Réponse à la question 1.1 de la Régie

Prévision d'avril 2002 (scénario moyen)	
Ventes régulières au Québec (VRQ)[*]	172660 GWh
Prévision d'août 2001[**]	
Ventes régulières au Québec (VRQ)	-168768 GWh
Addition de l'aluminerie Alouette[***]	- 4249 GWh
	- 357 GWh

[*] Affiché sur le site internet d'Hydro-Québec Distribution le 14 août 2002

[**] Plan d'approvisionnement R-3470, pièce HQD-2, Document 1

[***] R-3470, pièce HQD-7, Document 2, page 3

Réponse à la question 3.1 de la Régie

Comparaison de l'énergie contractuelle
et des besoins de 7,2 TWh pour 2007 (GWh)

	Énergie contractuelle annuelle		Énergie contractuelle 2007*	
	maximale	minimale	maximale	minimale
HQP base	2882	2882	2416	2416
HQP cyclable	2058	0	1725	0
TCE base	4063	4063	4063	4063
	9003	6945	8204	6479

* Les livraisons d'Hydro-Québec Production débutent en mars 2007.

Réponse à la question 8.1 de la Régie

Analyse de sensibilité
sur le coût des combinaisons dans le scénario moyen
$ 2007 / MWh

	Cas de base	Taux nominal d'actualisation à 7,33%
Contrats	61,47	[redacted]
C-16	60,06	60,06
C-01	60,77	60,77
C-22	61,84	61,83
C-03	61,97	61,96
C-07	64,31	64,30

Réponse à la question 8.2 de la Régie

Analyse de sensibilité
sur le coût du contrat de TCE
$ 2007 / MWh

	Cas de base	Augmentation de 10% du prix du gaz à DAWN	Remplacement de l'indice DAWN par l'indice AECO
Contrat de TCE	60,14	[redacted]	[redacted]

Réponse à la question 8.3 de la Régie

Analyse de sensibilité
sur le coût du contrat de TCE
$ 2007 / MWh

	Cas de base	Réduction inflation de 1% pour 20 années contractuelles *	Augmentation inflation de 1% pour 20 années contractuelles *
Combinaison de contrats	61,47	[redacted]	[redacted]
HQP 350 MW en base	55,38	59,62	51,64
HQP 250 MW cyclable	74,18	79,75	69,27
Contrat de TCE	60,14	[redacted]	[redacted]

* Simulations effectuées à taux réel d'actualisation maintenu constant à 7,8%

Réponses aux questions 9.1, 9.2, 9.3, 10.1, 10.2 de la Régie :

- Document de Merrimack Energy

9. Reference: HQD-2 document 4, pages 8 and 9, section 4, "Analysis Assumptions

9.1 Provide the details of the assumptions and calculations used to obtain a value of $125.78 per kW-year from the values presented in Table 1.

Response:

The basic premise of this analysis is to calculate the capital-related charges which must be recovered by the project developer to compensate for the investment in the generating facility. The analysis is based on a cash flow model that was developed to analyze the economics of utility and independent power projects. The model has been used since 1989, including analysis associated with the evaluation of the cost of technology options in regulatory proceedings in the US. The model is largely based on the Technology Assessment Guide methodology utilized by the Electric Power Research Institute. The capital related charge (capacity cost) is comprised of four fixed charge components: (1) Rate of Return (Debt and Equity); (2) Income Taxes; (3) Book Depreciation; and (4) Property Taxes and Insurance. The model projects these costs for the twenty years of the contract term and calculates the discounted cost each year based on the developers' discount rate (i.e. weighted average cost of capital). The sum of the discounted costs are then calculated for the twenty year term. The annualized cost of $125.78 is based on the product of the sum of the discounted costs times an annual capital recovery factor (i.e. annuity factor) divided by total plant capacity.

The relationship between the analysis and the assumptions included in Table 1 of HQD-2 Document 4 are highlighted in the following steps of the analysis:

1. The capital cost of $650 per kW from Table 1 is converted to a total project cost of $325 million US based on the capital cost times the project size. These costs have to be recovered through a capacity charge to pay off the equity and debt in the project.

2. Calculate the annual cost for the following components:
    a. Rate of return (equity and debt based on assumed rates and ratios from Table 1)
    b. Incomes Taxes (based on the composite state and federal tax rate)
    c. Book Depreciation (150% declining balance and 20 years)
    d. Property Taxes and Insurance (2% of total installed cost)

3. Calculate the discounted cost in each year for the above components (discount rate based on the weighted average cost of capital)

4. Calculate the sum of the discounted costs over a 20 year period

5. Multiply the sum of the stream of annual discounted costs by annual capital cost recovery factor based on the discount rate (same as an annuity calculation) to derive a levelized cost.

6. Divide by total capacity to derive the annual capacity cost in US$/kw.

9.2 Specify the utilization factor used in the assumptions

Response:

Since the above calculation is a capacity value, the implied utilization factor is 100%. For other analysis, the same utilization factor as the portfolio of contracts signed by Hydro-Quebec Distribution is used to ensure an equivalent analysis. The utilization factor used is 81.5%.

9.3 Indicate whether the heat rate of 6850 Btu/kWh corresponds to the output of the most recent and top-performing combined-cycle power plant technologies available on the market. Explain your answer and justify the use of a heat rate of 6850 Btu/kWh for purposes of this assessment.

Response:

The heat rate of 6850 Btu/kWh is definitely a conservative estimate and represents the low end of a typical range of heat rates for recent vintage combined cycle technologies for a full load heat rate (i.e. heat rate based on continuous operations of the plant at full output). Heat rates will vary based on equipment type, application (cogeneration vs merchant), and load level. For example, heat rates for units which cycle frequently or operate at partial load will be higher. Furthermore, heat rates tend to degrade over time, which is not reflected in this analysis. Thus, the analysis is conservative (i.e. represents a low heat rate for the combined cycle project) since it relies on estimated, not guaranteed heat rates, and does not reflect increasing heat rates over time based on unit degredation. By way of analysis, the reported full load heat rates for several of the units included in Exhibit A to HQD-2, Document 4 are included below:

Dighton Power	7,522 Btu/kWh
Tiverton Power	6,875 Btu/kWh
Millenium	6,825 Btu/kWh
Athens	6,850 Btu/kWh

Heat rates for other units evaluated throughout the country are in the 6,900 to 7,100 range for new technology.

10. References: **(i) HQD-2, document 4, page 4, section 1, "Introduction"**
(ii) HQD-2, document 4, page 13, section 5, "Results of the Analysis", Table 2.

10.1 Provide a breakdown of the total unit costs for each case shown in Table 2 of Reference (ii) based on the components identified in Reference (i).

Response:

In the process of conducting the analysis requested in Question 10.1 above, an error was uncovered in the real levelized cost analysis, which understated the total cost of the three combined cycle projects evaluated. A revised Table 2 from HQD-2, Document 4 is provided below.

Table 2
Analysis Results

Case	Real Levelized Cost (cents/KWh 2007)
Combination of Contracts	6.1 cents
New England (Dawn Gas Supply)	7.2 cents
New England (New York Gas Supply)	7.8 cents
New York (Dawn Gas Supply)	7.55 cents

The table listed below provides the real levelized costs by component for the three combined cycle options included in Table 2 of HQD-2, Document 4 as requested.

Costs in cents per kWh (Cn)	New England (Dawn Supply)	New England (NY Supply)	New York (Dawn Supply)
Capacity Charge	2.00	2.00	2.00
Fixed O&M	.30	.30	.30
Variable O&M	.24	.24	.24
Fuel Costs	3.95	4.50	4.40
Transmission Costs	.73	.73	.61
Total (c/kWh)	7.22	7.77	7.55

10.2 Specify the utilization factor for the combination of contracts signed by HQD as well as the utilization factor for the comparison power plants.

Response:

The utilization factor used for the combination of contracts signed by HQD as well as for the comparison power plants is the same to ensure a consistent analysis. The weighted average utilization factor for the portfolio of contracts is 81.5%. This same utilization factor is used to evaluate each power plant proposal.

Réponse à la question 16.1 de la Régie

92 % de FU, soit le facteur d'utilisation moyen des projets utilisés pour déterminer le coût de la centrale témoin

Réponse à la question 16.2 de la Régie

Le coût de la centrale témoin est calculé après la prise en compte des coûts de transport, mais avant les pertes électriques. Ce coût s'élève à 60,82 $ / MWh.

Les pertes électriques prises en compte dans le coût des combinaisons sont celles propres à chacune d'entre elles tel qu'estimées par TransÉnergie.