RÉGIE DE L'ÉNERGIE

HYDRO-QUÉBEC DISTRIBUTION'S APPLICATION FOR APPROVAL OF THE PROPOSED 2008-2017 SUPPLY PLAN

R-3648-2007

EVIDENCE OF OPTION CONSOMMATEURS

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1. PURPOSE OF EVIDENCE

The evidence generally follows the structure of HQD's Application and, in turn, considers HQD's load forecast, overall requirements (including reliability and reserve considerations), existing and planned supplies and strategies for acquisition of additional supply requirements. In doing so the evidence attempts to build on the findings of previous Régie proceedings by looking at changes from the 2005-2011 Supply Plan (R-3550-2004) and the resulting Régie decision (D-2005-178) and the Supply Plan Updates.

2. HQD'S LOAD FORECAST

2.1 HQD's Expected Sales Forecast

2.1.1 Comparison with previous Supply Plan

HQD's current sales forecast calls for electricity sales to customers to increase from 171.8 TWh in 2007 to 186.9 TWh in 2017 which translates into an average annual growth of 0.8%.[1] Anticipated sales growth for the next ten years is significantly lower (+15.1 TWh) when compared with the previous ten years (1997-2007) where sales have grown by 26 TWh at an average annual growth of 1.7%.[2]

Among significant variances since the last Supply Plan (2005-2014), HQD's sales forecast has seen successive decreases for 2008 sales which totalled 6.8 TWh (or about 4%) in the past three years.[3] HQD suggests that this is mostly due to a weaker industrial sector, notably the pulp and paper industry, higher energy efficiency savings as well as the introduction of a new weather normalisation. Table 1 contrasts current sales forecast for each customer class for 2008 and 2014 with sales forecast from the previous Supply Plan.

TABLE 1
COMPARISON OF SALES FORECAST PER CUSTOMER CLASS, 2008 AND 2014 (TWH)

		2005-2014 Supply Plan	2008-2017 Supply Plan	Difference	
Domestic and Agriculture	2008	59.6	60.3	0.7	1.2%
	2014	61.4	62.3	0.9	1.5%
General and Institutional	2008	32.9	34.9	2.0	6.1%
	2014	34.2	37.0	2.8	8.2%
Industrial Small & Medium	2008	11.1	9.2	-1.9	-17.1%
	2014	11.9	9.5	-2.4	-20.2%
Industrial Large Power	2008	68.7	61.4	-7.3	-10.6%
	2014	71.4	68.4	-3.0	-4.2%
Others	2008	5.4	5.2	-0.2	-3.7%
	2014	6.0	5.4	-0.6	-10.0%
Total Sales	2008	177.7	170.9	-6.8	-3.8%
	2014	184.8	182.6	-2.2	-1.2%

Source: HQD-1, doc. 2, p. 97, Table 2C-6.

[1] HQD-1, doc. 1, p. 14, Table 2.3.
[2] HQD-1, doc. 1, p. 12.
[3] HQD-1, doc. 1, p. 6.

As illustrated in the previous Table, non-Industrial customer classes have contributed to a small increase in sales forecast (+2.7 TWh in 2008 and +3.7 TWh in 2014) while Industrial customer classes (including 'Others') have seen their sales forecast reduced by much more (-9.4 TWh in 2008 and -6.0 TWh in 2014).

Table 2 contrasts HQD's current sales forecast with sales forecast underpinning the 2005 and 2006 Supply Plan Updates and the 2005-2014 Supply Plan and shows that current total sales forecast are significantly lower than previously anticipated even though some customers classes have higher sales forecast, General and Institutional notably.

TABLE 2
COMPARISON OF TOTAL SALES FORECAST, 2004-2014 (TWH)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
2008-2017 Supply Plan	164.6	168.8	170.2	171.8	170.9	173.6	176.8	178.0	180.3	181.3	182.6
2006 Supply Plan Update	164.5	169.7	171.8	173.9	174.9	176.5	178.4	179.6	181.1	181.5	182.4
Difference	*0.1*	*-0.9*	*-1.6*	*-2.1*	*-4.0*	*-2.9*	*-1.6*	*-1.6*	*-0.8*	*-0.2*	*0.2*
		3.2%	*1.2%*	*1.2%*	*0.6%*	*0.9%*	*1.1%*	*0.7%*	*0.8%*	*0.2%*	*0.5%*
2005 Supply Plan Update	164.5	170.9	173.6	174.8	176.9	178.2	179.4	180.2	182.0	182.6	183.8
Difference	*0.1*	*-2.1*	*-3.4*	*-3.0*	*-6.0*	*-4.6*	*-2.6*	*-2.2*	*-1.7*	*-1.3*	*-1.2*
		3.9%	*1.6%*	*0.7%*	*1.2%*	*0.7%*	*0.7%*	*0.4%*	*1.0%*	*0.3%*	*0.7%*
2005-201 Supply Plan	164.0	169.3	173.1	175.3	177.7	178.8	180.1	181.2	182.9	183.6	184.8
Difference	*0.6*	*-0.5*	*-2.9*	*-3.5*	*-6.8*	*-5.2*	*-3.3*	*-3.2*	*-2.6*	*-2.3*	*-2.2*
		3.2%	*2.2%*	*1.3%*	*1.4%*	*0.6%*	*0.7%*	*0.6%*	*0.9%*	*0.4%*	*0.7%*

Sources: HQD-1, doc. 2, p. 110, Table 2D-2
HQD-1, doc. 2, p. 57, Table 2A-8
HQD-1, doc. 2, p. 89, Table 2C-1
État d'avancement 2005, p. 11.
HQD-1, doc. 2, p. 97, Table 2C-6

The present comparison is strikingly different from the previous exercise where 2005-2014 sales forecast were considerably higher than previous expectations (ie, 2002-2011 Supply Plan).

A number of reasons explain lower sales forecast for the current Supply Plan period when compared to the previous Supply Plan.

2.1.2 Actual sales through 2007

First, actual sales through 2007 have been significantly less than projected in 2004 when the previous Plan was prepared and is essentially attributable to considerably lower sales to

Industrial customers (-4.9 TWh or nearly 6%) but partly offset by increased sales to General and Institutional customers (+1.5 TWh or 4.6%).[4]

Actual sales results through 2007 appear to be consistent with results from the key factors that have a significant impact on those customer classes. Table 3 contrasts the previously forecast values with actual values for the economic factors underlying electricity sales for the Industrial and General & Institutional sectors.

TABLE 3
DEMOGRAPHIC AND ECONOMIC FACTORS, ACTUAL VS. FORECAST

	2004	2005	2006	2007
Population (millions)				
Actual and 2008-2017 Supply Plan	7,549	7,598	7,652	7,704
2005-2014 Supply Plan	7,530	7,566	7,597	7,628
Difference	*19*	*32*	*55*	*76*
Manufacturing GDP (%)				
Actual and 2008-2017 Supply Plan	0.1	0.4	-0.2	-2
2005-2014 Supply Plan	3.2	2.8	3	2.8
Difference	*-3.1*	*-2.4*	*-3.2*	*-4.8*
Tertiary GDP (%)				
Actual and 2008-2017 Supply Plan	2.9	2.6	2.6	2.5
2005-2014 Supply Plan	2.7	2.5	2.7	2.5
Difference	*0.2*	*0.1*	*-0.1*	*0*
Oil Prices ($)				
Actual and 2008-2017 Supply Plan	41.45	56.48	66.09	65.14
2005-2014 Supply Plan	37.98	36.35	32.71	30
Difference	*3.47*	*20.13*	*33.38*	*35.14*

Sources: HQD-1, doc. 2, p. 109, Table 2D-1
HQD-1, doc. 2, p. 50, Table 2A-5
R-3550-2005, HQD-2, doc. 1, p. 13, Table 1.1

As Table 3 illustrates, values for Manufacturing GPD, which impacts Industrial sectors, are anaemic and well below forecast values. With regards to the General and Institutional sectors, while some values (ie, Population and Tertiary GDP) are slightly higher than anticipated, fuel prices, especially oil, are radically above forecast values, sometimes by more than twice as much.

2.1.3 Economic and Demographic Factors

Second, economic and demographic factors as well as fuel prices underlying electricity sales for the current Plan are, to a degree, different from the previous Plan. Economic factors tend to be

[4] HQD-1, doc. 2, p. 97, Table 2C-6.

higher with some important exceptions and demographic factors are also higher as demonstrated in Table 4 below.

TABLE 4
COMPARISON OF ECONOMIC AND DEMOGRAPHIC FACTORS

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Population (millions)											
Actual and 2008-2017 Supply Plan	7,549	7,598	7,652	7,704	7,757	7,806	7,851	7,895	7,936	7,973	8,006
2005-2014 Supply Plan	7,530	7,566	7,597	7,628	7,657	7,685	7,713	7,738	7,763	7,786	7,808
Difference	*19*	*32*	*55*	*76*	*100*	*121*	*138*	*157*	*173*	*187*	*198*
Household Formation (thousands)											
Actual and 2008-2017 Supply Plan	58.4	50.9	47.9	46.5	43.0	38.0	36.0	35.0	34.0	30.5	29.8
2005-2014 Supply Plan	52.5	43.2	36.0	34.0	32.0	30.6	29.5	28.1	24.7	23.1	23.5
Difference	*11.2%*	*17.8%*	*33.1%*	*36.8%*	*34.4%*	*24.2%*	*22.0%*	*24.6%*	*37.7%*	*32.0%*	*26.8%*
GDP (Cumulative Growth, %)											
Actual and 2008-2017 Supply Plan	2.7	4.9	6.6	8.0	10.0	12.6	15.1	17.5	19.8	22.1	24.4
2005-2014 Supply Plan	3.0	5.4	8.0	10.5	12.9	15.4	17.9	20.4	22.6	24.8	27.0
Difference	*-0.3*	*-0.5*	*-1.4*	*-2.5*	*-2.9*	*-2.8*	*-2.8*	*-2.9*	*-2.8*	*-2.7*	*-2.6*
Manufacturing GDP (%)											
Actual and 2008-2017 Supply Plan	0.1	0.4	-0.2	-2	1.5	3	2.5	2.3	2.2	2.2	2.2
2005-2014 Supply Plan	3.2	2.8	3	2.8	2.6	2.7	2.7	2.7	2.4	2.4	2.4
Difference	*-3.1*	*-2.4*	*-3.2*	*-4.8*	*-1.1*	*0.3*	*-0.2*	*-0.4*	*-0.2*	*-0.2*	*-0.2*
Tertiary GDP (%)											
Actual and 2008-2017 Supply Plan	2.9	2.6	2.6	2.5	2.1	2.6	2.5	2.4	2.4	2.4	2.4
2005-2014 Supply Plan	2.7	2.5	2.7	2.5	2.4	2.5	2.5	2.5	2.2	2.2	2.2
Difference	*0.2*	*0.1*	*-0.1*	*0*	*-0.3*	*0.1*	*0*	*-0.1*	*0.2*	*0.2*	*0.2*

Sources: See Table 2.

2.1.3.1 Demographics

When current values are compared to values from the previous Supply Plan, population growth is 100 k stronger in 2008 and nearly 200 k stronger in 2014 which is the result of a minor baby-boom attributable to a favourable age structure.[5]

That, in turn, translates into higher household formation which follows a similar path. Current values are significantly higher than the values projected in the previous Supply Plan (+30% on average) but that gap is narrowed if current values are contrasted with the 2006 Supply Plan Update (from +20% in 2007 and 2008 to less than 5% after 2009).[6]

[5] HQD-1, doc. 2, p. 39-40.
[6] État d'avancement du Plan 2006, p. 38, Table A1.

2.1.3.2 Economics

With regards to economic factors, values for the different GDP are very similar to values previously anticipated. Global GDP and Tertiary GDP values are slightly higher while Manufacturing GDP is slightly lower with exception for the near term which is markedly revised downward taking into account difficult economic circumstances for manufacturing and some natural resources industries such as the pulp & paper. The economic slowdown for those customers was, to some extent, already foreshadowed by HQD in the 2006 Supply Plan Update.[7]

HQD's forecast for most economic factors is generally in line with other parties[8] with a notable exception for Manufacturing GDP. The discrepancy is probably explain by different forecast date.

2.1.3.3 Fuel prices

As for fuel prices, HQD's previous forecast[9] did not envisioned escalating oil prices which are, on average, more than twice as high in the current Supply Plan while natural gas prices are also higher but to a lesser extent (+35% on average). Compared to other parties,[10] HQD's forecast values for the current Plan are in line with other parties but in the higher end.

Higher fuel prices have a significant impact on sales to the General and Institutional sector since it translates into faster and higher conversions to electricity.[11]

2.1.4 Energy efficiency

Third, further depressing sales forecast are higher energy savings achieved mainly from superior results from the PGEÉ programs which add an extra 4 TWh in energy savings by 2014 from what was previously forecast. The Industrial and Domestic & Agriculture sectors each contribute to an extra 1.5 TWh in energy savings while the General & Institutional sector adds 1 TWh.

Table 5 below contrasts, on comparable basis,[12] total cumulative savings underpinning the previous Supply Plan with current values.

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7 État d'avancement du Plan 2006, pp. 5 & 9.
8 HQD-1, doc. 2, p. 45, Table 2A-3.
9 État d'avancement du Plan 2005, pp. 40-41.
10 HQD-1, doc. 2, p. 49, Table 2A-4 (Revised, 28 Jan. 2008).
11 État d'avancement du Plan 2005, pp. 5-6.
12 HQD-3, doc. 1, p. 12, Response 7.1.

TABLE 5
COMPARISON OF CUMULATIVE ENERGY SAVINGS (TWH)

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Natural Energy Efficiency	2008-2017	0.7	1.5	2.1	2.8	3.4	4.0	4.7	5.3	5.9	6.5	7.0	7.6	8.2	8.7
	2005-2014	0.8	1.5	2.1	2.7	3.5	4.0	4.7	5.3	5.9	6.5	7.2	n/a	n/a	n/a
Previous HQ Programs	2008-2017	2.4	2.4	2.3	2.3	2.1	2.1	2.1	2.1	2.1	2.0	2.0	1.9	1.8	1.8
	2005-2014	2.4	2.4	2.3	2.3	2.2	2.1	2.1	2.1	2.0	2.0	1.9	n/a	n/a	n/a
PGEE	2008-2017	0.1	0.4	1.0	1.7	2.3	3.1	4.2	5.0	5.7	6.4	7.1	7.7	7.9	7.9
	2005-2014	0.0	0.4	0.7	1.2	1.7	2.1	2.6	3.0	3.0	3.0	3.0	n/a	n/a	n/a
Total	2008-2017	3.2	4.3	5.4	6.8	7.8	9.2	11.0	12.4	13.7	14.9	16.1	17.2	17.9	18.4
	2005-2014	3.2	4.3	5.1	6.2	7.4	8.2	9.4	10.4	10.9	11.5	12.1	n/a	n/a	n/a
	difference	0.0	0.0	0.3	0.6	0.4	1.0	1.6	2.0	2.8	3.4	4.0			
		0%	0%	6%	10%	5%	12%	17%	19%	26%	30%	33%			

Sources: R-3550-2005, HQD-2, doc. 1, p. 37, Table 1.1
R-3648-2007, HQD-1, doc. 2, p. 62, Table 2A-10
R-3648-2007, HQD-1, doc. 2, p. 115, Table 2D-11

2.1.5 Weather normalization and other methodological changes

Fourth, the introduction of a new weather normalisation that does account for climate change reduces sales forecast by a further 800 GWh on average for the period from 2007 to 2017.[13] About 75% of that reduction in sales is attributable to the Domestic and Agriculture sector.

A number of other methodological changes impact (positively or negatively) sales forecast.[14] Among them are revised technico-economic parameters for the Domestic & Agriculture sector which impacts sales by about 0,5 TWh for 2007 and somewhat more than 1,5 TWh by 2017.[15]

2.2 HQD's Expected Energy Requirements

2.2.1 Translating Sales into Requirements

A number of adjustments are required in order to translate HQD's electricity sales forecast into a forecast of electricity energy needs for supply planning purposes including:

- The exclusion of sales to remote communities,
- The inclusion of consumption for internal use, and

[13] HQD-1, doc. 2, App. 2E-5, p. 148.
[14] See Appendix 2E and HQD-3, doc. 1, pp. 8-11, Responses 6.1 and 6.2.
[15] HQD-1, doc. 2, App. 2E , p. 153, Table 2E-8.

- An allowance for transportation and distribution losses.

Notwithstanding reduced sales, there are no significant changes from the previous Plan.

2.2.2 Losses

Transmission and distribution loss rates remain constant over the period and stands at 5.3% and 2.2 respectively.[16] HQD forecasts a steady loss rate as it has no indication that the loss rates should either decrease or increase over the planning period.

The integration of nearly 3 500 MW of wind power resources by 2017 which will most probably be dispersed geographically should have an impact on losses. However, even if new wind power resources were to negatively impact transmission losses, say, driving it to 5.3% or 5.5%, it would have a minor but significant impact on total requirements by adding 0.2 to 0.6 TWh respectively by 2017.

In an answer to OC's information requests, HQD has indicated that winning bids will have had their projects assessed by HQT and the results will be integrated into the transmission loss rate when applicable.[17] Consequently, it is reasonable not to anticipate changes in rate losses until clear indication provide otherwise.

2.3 HQD's Expected Capacity Requirements

2.3.1 Overall growth (from Sales)

In terms of power requirements, HQD's peak demand is projected to increase by 3 581 MW from 35 100 MW in 2006-2007 to 38 681 MW in 2016-2017 which represents an average annual growth rate of just over 1.0%.[18]

As for the last Supply Plan, power requirements forecast are derived from the expected energy requirements forecast and assumptions regarding the characteristics of the energy use in January (space heating and water heating among others). Shifts in energy by sector or end use application can lead to differences in growth rates between energy and power requirements.[19]

Though energy requirements are reduced in line with sales forecast when compared with the previous Supply Plan (see above), capacity requirements evolve differently[20], ie, they increase when contrasted with the previous Plan.

[16] HQD-1, doc. 2, p. 56, Table 2A-7..
[17] HQD-3, doc. 7, p. 14, Responses 10.1 and 10.2.
[18] HQD-1, doc.2, p. 60.
[19] HQD-1, doc. 2, p. 133.
[20] HQD-1, doc. 1, p. 6, lines 14-18.

2.4 Load Forecast Sensitivity

Similar to the previous two Plans, HQD has described the potential sensitivity of expected energy and capacity requirements to economic and demographic assumptions as well as that to variations in weather.

Sensitivity to annual variations in weather (ie, one standard deviation) is 1.9 TWh and this value is held constant throughout the forecast period.21 Moreover, sensitivity (also at one standard deviation) in requirement to economic and demographic factors increases from 42.9 TWh in 2007 to 11.3 TWh in 2017.

Some uncertainty concerns (which impacts demand variance) identified in A-2004-01[22] appear to have been 'neutralised' by HQD in this Plan as opposed to the 2005-2014 Supply Plan, namely:

- Higher residential growth where higher near term forecast in the current Plan are in line with actual sales (2005-2007);
- Competitive position of electricity for General & Institutional sectors which is partly addressed with fuel prices; and
- Industrial expansion, particularly in the aluminum sector which seems partly addressed with Alcan's 225 MW but remains in part due to a recent announcement by the Quebec Government with regards to expansion at Alcoa's Baie-Comeau facility.[23]

2.5 Conclusions

Overall, HQD's load forecast appears reasonable when considered in terms of changes observed from the previous 2005-2014 Supply Plan and the 2005 and 2006 Updates even though in the very near term a strong uncertainty remains with some economic factors, notably with impacts for the Industrial sector. Also, the fact that HQD has updated[24] its forecast further supports that sales forecast is reasonable.

[21] HQD-1, doc. 2, p. 75, Table 2B-6.
[22] A-2004-01, pp. 33-34.
[23] March 4, 2008, http://www.premier-ministre.gouv.qc.ca/salle-de-presse/communiques/2008/mars/2008-03-04.shtml.
[24] HQD-1, doc. 2, p. 43 and HQD-3, doc. 1, p. 3, Response 1.1.

3. HQD'S SUPPLY REQUIREMENTS

3.1 Energy Requirements

3.1.1 Heritage Pool

As stated above expected energy requirements are sales to customer classes plus or minus some specific items such as transportation and distribution losses. In the previous Supply Plan, energy requirements also included an allowance for managing the Heritage Pool in real time.[25]

HQD had demonstrated that managing the Heritage Pool in real time will be less than optimal and that the possibility exists for unutilized energy.[26] It was thus necessary to plan for an allowance that would cover unutilised Heritage Pool supplies. The Régie adopted HQD's approach but also stressed the importance to minimise unutilised Heritage Pool supplies.[27]

HQD's current Plan however does not plan for any allowance for managing the Heritage Pool in real time.[28] HQD now considers that it is not necessary to plan for requirements that would 'compensate' for unutilized Heritage Pool supplies — which are volatile in nature — through long-term contracts.[29]

HQD's proposal to eliminate the allowance set for unutilised Heritage Pool electricity is reasonable for the following reasons.

First, HQD's stated planning strategy is to cover short-term requirements with short-term resources and cover long-term requirements with long-term resources.[30] Since unutilised energy is largely the results of very short-term (eg., day to day, hour to hour) forecasting errors and variances, it is consistent to treat unutilised Heritage Pool supplies as short-term requirements and not planning for them in the Supply Plan.

It is also consistent with HQD's planning approach to electricity provided through the Framework Agreement which is not planned for.[31] It is worth reminding that the Framework Agreement covers similar thought different uncertainties and other short-term variances in balancing total supply and demand.[32]

Third, conceptually, the allowance set for unutilised energy could be seen as a reserve margin that was specifically designed to uncertainty associated with the early management of both

[25] R-3550-2004, HQD-3, doc.3, p. 5.
[26] R-3550-2004, HQD-5, doc. 6, p. 33, Response 41.1 and HQD-5, doc. 1.1, p. 57, Response 22.1.
[27] D-2005-178, p. 27.
[28] HQD-1, doc. 1, pp. 36-37.
[29] HQD-3, doc. 2, p. 25-26, Responses 25a and 25b.
[30] D-2005-178, p. 23.
[31] HQD-1, doc. 2, pp. 216-217.
[32] HQD, 3, doc. 7, pp. 7-8, Response 4.3.

Heritage and post-Heritage supplies. HQD appears to have gained sufficient experience and confidence for not planning any allowance in that regard.[33]

3.1.2 Reliability criteria

In decision D-2002-169 (pages 46-47) following the first Supply Plan, the Régie adopted HQD's energy reliability criterion which was to demonstrate the ability to meet a strong growth scenario over the entire planning horizon and directed HQD to file in in its next Supply Plan alternative criteria.

In the previous Supply Plan, HQD proposed an energy reliability criterion that called for HQD to have sufficient energy supply capability in place such that its dependence on short-term markets beyond a four year horizon is less than 5 TWh per annum under a higher load growth scenario. HQD defined the high growth scenario as the medium growth scenario plus one standard deviation for four years forward[34].

The 5 TWh limit reflected HQD's expectations with regards to the inter-ties' reliable (or dependable) capacity for imports after allowing for both technical and market constraints and also allowing for HQP's potential need to access the interconnected markets to guarantee the Heritage Pool supplies. Noteworthy however is the fact that HQD's 5 TWh limit did not specifically focused on neighbouring markets but included the Quebec market.

In decision D-2005-178 (p. 11-12) which followed hearings for the 2005-2014 Supply Plan, the Régie adapted HQD's proposed energy criterion so that it is five years forward instead of four and specified that the 5 TWh limit is for neighbouring short-term markets only (ie, outside Quebec).

HQD has illustrated its capability to meet a higher growth scenario according the Régie's decision.[35]

3.2 Capacity Requirements

3.2.1 Reliability criterion

For planning purposes, HQD's capacity requirements include an allowance for reserves consistent with the NPCC (Northeast Power Coordinating Council) resource adequacy criterion which requires that the probability of disconnecting a non-interruptible customer due to resource inadequacies will be no more than once in ten years or 2.4 hours per annum.[36]

HQD also maintained a four year horizon for capacity adequacy (ie, until 2010-2011)[37] which is consistent past practices.[38]

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[33] HQD-1, doc. 1, p. 37, lines 6-8.
[34] R-3550-2004, HQD-3, doc. 1, p. 6.
[35] HQD-1, doc. 1, p. 26, Table 3.3.
[36] D-2005-178, p. 17 and HQD-1, doc. 1, p.21.
[37] HQD-1, doc. 1, table 2.7 (p. 18) and p. 22.

3.2.2 Reserve margins

Reserve margins underpinning the current Supply Plan are slightly higher than those underpinning the previous Supply Plan as well as the 2006 Supply Plan Update.[39] There are a number of reasons explaining higher percentages for reserve margins.

First, reserve margins in the previous Supply Plan essentially covered Heritage Pool supplies.[40] The current margins, as well as those used for the 2006 Update, cover Heritage pool supplies but also take into account HQD's post-Heritage supplies.[41 & 42]

Second, changes in either variances (weather or demand) induce changes in reserve margin requirements. The introduction of a new weather normalisation results in a bigger weather variance for capacity when compared to the 2006 Update.[43] HQD claims that that impact adds about 0.6 percentage points to reserve margins.[44]

Finally, HQD is introducing changes in order to harmonise resources adequacy material for NPCC with its Supply Plan Review.[45] This methodological change only 'cosmetically' changes the percentages of reserve margins.

In NPCC assessments, interruptible power contracts are treated as a supply resource and included based on their gross value. In contrast, HQD used to treat interruptible power contracts as a supply resource but only included their net value in its supply balance which had no impact on its total reserve margins.

The difference between gross and net values is the 30% reserve margin that HQD applies to interruptible power contracts.[46] HQD's new approach shifts the 30% margin back into the total reserve margin but also increases interruptible power contracts to their gross value in its supply balance.[47]

This change answers a request made by the Régie in its decision D-2005-178 (p. 17) where it directed HQD to reconcile variances from Supply Plan exhibits with NERC/NPCC material with regards to reliability and reserve margins.

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38 R-3550-2004, HQD-3, doc. 1, pp. 7-9.
39 HQD-1, doc. 1, p. 22, Table 3.1.
40 HQD-1, doc. 1, p. 22, lines 6-10.
41 HQD-1, doc. 1, p. 22, lines 14-17 and HQD-1, doc. 2, p. 215.
42 It our understanding taht HQD'S contracts with HQP for post-Heritage supplies (ie, 250 MW baseload and 350 MW cyclable) do not require any allowance for reserve margins since they are firm deliveries. See État d'avancement du Plan 2006, p. 23, lines 18-20.
43 HQD-1, doc. 2, p. 83-84.
44 HQD-1, doc. 1, p. 23, lines 7-9.
45 HQD-1, doc. 1, p. 23, lines 11-13.
46 HQD-1, doc. 1, p. 23, footnote.
47 HQD-1, doc. 1, p. 36, Table 5.1.

Overall, HQD's new approach to interruptible power contracts adds about 0.5 to 0.7 percentage points to reserve margins[48] and is consistent with comments made in previous evidence filed by ECS on behalf of Option consommateurs.[49]

Overall, however, demand variance is smaller in the current Plan than it was for the previous.[50]

3.3 Current supplies

In a nutshell, HQD can rely on two broad forms of supply, namely, the Heritage Pool supplies and post-Heritage supplies.

The former is provided by HQP who is required to provide a specified amount of energy (179 TWh) and capacity (nearly 37 450 MW including an allowance of 3 100 MW for reserves) as well as some ancillary services.[51] Appendix 4A of HQD-1, doc. 2 provides details on the binding agreement associated with the delivery of Heritage supplies by HQP to HQD.

For planning purposes, any energy and power requirements in excess of the Heritage Pool, which are determined as the difference between total supply needs minus the Heritage Pool contribution, are designated as post-Heritage requirements. Those excess requirements still represent a small share of total requirements. For energy, these represent about 4% in 2007 and 11% for 2017.[52] Capacity requirements in excess of Heritage supply are a little higher representing 6% in 2007 and 14% 2017.[53]

3.3.1 Long-term supply contracts

In order to meet planned requirements above the Heritage Pool supplies, HQD has thus far signed 14 long-term contracts through tendering process eventually representing more than 2 150 MW of installed capacity.[54]

Most contracted resources are baseload capacity (13 out of 14) of which the majority is wind power (8 out of 13) and one (ie, TCE) also provides peaking capacity. As for the other contracted resource, it is of the cyclable type.[55]

Two specific supply sources that were at the planning/tendering stage for the previous Supply Plan have had some short falls.

First, call for tender A/O 2004-02 which called for 350 MW (out of a total of 800 MW)[56] for cogeneration capacity has had disappointing results: a single 8 MW contract was awarded to

[48] HQD-1, doc. 1, p. 23, lines 23-24.
[49] R-3550-2004, Evidence of William Harper, p. 24, lines 10-17.
[50] HQD-1, doc. 2, p. 17-22.
[51] HQD-1, doc. 1, p. 28, lines 1-11.
[52] HQD-1, doc. 1, p. 36, Table 5.1
[53] HQD-1, doc. 1, p. 38, Table 5.2.
[54] HQD-1, doc. 1, p. 28, lines 14-16.
[55] Appendix 4B of HQD-1, doc. 2 details expected energy contribution (p. 216), capacity contribution (p. 217) and in-service dates (p. 215) for each contract.

Tembec.[57] HQD has not planned for any further capacity from that specific supply source.[58] In an answer to an information request from OC[59], HQD's has indicated that since supply requirements are balanced by 2010, there is no need to seek additional cogeneration energy.

In our view, HQD has not provided a convincing rational for not planning further supplies from that specific source as opposed to other planned sources such as biomass-based cogeneration which HQD was directed to acquire per government decree (see below). Nonetheless, HQD has other baseload resources planned for the future and further baseload supplies provided by that specific source are not absolutely necessary (see section 3.5). In light of this, HQD's approach appears reasonable.

Second, two wind power contracts awarded under A/O 2003-02, totalling 250 MW, due to come in line in late 2006 and 2007 have been delayed by a year and two years respectively.[60] Expected energy and capacity contribution from those sources are taken into account in HQD's supply balance.[61]

3.3.2 Other resources and supply arrangements

3.3.2.1 Supply Arrangements

For purposes of 'firming up' wind power resources, HQD has signed[62] an agreement with HQP that provides for a) a load balancing service that shapes energy supplies and b) a guaranteed capacity contribution of 35%.[63]

In order to address very short-term needs due to weather variations or momentary unavailability of other suppliers[64], HQD signed[65] the Framework Agreement with HQP which sets the price for electricity mobilised above the Heritage supplies.[66]

3.3.2.2 Interruptible Power

HQD's expect a gross value of 800 MW of interruptible power over the planning horizon.[67] HQD'S original evidence indicated that there was about 550 MW of available interruptible contracts. Due to changes in available supplies following the temporary suspension TCE's

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56 R-3550-2004, HQD-3, doc. 3, p. 13.
57 HQD-1, doc. 2, p. 32, lines 7-13.
58 HQD-1, doc. 1, p. 31, lines 20-22.
59 HQD-3, doc. 7, p. 20, Response 18.1.
60 See footnotes for Anse-à-Valleau and St-Ulric/St-Léandre of HQD-1, doc. 2, p. 215.
61 HQD-3, doc. 7, p. 26, Response 25.6.
62 HQD-1, doc. 2, p. 33, lines 5-8.
63 HQD-1, doc. 1, p. 29, lines 4-12.
64 HQD-3, doc. 7, pp. 7-8, Response 4.3.
65 HQD-1, doc. 2, p. 33, lines 1-4 and p. 35, lines 1-4.
66 HQD-1, doc. 1, p. 28, lines 11-13.
67 HQD-1, doc. 1, p. 33.

contract (ie, 547 MW), HQD arranged for supplementary interruptible power and it now stands at about 650 MW as of January 2008.[68]

3.4 On-going CFTs and Planned contracts

As well as the contracted resources and supply arrangements highlighted above, HQD is also in the process of making the following supply arrangements.

First, the second Wind power CFT (A/O 2005-03) is now well-advanced as HQD opened 66 proposals totalling nearly four-times what is called for in September 2007.[69] However, deliveries from that CFT that were first scheduled to begin by September 2010 have been deferred until December of that same year.[70] The first CFT for wind power resources also totalled four times what was called for.[71]

Second, in its latest Energy Strategy,[72] the Quebec Government has pledge for more renewable resources to be contracted by HQD. More specifically, the Energy Strategy calls for a further 500 MW of wind power opened only to municipal and First Nations communities.[73] HQD has yet to issue a CFT but deliveries are currently expected to begin in late 2011.[74]

The above wind power CFTs are included in HQD's supply balance on a 30% firm contribution.[75] HQD indicates that it set the contribution of new wind resources at that level — as opposed to the 35% applied for the first wind power CFT — as there is some uncertainty in that regard.[76] HQD also indicates that that 30% contribution would be revised once contracts are signed, if necessary.

For planning purposes, it is reasonable to limit new wind power resources' contribution to 30% pending further detailed analysis in that regard. Furthermore, if the second and third wind power CFTs were included at 35% instead of 30%, the net impact on HQD's total requirements would be in the order of 35 MW in 2011-2012 to 125 MW in 2016-2017.

Third, the Government also pledged[77] for HQD to contract 100 MW of biomass-based cogeneration with deliveries to start no later than 2011.

Even though the Government pledged for the two latter CFTs (ie, third wind power and cogeneration), HQD cannot yet rely on any government regulation supporting either the quantities or the anticipated in-service dates.[78]

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[68] HQd-3, doc.7, p. 11, Response 7.1.
[69] HQD-1, doc. 1, p. 30, lines 24-25.
[70] HQD-1, doc. 2, p. 24, lines 21-25.
[71] R-3550-2004, HQD-5, Document 6. P. 50, Response 64.4.
[72] Gouvernement du Québec (2006) *Québec Energy Strategy 2006-2015: Using energy to build the Québec of tomorrow*.
[73] Energy Strategy – English version, p. 32.
[74] HQD-1, doc. 1, p. 31, lines 11-17.
[75] HQD-1, doc. 1, p. 38, Table 5.2 (footnotes) and HQD-3, doc. 7, p. 22, Response 20.3.
[76] HQD-3, doc. 2, p. 21, Response 21.b.
[77] HQD-1, doc. 1, p. 31, lines 8-11.

Finally, for reasons similar to those mentioned above (ie, pending regulation), HQD does not plan any contribution from micro-generation.[79]

3.5 Additional supplies required

The load duration curves[80] HQD has provided for additional supply requirements suggest that there are capacity needs for most hours. However, HQD has also at least 500 MW of excess baseload capacityfor many hours and more than 600 MW (up to 700 MW) exists for the lowest thousand hours.

While HQD has provided information on the load profiles associated with the post-Heritage Pool requirements, it has not yet provided a clear picture of how these load profiles translate into the requirements for different types of capacity.[81]

The load profile associated with the requirements in excess of the Heritage Pool is a key factor in determining the types of resource options that are best used (from both a technical and cost-effectiveness perspective) to meet these incremental requirements.

Tables 5.1 and 5.2 succinctly summarizes the additional energy and capacity requirements that HQD has identified as still needing to be addressed over the coming 10-year planning horizon 2007-2017.

Additional energy requirements are, on the whole, either in excess (negative) or nearly balanced once planned resources have been set up.

With regards to additional capacity requirements, significant needs (more than 850 MW) appear as early as 2009-2010. The important leap in additional requirements from 2008-2009 to 2009-2010 and the year after is attributable to important sales increase to Large Power customers (see HQD-1, doc. 2, p. 55, Table 2A-6) which grow at an average rate of 4% during those years (from 61,4 TWh in 2008 to 63,8 TWh in 2009 and to 66,1 TWh in 2010).

However, year 2008 is not adjusted[82] to take into account the suspension of the TCE contract for that same year. Basically, energy supplies are reduced by 4.3 TWh and capacity by 547 MW. HQD has provided details on how it arranged to meet its reliability criteria for the 2008 part of year 2007-2008 in an answer to OC's information requests.[83]

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78 HQD-1, doc. 1, p. 36, Response 24.1.
79 HQD-1, doc. 1, p. 32, lines 1-11. See also HQD-3, doc. 8, p. 4, Response 1.4.
80 HQD-1, doc. 2, Appendix 5A..
81 HQD-1, doc. 1, p. 43, lines 12-20.
82 HQD-1, doc. 1, p. 39.
83 HQD-3, doc. 7, p. 23, Response 22.1. See also p. 11, Response 7.1.

4. HQD'S 2008-2017 SUPPLY STRATEGY AND PLANS

4.1 Near Term (2008-2012)

For the very near term (up until 2010), HQD's supply balance shows energy and capacity during the winter months and excesses during the rest of the year.[84] Accordingly, HQD strategy to insure its supply balance will be to maximise re-sales and acquire energy products with guaranteed capacity.[85]

In order to meet capacity shortfalls for 2008-2012, HQD anticipates relying more heavily on interruptible power contracts and short-term capacity markets.With regards to short-term markets, HQD indicates that the 500 MW contribution planned for is a minimum[86] and that it has secured a 500 MW transit for HQT-NY.[87] Also, HQD appears to have secured without much difficulty 400 MW on a short notice from short-term markets following the suspension of TCE's contract.[88] This in turn, tends to confirm that relying on short-term markets for short-term capacity shortfall is justified.[89]

With regards to interruptible power, relying more on those contracts generates some concern. First, it must be noted that so far HQD has been capable of relying on at least 650 MW (gross values) which tends to confirm that HQD can rely on a sufficient pool of Large Power customers.[90] However, HQD has barely interrupted any customer in the past few years.[91]

If customers' expectation is that they won't be interrupted much, if at all, and that they end up being disconnected after all, it appears reasonable to assume that the assumption leading to plan for 800 MW over the planning horizon is optimistic. Supporting this view is the fact that higher interruption might lead to lower turn outs as customers' expectation and economic benefit decrease overtime. In other words, the risk of being interrupted is increased lowering the benefits of enrolling into the program.

This, however, does not rule out relying more heavily on interruptible power in the near term.

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84 HQD-1, doc. 2, p.239.
85 HQD-1, doc. 1, p. 40, lines 9-11.
86 HQD-3, doc. 1, pp. 41-42.
87 HQD-1, doc. 1, p. 40, lines 24-25 and p. 41, lines 1-4.
88 HQD-3, doc. 7, p. 23, Response 22.1.
89 See also, HQD-1, doc. 2, Appendix 4D.
90 HQD-3, doc. 7, p. 11, Response 7.1.
91 HQd-3, doc. 7, p. 8, Response 4.4 and HQD-1, doc. 2, p. 222.

4.2 Longer Term (2013-2017)

HQD's longer term strategy for meeting capacity requirements calls for:

- Increase use of current and available means which are relying more heavily on interruptible power as well as on short-term neighbouring markets;[92]
- Explore new curtailment and demand response program to assess possibilities;[93]
- And eventually lunch a CFT for (most probably) a modulable resource able to deliver capacity for long hours, with few restrictions, lots of energy, in winter months.[94]

Overall, HQD's three-step strategy appears reasonable. First, since sales forecast still represent some uncertainty in the near term especially for Large Power loads, it is appropriate to rely on available curtailment methods as well as short term markets until HQD can refine what specific resources it should add to its supply mix.[95]

Second, in the current context, notably increasing capacity costs (due to strong demand) and climate change concerns, it appears reasonable to seriously investigate dependable curtailment and demand response programs. To that matter, HQD should try as soon as possible to demonstrate the cost-effectiveness and reliability of innovative curtailments through pilot-projects or other means available.

Third, modulable resources would certainly help in diversifying HQD' current supply mix which has not changed much since the last Supply Plan and would also help in meeting higher than expected load.

[92] HQD-1, doc. 1, pp. 41-42.
[93] HQD-1, doc. 1, pp. 42-43.
[94] HQD-1, doc. 1, pp. 43-44.
[95] See HQD-3, doc. 1, pp. 40-42 , Responses 26.1 to 26.3.