The peak load forecast for the Québec Control Area for 2007 through 2009 has decreased as compared to the forecast used in the 2005 Triennial Review. The shutting down of certain industrial loads such as sawmills and paper mills, and higher load conservation measures implemented by Hydro-Québec Distribution explain this load forecast reduction.

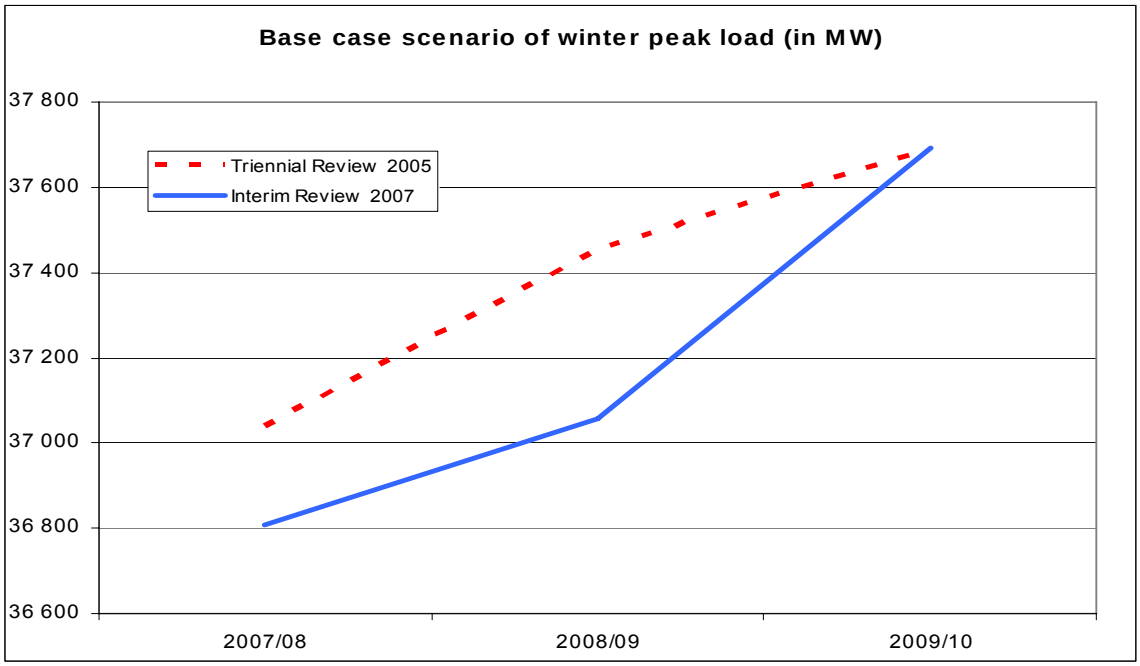
For the 2007/2008 winter, peak load is expected to reach 36 808 MW, a decrease of 230 MW in comparison with the forecast of the 2005 Triennial Review.

For 2008-2009, the winter peak load forecast is 395 MW lower than the 2005 Triennial forecast for that peak. For 2009-2010, the new peak forecast is equal to the 2005 Triennial Review. The comparisons of the 2005 and the updated Load Forecast are shown in Table 1 and Figure 1.

Table 1 – Base Case Scenario of Peak Load Forecast (MW)

Winter Peak	Triennial Review 2005	Interim Review 2007	Difference
2007/08	37 038	36 808	-230
2008/09	37 454	37 059	-395
2009/10	37 690	37 691	1
Average growth rate	**0,9%**	**1,2%**	

FIgure 1



Load forecast uncertainty is due to load sensitivity to weather conditions and to uncertainty caused mainly by the evolution of economic and demographic parameters affecting load demand in the study period. In this Interim Review, load forecast uncertainty was revised upward. Table 2 presents a comparison of load forecast uncertainty. The Québec Area does not forecast load under extreme weather conditions.

Climatic uncertainty is modeled by recreating each hour of the last 36-year period of climatic conditions (1971 through 2006) under the current load forecast conditions. Moreover, each year of historical data is shifted up to ± 3 days to gain information on conditions that occurred during a weekend for example.

In 2007, Hydro-Québec Distribution introduced in its load forecast a new weather pattern based on the average climatic conditions observed from 1971 to 2006 adjusted for a global warming of 0.30°C per decade starting in 1971. The old weather pattern was based on the average climatic conditions from 1971 to 2000 adjusted for a global warming of 0.31°C per decade starting in 2001.

For winter 2007/08, the new weather pattern implies a reduction of the load forecast of 360 MW, but deviation expressed in MW, is greater than it was before, so the load forecast uncertainty expressed as a percentage on the load is higher.

Table 2 – Comparison of Load Forecast Uncertainty (%)

Reviews of Resource Adequacy	Current year	+ 1 year	+ 2 years	+ 3 Years
Triennial Review 2005	4,5%	4,6%	5,0%	5,4%
Interim Review 2007	4,6%	4,9%	5,2%	5,5%

In the GE MARS model, the load forecast uncertainty is taken into account through load multipliers. In this review, the load multipliers, for each year, go from one standard deviation to two standard deviations. In the 2005 Triennial Review, the load multipliers were limited to about 1,75 standard deviations.

High case scenario of demand

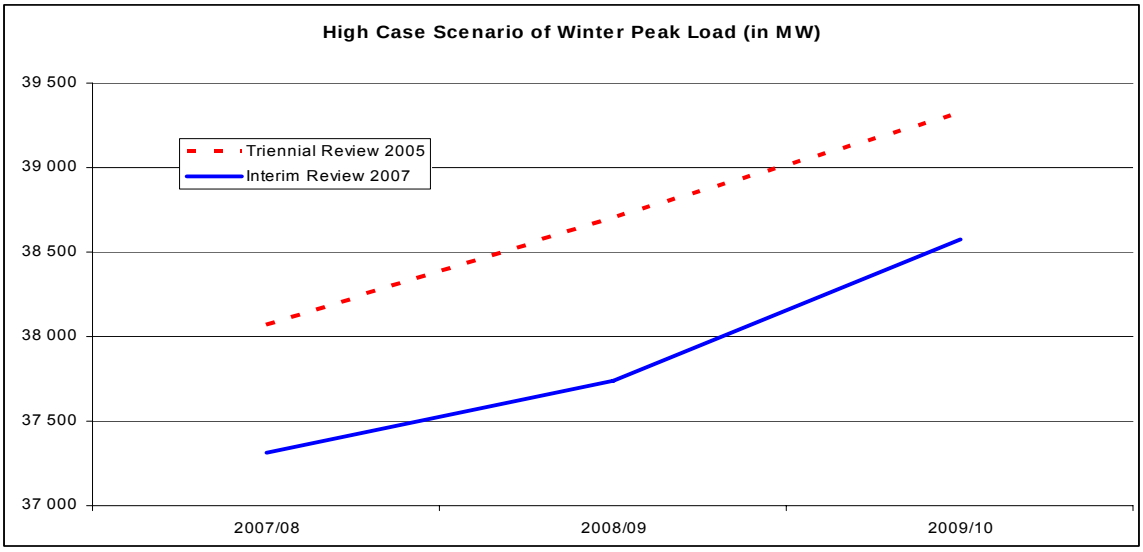
In comparison to the 2005 Triennial Review, the high case scenario of peak load has been revised downward by about 750 to 970 MW. This change is basically explained by the reduction of the forecast horizon and by the downward revision of the base case scenario of demand.

The Load Forecast Uncertainty for the High Load Forecast Scenario is only affected by weather conditions. The load sensitivity to weather conditions has been revised upward (from 3,5 % to 4,3 %) in this Review.

Table 3 – Comparison of High Load Forecast Annual Peak Load (in MW)

Winter Peak	Triennial Review 2005	Interim Review 2007	Difference
2007/08	38 069	37 315	-754
2008/09	38 699	37 736	-963
2009/10	39 319	38 573	-746
Average growth rate	**1,6%**	**1,7%**	

Figure 2



3.2 Resources

The total net planned resources present in this Interim Review are roughly equal to those forecasted in the 2005 Triennial Review. But the compositions of these resources are different.

The differences are:

- Generation from Churchill Falls station in Labrador during winter period is reduced by 134 MW to 4 930 MW to maintain the transformers durability;
- Investment in some distribution substations increased the potential of voltage reduction by 50 MW, for a total of 250 MW;

- Power purchases from Québec's Independent Power Producers increased by 150 MW during all the studied period;
- Available and committed capacities of Hydro-Québec Production are 41 MW higher in 2007-2008 and lower (166 MW in 2008-2009 and 287 MW in 2009-2010). Those differences come from variations of hydraulic restrictions, effective unavailability and a delay in the upgrading hydraulic station program.

In 2007-2008, the interruptible loads are 185 MW lower because Hydro-Québec Distribution signed for less megawatt due to a lower load forecast. For the other years, the interruptible loads are 65 MW higher.

Because of energy surpluses, Hydro-Québec Distribution has negotiated with TransCanada Energy, a private producer operating a 547 MW natural gas cogeneration plant in Québec, a total stop of production in 2008. On December 7, 2007, the Québec Energy Board accepted the agreement between TransCanada Energy and Hydro-Québec Distribution. To replace this capacity, Hydro-Québec Distribution bought the equivalent value of peak power resources.

Table 4 – Total Net Planned Resources (in MW)

Winter peak	Triennial Review 2005	Interim Review 2007	Difference
2007/08	42334	42397	63
2008/09	42825	42895	70
2009/10	42981	42930	-51

The nuclear power station Gentilly-2 has temporarily ceased generation since the beginning of the month of November to make some technical adjustments. The restart of the power plant should be carried out before the end of 2007. With a capacity of 675 MW, Gentilly-2 station supplies about 3 % of electrical energy to the Hydro-Québec network.

Wind power is completely derated in this Review. The evaluation of wind power capacity contribution during peak period is in progress. If some effective capacity values are determined, they will be applied in the next Québec Triennial Review. For information, Table 5 presents the installed and planned wind capacity up to 2009-2010 winter peak period.

Table 5 – Total Wind Power Capacity (in MW)

	2007/08	2008/09	2009/10
Wind Power Capacity	422,5	757	1057

3.3 Transfer Limits

The transfer capabilities of Quebec's transmission system are slightly different from those presented in the 2005 Triennial Review. These differences don't have any impact on the Québec reliability. The actual and planned transmission system should be more than adequate to deliver all the resources to the loads.

The new interconnection of 1 250 MW with Ontario, announced on November 14th 2006, is not included in this Interim Review. This interconnection will be implemented in May 2009.

Table 6 – Québec Internal Transfer Capacities (in MW)

Sub area		Triennial	Interim
Sending	**Receiving**	**Review 2005**	**Review 2007**
Churchill Falls	Manicouagan	5 200	5 200
Manicouagan	Québec Center	11 600	12 100
Québec Center	Montréal	17 900	17 700
James Bay	Québec Center	13 500	14 100
James Bay	Nicolet-Des Cantons	2 000	2 000
Nicolet-Des Cantons	Montréal	1 800	1 900

4. Results

Québec Control Area uses the Loss of Load Expectation (LOLE) approach in determining generation requirements with a criterion of 0.1 day per year. This criterion meets the NPCC resource adequacy criterion as showed in the Québec 2005 Triennial Review.

4.1 Base case scenario of demand

For each year, the Loss of Load Expectation is well under 0.1 day per year. The results of Tables 7 and 8 indicate that the Québec Area is in compliance with the NPCC criterion under the Base Load Forecast Scenario for the entire period covered by this Review

Table 7 – Comparison of Planned and Required Reserves (Base Case)

Winter Period	Planned Reserve (MW) [1]		LOLE (Day/year)		Required Reserve (MW)	
	Triennial Review 2005	Interim Review 2007	Triennial Review 2005	Interim Review 2007	Triennial Review 2005	Interim Review 2007
2007/08	5 293	5 589	0,035	0,001	3 642	3 695
2008/09	5 369	5 836	0,029	0,001	3 837	3 933
2009/10	5 289	5 239	0,024	0,012	3 781	4 199

(1) : Difference between planned capacity and peak demands.

Table 8 – Planned and Required Reserves (in %) (Base Case)

Winter Period	Planned Reserve (%) [2]		Required Reserve (%)	
	Triennial Review 2005	Interim Review 2007	Triennial Review 2005	Interim Review 2007
2007/08	14,3%	15,5%	9,8%	10,3%
2008/09	14,3%	16,1%	10,2%	10,9%
2009/10	14,0%	14,2%	10,0%	11,4%

(2) : Difference between planned capacity resources and peak demands expressed as a percentage of peak demand.

4.2 High case scenario of demand

Results of Table 9 indicate that the Québec Control Area is in compliance throughout the period covered by this Interim Review with the NPCC criterion under the High Load Forecast. For the entire period, the LOLE for the high case scenario of demand is under 0,1 day per year. In comparison to the results of the 2005 Triennial Review, the reliability of the Québec Control Area has improved in the high case scenario.

Table 9 – Planned Resources, Annual Peak Loads, Planned Reserves and LOLE (High Case)

Winter peak	Planned ressources (MW)	Annual peak load (MW)	Planned reserve		LOLE (Day/year)	
			(MW)	(%)	Triennial Review 2005	Interim Review 2007
2007/08	42 397	37 315	5 082	13,6%	0,052	0,003
2008/09	42 895	37 736	5 159	13,7%	0,059	0,003
2009/10	42 930	38 573	4 357	11,3%	0,072	0,029

5. Conclusion

The Québec Control Area meets the NPCC Resource Adequacy Criterion under the base and high case scenarios of peak load forecast for the entire period covered by this Interim Review.