

QUÉBEC CONTROL AREA
2003 INTERIM REVIEW
OF
RESOURCE ADEQUACY

Approved by the RCC on March 18, 2004

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December 2003

Executive summary

This is the Québec Control Area 2003 Annual Interim Assessment ("*2003 Interim Review*") of its 2002 Area Review of Resource Adequacy covering the period between November 2003 through October 2007. This *2003 Interim Review* is done to comply with the Reliability Assessment Program established by the Northeast Power Coordinating Council (NPCC). This assessment follows the resource adequacy review guidelines as outlined in the NPCC B-8 Document "Guidelines for Area Review of Resource Adequacy".

This *2003 Interim Review* underlines the changes in assumptions that had to be made since the submission of the 2002 Triennial Review and assesses the impact of these changes on the reliability of the Québec Control Area.

Results of this *2003 Interim Review* show that the Québec Control Area complies with the NPCC resource adequacy reliability criterion under both the Base and High Load Forecast Scenarios. However, 75 MW of additional net resources or reserve sharing will be needed for the last year, 2006/2007, of the period under study in the High Load Forecast Scenario.

Introduction

This *2003 Interim Review* is the first update of the Québec's 2002 Triennial Review of Resource Adequacy since it was approved in November 2002. The major assumptions of this *2003 Interim Review* are consistent with the Hydro-Québec's Strategic Plan 2004-2008 published in December 2003 and the "État d'avancement du Plan d'approvisionnement 2002-2011" of Hydro-Québec Distribution filed before the Québec Energy Board (Régie de l'énergie du Québec) in October 2003.

Assumptions Changes

Load

Base Load Forecast Scenario

The internal load forecast of the Québec Control Area for the period 2003 through 2007 published in fall 2003 has increased as compared to the forecast used in the 2002 Triennial Review due to a higher rate of growth for both the residential and large industrial customers demand. For the 2003/2004 winter peak period, the internal peak load forecast is 34 563 MW and the firm sales outside the Québec Control Area are about 100 MW higher than indicated in the 2002 Triennial Review, mainly because of a repeated contract with Cornwall Electric. This results in a total peak load forecast of 35 035 MW which is 957 MW higher than the forecast in the 2002 Triennial Review. For the following years of the period under assessment, the differences between the two

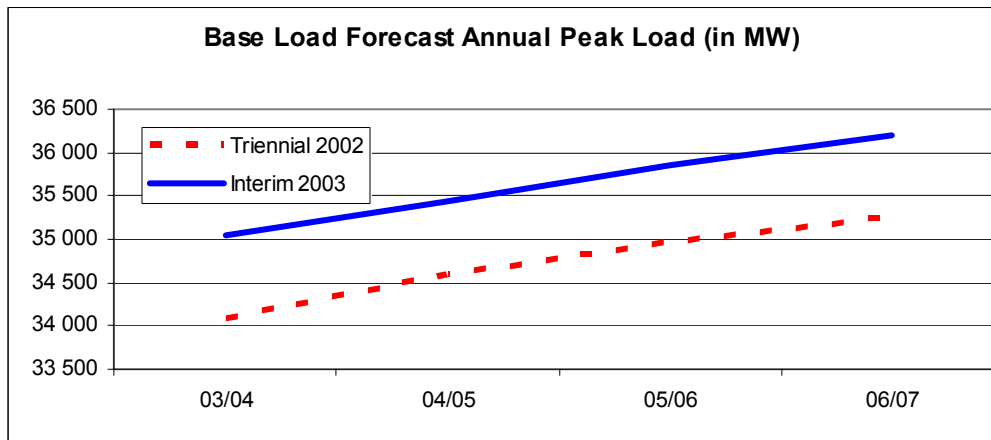
winter peak load forecasts stay between 850 MW and 950 MW as shown in Table 1 and Figure 1.

Table 1

Base Load Forecast Annual Peak Load (in MW)

	Triennial 2002	Interim 2003	Difference
2003/2004	34 078	35 035	957
2004/2005	34 587	35 435	848
2005/2006	34 956	35 855	899
2006/2007	35 244	36 193	949

Figure 1



The load duration curve used for the forecast of power requirement in this *2003 Interim Review* is slightly different than the one used in the 2002 Triennial Review in order to reflect customer consumption patterns. This change to the load duration curve requires about 115 MW of additional required reserves.

High Load Forecast Scenario

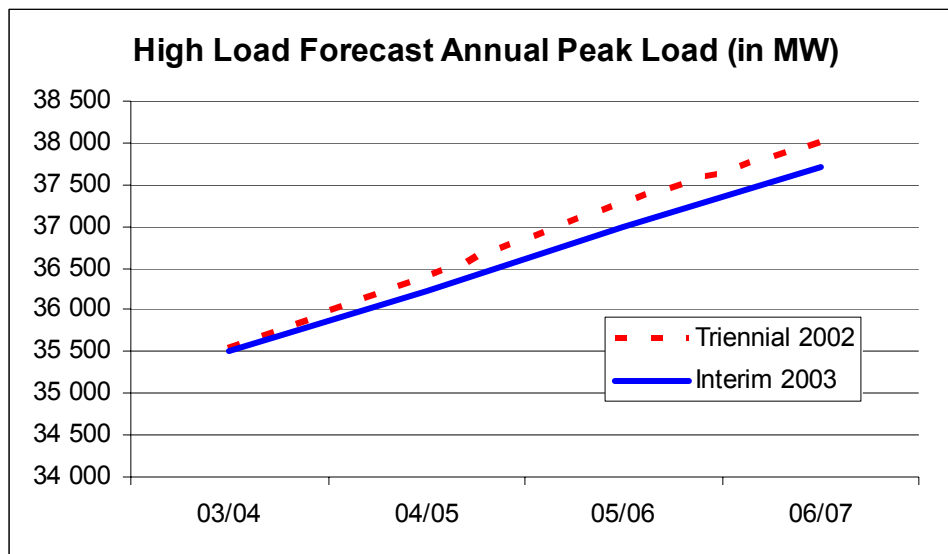
The winter peak load forecast for the High Load Scenario over the period 2003 through 2007 was increasing at an average annual rate of 2,25 % in the 2002 Triennial Review. For the *2003 Interim Review*, this winter peak load forecast grows at an average annual rate of 2,03 % as shown in Table 2 and Figure 2. The High Load Scenario is built by adding some potential load growth over the Base Load Scenario and this potential load growth increases as we look at years farther from the current year. Even if the winter peak load forecasts in the Base Load Scenario has increased for around 900 MW between the 2002 Triennial Review and the *2003 Interim Review*, the High Load forecasts were reduced as the time delay from now is reduced and so the additional potential for load growth is smaller.

Table 2

High Load Forecast Annual Peak Load (in MW)

	Triennial 2002	Interim 2003	Difference
2003/2004	35 530	35 507	-23
2004/2005	36 400	36 216	-184
2005/2006	37 270	36 998	-272
2006/2007	37 990	37 719	-271

Figure 2



Resources

For the 2003/2004 period, the net available resources are 259 MW lower than forecasted in the 2002 Triennial Review. For the 2004/2005, 2005/2006 and 2006/2007 winter periods, the net available resources increase respectively of 168 MW, 509 MW and 782 MW , as shown in Table 3 and Figure 3. These differences in net available resources take into account the short term calls for tenders of 540 MW, 810 MW and 500 MW forecasted respectively for the years 2004/2005, 2005/2006 and 2006/2007 and identified by Hydro-Québec Distribution in Table 6.3.1 page 31 of the document entitled "État d'avancement du Plan d'approvisionnement 2002-2011" filed before the Québec Energy Board in October 2003. This document is available on the Québec Energy Board's web site (http://regie-energie.qc.ca/audiences/EtatApproHQD/Etat_22nov02.pdf).

Since Hydro-Québec has submitted its data for the North American Electric Reliability Council (NERC) 2003/2004 Winter Assessment, which was published on November 14, 2003, several actions have been taken by the Québec Area to increase available resources. For example, Hydro-Québec Production commissioned in December 2003

rather than May 2004 the second unit (439 MW) at the Sainte-Marguerite 3 generating station and signed power purchase contracts for 232 MW with private producers in Québec for January and February 2004. Details of total planned resources for the *2003 Interim Review* can be seen in Table 4.

The following changes to the available resources included to the *2003 Interim Review* were made since the publication of the 2002 Triennial Review :

- Addition of a new Combined Cycle Gas Turbine at Bécancour with generating capacity of 510 MW, owned by TransCanada Energy and forecasted to operate in October 2006;
- Addition of a new Hydro-Québec Production hydroelectric generating station (Mercier 32 MW) forecasted to operate in October 2006;
- Addition of generating capacity at the Outardes-4 hydroelectric generating station (28 MW);
- Additional power purchases from independent power producers for a total capacity of 210 MW;
- Reduction of 100 MW of interruptible load from a large industrial customer under long term interruptible contract.

Also, Hydro-Québec Distribution has signed for more than 800 MW of interruptible load with large industrial customers in Québec for the December 2003 through November 2004 period. These interruptible loads are not included in this *2003 Interim Review*.

Table 3

Total Planned Resources (in MW)

	Triennial 2002	Interim 2003	Difference
2003/2004	38 795	38 536	-259
2004/2005	38 943	39 111	168
2005/2006	39 498	40 007	509
2006/2007	39 568	40 348	780

Figure 3

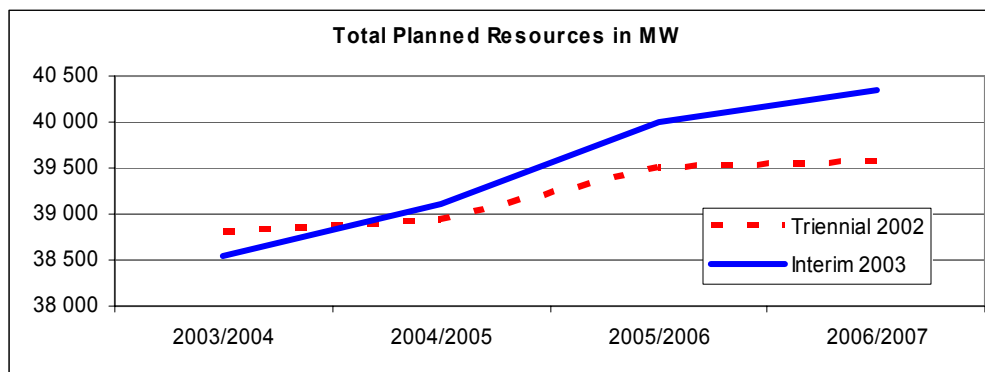


Table 4

Québec Interim Review 2003				
Planned Net Resources (in MW)				
	2003/2004	2004/2005	2005/2006	2006/2007
Available and Committed Generation	30 814	31 458	32 004	32 661
Firm Purchases	7 207	7 138	7 488	7 172
Interruptible Load	515	515	515	515
Total Planned Net Resources	38 536	39 111	40 007	40 348
Available and Committed Generation (in MW)				
	2003/2004	2004/2005	2005/2006	2006/2007
Hydro-Québec Actual Units	30 814	31 294	31 267	31 257
Refurbishing	0	19	49	101
Grand-Mère Station	0	81	81	81
Upgrading Outardes-3	0	64	128	190
Toulnustouc Station	0	0	465	465
Upgrading Outardes-4	0	0	14	28
Mercier Station	0	0	0	32
Trans-Canada Energy c.c.	0	0	0	507
Total Generation	30 814	31 458	32 004	32 661
Firm Purchases (in MW)				
	2003/2004	2004/2005	2005/2006	2006/2007
Churchill Falls	5 064	5 058	5 093	5 087
NB Power	200	200	200	200
Private Producers in Québec	1 543	1 340	1 385	1 385
New York Generators	400			
Short Term Calls for Tenders		540	810	500
Total Firm Purchases	7 207	7 138	7 488	7 172

RESULTS

Québec Control Area uses the Loss of Load Expectation (LOLE) approach in determining generation requirements with a criterion of 2.4 hours per year, which meets the NPCC resource adequacy criterion. Except some minor and required model parameter updates, there is no change in the model used for this *2003 Interim Review* and the 2002 Triennial Review.

Base Load Forecast Scenario

Table 5 summarizes the Québec Control Area system Loss of Load Expectation (LOLE) results for the Base Load Forecast Scenario and Table 6 shows the required and observed reserves for the *2003 Interim Review*. They indicate that Québec Area is in compliance for the period from 2003 through 2007 with the NPCC criterion under the Base Load Forecast Scenario.

Table 5

Base Case LOLE

Year	2002 Triennial Review (Hours/year)	2003 Interim Review (Hours/year)
2003/2004	0,57	2,16
2004/2005	1,23	2,24
2005/2006	1,08	1,63
2006/2007	1,27	2,07

Table 6

Québec Control Area Reserves (in % of the Annual Peak Load)

	2003/2004	2004/2005	2005/2006	2006/2007
Required Reserves	9,7%	10,2%	10,6%	11,1%
Observed Reserves	10,0%	10,4%	11,6%	11,5%

High Load Forecast Scenario

Table 7 indicates that Québec Control Area is in compliance for the period from 2003 through 2007 with the NPCC criterion under the High Load Forecast Scenario, taking into account that, for the year 2006/2007, net resources equal to 75 MW need to be added to the forecasted available net resources.

Looking at the estimation results for the first three years of this *2003 Interim Review*, the High Load Forecast Scenario seems to be more reliable than the Base Load Scenario. These results are mainly drove by the assumptions used in both scenarios for the load forecasts and the levels of uncertainties. In the Base Load Forecast Scenario, we take into account two kinds of uncertainty, the weather and the level of economic activity. In the High Load Forecast Scenario, only weather uncertainty is used. Further analysis will be done by Hydro-Québec to better identify the uncertainties associated with the Base Case and the High Case. However, the criteria will be met in both scenarios.

Table 7

High Case LOLE

Year	2002 Triennial Review (Hours/year)	2003 Interim Review (Hours/year)
2003/2004	0,47	1,43
2004/2005	1,68	1,74
2005/2006	2,98	1,51
2006/2007	6,26	2,66

CONCLUSION

The Québec Control Area meets the NPCC Resource Adequacy Criterion under the Base Load Forecast Scenario assumptions through November 2003 to October 2007 period.

For the High Load Forecast Scenario, 75 MW of resources need to be added to the net resources for the last year of the study period (2006/2007).