BEFORE THE

RÉGIE DE L'ÉNERGIE

IN THE MATTER OF:

HYDRO QUÉBEC

ALLOCATION DU COÛT DE FOURNITURE DE L'ÉLECTRICITÉ PATRIMONIALE PAR CATÉGORIE DE CONSOMMATEURS POUR LES ANNÉES 2001 ET 2002

REQUÉTE R-3477-2001

Responses to Information Requests

Prepared by:

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On Behalf of:

L'association québécoise des consommateurs industriels d'électricité (AQCIE)

L’association des industries forestiéres du Québec (AIFQ)

5 July 2002

Demande de renseignements de L'UNION DES CONSOMMATEURS

Demande adressée à l'AQCIE et à l'AIFQ

1. **Référence :** Rapport d'expertise de IEc, p. 2

Préambule : « *HQ proposes to classify generation costs on the basis of system load factor. While various methods may be used to classify electric generation costs, we note that HQ's proposed method produces a classification split that is more energy-related than that used historically by other Canadian utilities.* » (nos soulignés)

Questions :

1.1 Veuillez préciser les différentes méthodes pouvant être utilisées pour allouer les coûts de fourniture (*electric generation costs)*

1.2 Veuillez définir la structure du parc de chacune des compagnies électriques canadiennes dont il est question plus haut et faire la comparaison avec la méthode proposée par Hydro-Québec en indiquant la période exacte analysée (*used historically)*

1.3 Veuillez justifer la pertinence d'une référence à la moyenne des entreprises électriques canadiennes pour déterminer le partage énergie/puissance du coût de fourniture d'Hydro-Québec en précisant la connaissance personnelle et l'expérience que l'expert a du réseau actuel d'Hydro-Québec

Response:

1.1 Electric utility generating plant costs can be classified into demand-related and energy-related portions both directly and indirectly. Direct methods of classification include (but are not limited to) the straight fixed-variable method (see page 11 of IEc's report), equivalent peaker methods, and judgmental weightings methods. Indirect methods involve the use of allocation factors or methods that implicitly or explicitly include both energy and demand components. These approaches include such methods as peak-and-average, average-and-excess, base-intermediate-peak, and probability of dispatch methods.

IEc notes that Hydro Québec's approach contains both the direct and indirect classification approaches. It uses the system load factor to derive a judgmental energy weighting for the direct classification. However, by using a very broad peak demand allocator based on 300 hours, Hydro Québec implicitly adds an additional energy component to the "demand" costs in the allocation stage.

One of the more thorough reviews of generating plant classification and allocation methods may be found in the NARUC "Electric Utility Cost Allocation Manual," January 1992, pages 35 to 68. While neither exhaustive nor completely accurate, this manual provides descriptions and examples of many of the classification/allocation methods used by utilities and regulators in North America.

1.2 Please see Exhibit 17 in IEc's report. In general, the Canadian utilities referenced therein used judgmental energy weighting direct classification schemes, sometimes in conjunction with implicit energy weighting through the use of the average-and-excess allocation method. Thus, other Canadian utilities tended to use classification schemes which are methodologically similar to the Hydro Québec approach. Unlike Hydro Québec, however, it is Mr. Knecht's recollection that no Canadian utilities used a very broad definition for peak demand periods, such as the 300 hour definition used by Hydro Québec.

1.3 IEc believes that a comparison of Hydro Québec with other Canadian utilities is much more appropriate than a comparison with utilities in the United States or other countries, where generating capacity is dominated by fossil fuel thermal facilities. In the U.S., the straight fixed-variable method is more common than it is in Canada. However, for utilities dominated by hydroelectric or nuclear capacity, with relatively high fixed costs and low energy costs, the straight fixed-variable approach would produce an extremely high demand component of cost, that is not reflective of the relative long-run costs of energy and power. Moreover, fixed plant-related costs for hydro facilities are related not only to the capacity of the facility, but to its energy storage and production capabilities. Thus, IEc deems that other Canadian experience, where hydroelectric and nuclear capacity represent a large share of total generating capacity, is a reasonable basis for comparison for Hydro Québec's system.

IEc notes also that Hydro Québec has not provided any cost information or planning documents in these proceedings, upon which IEc could rely for cost-based classification. IEc has reviewed the Merrill Lynch report to the Ministry of Natural Resources regarding the introduction of competition in Québec electricity supply and various other publicly available materials to develop a general understanding of Hydro Québec's system.

2. **Référence :** Rapport d'expertise de IEc, p. 13

Préambule : **«** *We recommend that the Régie establish a fixed cost classification split, based on 60 percent energy-related and 40 percent demand-related. Such a classification split is somewhat more favorable to the temperature sensitive classes than the average produced by IEc's 1991 analysis* » (nos soulignés)

Question 2.1 : **Veuillez démontrer à l'aide de données quantitatives que les propos ci-dessus soulignés sont justifiés**

Response:

2.1 Please see Exhibit 17 to the IEc report. The average classification split for bulk power for the Canadian utilities studied was 53.5% energy, 46.5% demand.

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À L'AQCIE ET L'AIFQ
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1. Mémoire

Référence : i) Mémoire de l'AQCIE et l'AIFQ, page 2, 5e paragraphe

Préambule : « L'AQCIE et l'AIFQ suggèrent en conséquence que, dans la mesure où la Régie devait, dans le cadre de l'exercice annuel auquel elle doit se livrer en vertu de l'article 52.2 de la Loi, conclure que l'évolution du profil de consommation des usagers du Québec fait en sorte que les coûts pour l'ensemble des usagers vont en décroissant, elle devrait adresser au Gouvernement une recommandation formelle à l'effet d'exercer le pouvoir prévu à l'article 24.1 de la Loi sur Hydro-Québec lui permettant de «… diminuer le coût de fourniture de l'électricité patrimoniale allouée à chaque catégorie de consommateurs prévu à l'article 52.2 de la Loi sur la Régie de l'énergie». »

Question :

1.1 Compte tenu que depuis juin 2000, par les modifications apportées à la Loi sur la Régie de l'énergie (la «Loi») par le projet de loi no° 116, la Régie n'exerce plus de compétence à l'égard de la production d'électricité, quel serait le fondement législatif de l'autorité de la Régie pour adresser au gouvernement une recommandation formelle en matière de coût de fourniture de l'électricité patrimoniale?

Response: Response is provided by AQCIE/AIFQ in a separate document.

2. Mémoire

Référence : i) Mémoire de l'AQCIE et l'AIFQ, page 3, 1er paragraphe

Préambule : « L'AQCIE et l'AIFQ soumettent respectueusement que l'inclusion des contrats spéciaux dans les calculs d'Hydro-Québec est non seulement injuste envers les autres catégories mais qu'elle est aussi contraire à la Loi. »

Questions :

2.1 Selon l'AQCIE et l'AIFQ, l'électricité fournie en vertu des contrats spéciaux conclus avant juin 2000, lors de l'entrée en vigueur des modifications apportées à la Loi par le projet de loi no° 116, fait-elle partie de l'électricité patrimoniale? Si oui, alors pourquoi les contrats spéciaux devraient-ils être exclus du volume de consommation patrimoniale annuelle du Distributeur et de l'allocation du coût de fourniture par catégorie de consommateurs? Si non, à quelles conditions, à quel coût et auprès de quel producteur devraient-ils être approvisionnés compte tenu des modalités de la Loi concernant le coût de fourniture des contrats spéciaux? Veuillez expliquer la distinction que vous faites entre le coût de fourniture applicable durant la période du contrat et celui applicable au terme du contrat.

2.2 Veuillez expliquer pourquoi, selon vous, la Loi traite de la détermination du coût de fourniture pour les contrats spéciaux dans le même article et à l'intérieur des mêmes alinéas où il est traité du coût de fourniture de l'électricité patrimoniale.

Response: Responses are provided by AQCIE/AIFQ in a separate document.

3. Vue d'ensemble et sommaire

Références :

i) Rapport d'expertise de Robert Knecht, page 3, 2e paragraphe, 2e et 3e phrases et 3e, 4e et 5e paragraphes

ii) Rapport d'expertise de Robert Knecht, page 19, dernier paragraphe, 1ère et 2e phrases

Préambule : « Without necessarily faulting HQ's overall methodology, IEc notes that this requirement, as implemented by HQ, can produce anomalous results over time. For example:

- If the mix of overall load shifts from low load factor residential classes to higher load factor industrial classes (e.g., as a result of reductions in electric heat), rates for all rate classes will increase, with no net change to the 2.79 cents per kWh average. This result is particularly bizarre, because an increase in the mix of high load factor industrial load tends to reduce the per-unit cost of generation.
- Improvements in the distribution system to reduce losses at low voltage levels will cause rates for industrial customers to increase. This result also is peculiar, in that industrial customers generally do not use the distribution system, and reductions in distribution losses will reduce the overall costs incurred by a distribution utility which purchases the power for its customers.
- Improvements in the load factor for one class will cause rates to increase for all other classes, despite concurrent decreases in the unit costs of supply.» [référence i)]

« This report demonstrates that the methodology filed by HQ to allocate generation costs to the various rate classes produces illogical and counter-intuitive results. In our opinion, this result is due primarily to the statutory restriction that the average delivered cost of power for heritage pool service must be 2.79 cents per kWh. » [référence ii)]

Questions :

3.1 Est-ce que les modifications (parts fixes d'énergie et puissance de 60 % et 40 %, utilisation de 1CP et de taux de pertes en puissance pour l'établissement des facteurs d'utilisation, prise en compte de l'impact de la puissance interruptible) que vous proposez à la formule d'allocation permettent d'éviter les effets ci-haut mentionnés?

3.2 Considérez-vous que les effets pervers et les anomalies que vous soulevez dans votre rapport d'expertise sont principalement dus au fait que l'allocation des coûts de fourniture entre chaque catégorie d'usagers doit obligatoirement produire un coût moyen de 2,79 ¢/kWh?

Response:

3.1 In general, no. As cited in the preamble above, IEc concludes that the anomalies are primarily a result of the legislated 2.79 cent per kWh average. IEc's recommendations generally address the inputs to the methodology, and not the arithmetic. However, IEc notes that establishing a fixed demand-energy split, rather than one that varies with system load factor, will mitigate the second-order effect discussed at pages 8 and 10 of the IEc report. Please see also response to interrogatory 8.1 below.

3.2 Generally, yes, recognizing that the fixed demand-energy split mitigates the second order effects problem.

4. **Vue d'ensemble**

Référence : i) Rapport d'expertise de Robert Knecht, page 3, dernier paragraphe, 2^{e} phrase

Préambule : « While various methods may be used to classify electric generation costs, we note that HQ's proposed method produces a classification split that is more energy-related than that used historically by other Canadian utilities. »

Question :

4.1 À quelles autres entreprises canadiennes faites-vous référence? De quelle façon sont-elles comparables à Hydro-Québec Distribution?

Response:

4.1 Please see Exhibit 17 in IEc's report, and IEc's response to L'Union des Consommateurs 1.2 and 1.3.

5. Vue d'ensemble et classification des coûts

Références : i) Rapport d'expertise de Robert Knecht, page 4, 1er paragraphe, dernière phrase
ii) Rapport d'expertise de Robert Knecht, page 14, 1er paragraphe, 1ère phrase

Préambule : « We recommend that a fixed classification split be used, at 60 percent energy, 40 percent demand. » [référence i)]
« We recommend that the Régie establish a fixed cost classification split, based on 60 percent energy-related and 40 percent demand-related. » [référence ii)]

Question :

5.1 Veuillez justifier votre recommandation pour une répartition fixe ainsi que pour une répartition de 60 % en énergie et 40 % en puissance. Selon vous, cette répartition devrait rester fixe combien de temps?

Response:

5.1 The basis for IEc's recommendation for a fixed classification split of 60% energy and 40% demand is stated in IEc's report at page 2-3 (last bullet on page 2), pages 11-13, and Exhibit 17.

In respect of the question regarding duration for the split, IEc notes that stability is a relatively important principle for cost allocation and utility rate design (see, for example, Bonbright, Danielsen & Kamerschen, Principles of Public Utility Rates, Second Edition, p.383). Since IEc's recommended split is reasonably consistent with the historical practices of other Canadian utilities, and it is consistent with Hydro Québec's historical practice, IEc sees no reason why this factor could not remain in place until Québec establishes a different economic regime for the pricing of generation services. Having said that, however, IEc notes that economic, social and political conditions change, which may result in unforeseen events or situations. Thus, regulatory authorities are usually the final arbiter of when any particular cost allocation methodology should be revisited.

6. Vue d'ensemble

Référence : i) Rapport d'expertise de Robert Knecht, page 4, 3[e] paragraphe, dernière phrase

Préambule : « IEc recommends that interruptible demand be excluded from HQ's calculation of peak demand for purposes of this proceeding. »

Question :

6.1 Pourquoi considérez-vous que le Distributeur devrait tenir compte de l'impact de la puissance interruptible pour l'allocation du coût de fourniture de l'électricité patrimoniale par catégorie de consommateurs? Veuillez expliquer votre réponse en fonction du contexte du Distributeur.

Response:

6.1 The simple answer to the question is that interruptible load does not contribute to the peak demand that the Distributor needs to serve. Because the Distributor does not have to procure capacity to serve that load, all of the load that Hydro Québec can interrupt should be excluded from the load factor calculation for cost allocation purposes. There is no cost-based reason to assign capacity-related demand costs to load for which the Distributor has no obligation to provide capacity.

In the traditional integrated model for an electric utility, the utility offered interruptible service as a means to avoid constructing generation and transmission assets to meet extreme peak demand periods. Some customers were willing to take this kind of lower quality service and the associated costs in exchange for a lower price. In many cases, it was less expensive for the utility to offer a rate discount to interruptible customers than to construct the generation and transmission capacity necessary to meet the extreme peak periods. That is, the benefits of the avoided capacity costs outweighed the costs associated with rate discounts.

In a partially restructured environment, interruptible service has the same type of economic value. In the specific case of Québec, however, it is difficult to state with certainty how the economic value associated with having interruptible customers affects the Distributor, because the mechanism by which the prices paid by the Distributor is not known.

However, if all of the Distributor's customers had been firm when the purchase price for the heritage pool was determined, the generator would have perceived that the average cost of serving that pool was higher than it was given the existence of the interruptible load. Further, it is economically reasonable to assume that the generator would want to get a higher price to serve the heritage pool load if that load cost more to serve. It is IEc's view that it is likely that the average heritage pool cost would have been higher if all interruptible load had been firm. Thus, the existence of the interruptiblility provisions for some loads affords a benefit to all of the Distributor's customers, in the form of a lower overall energy cost. Note also that since Hydro Québec offers an interruptible discount, it is logical to conclude that it has relied upon the existence of that interruptible service to obtain a lower average price for energy from the generator. If that interruptible load had no value, there would be no reason for the Distributor to offer a rate discount.

As detailed in IEc's report, it is necessary to reflect the value of that lower energy cost in the cost allocation algorithm, in order to properly align the costs and benefits of interruptible service. Hydro Québec's methodology fails this test.

To demonstrate the basis for this conclusion, consider the following example. In this example, we consider the difference in costs between a world of lower energy rates *with* interruptible service, and a world of higher energy rates *without* interruptible service. We evaluate the differences in class-by-class rates between the two cases, for both the Hydro Québec methodology and the method proposed in the IEc report.

Under Hydro Québec's methodology, the higher energy rate scenario would result in a proportionately higher cost rate for all classes to increase. For example, a 2 percent higher energy cost in the *without interruptible* case would result in a 2 percent higher cost rate for all rate classes. That result occurs because there is no change in system or class load factor in Hydro Québec's methodology, because Hydro Québec implicitly assumes that interruptible load is firm. So, all customer classes would have needed to pay more for service, even though they had the same load pattern and consumption levels as they actually do in the *with interruptible* case.

Also under Hydro Québec's methodology, the large industrial customer classes would experience, *on average*, the same higher cost as all other classes. Within the large industrial class, however, the interruptible customers would pay significantly more (because they would not get an interruptible credit), while the firm customers would pay relatively less. Depending on the circumstances, the industrial customers who are now firm might see *lower* rates *without interruptible* service, because the impact of increased revenues from interruptible customers may outweigh the higher system-wide average cost effect.

Now consider the implications of these cases using the methodology proposed in the IEc report, in which interruptible load is excluded in the load factor calculation for the cost allocation algorithm. If the interruptible load were all firm, again the average system-wide cost of service would be higher as described above. However, in

IEc's method, *the load factor for the industrial rate classes will be much lower than it would be with interruptible service.* This lower load factor for the industrial class would means that the industrial class average cost rates would be higher *without interruptible*, with offsetting cost rate reductions for the other rate classes. Depending on the exact magnitude of the higher system-wide costs, the impacts of the switch between interruptible and firm industrial load on the other rate classes are reduced or eliminated. Thus, for example, a system wide higher energy cost of 2 percent on average might be offset by a 2 percent decline in the residential class tariff due to the load factor effect in the algorithm. And, within the industrial class, the higher average cost rate burden would be primarily borne by those customers who were otherwise interruptible, because they lose the interruptible discount.

Thus, implicitly, Hydro Québec's methodology shares the benefits of interruptible service amongst all the rate classes, while imposing the costs of interruptible service (in the form of rate discounts) only on firm service industrial customers. IEc's method spreads both the benefits and cost of the interruptible service more equitably amongst all of the rate classes.

7. Implications de la méthodologie d'Hydro-Québec

Références :

i) Rapport d'expertise de Robert Knecht, page 9, 1er paragraphe, 1ère, 2e, 3e et 4e phrases

ii) Rapport d'expertise de Robert Knecht, page 9, dernier paragraphe et page 10, 1er paragraphe, 1ère phrase

Préambule : « First, we consider the impact of a shift in the "mix" of energy consumption. For demonstration purposes, we prepared an alternative version of the 2001 base analysis. This simulation is shown in Exhibit 5. The only input change from the 2001 base year is a 20 percent increase in Rate L energy consumption and a corresponding kWh reduction in Rate D consumption, as shown in the Loss Factor Calculation table at the top of the first page of Exhibit 5. » [référence i)]

« We have one final observation with respect to this anomaly. HQ's position is that the Act only provides for changes based on load factors and loss factors. This simulation changes neither load, nor loss factors, and yet the rates change. » [référence ii)]

Question :

7.1 Veuillez confirmer que les facteurs d'utilisation et les taux de pertes par catégorie ne changent pas suite à une augmentation de 20 % de la consommation de la catégorie au tarif L et à une réduction correspondante de la consommation de la catégorie aux tarifs D et DM. Veuillez justifier la vraisemblance d'un tel scénario.

Response:

7.1 IEc notes that the referenced scenario is an example to demonstrate the implications of the methodology, and is not intended to specifically simulate an actual event.

IEc confirms that it has assumed that the loss factors at the various voltage levels do not change from those used by Hydro Québec. In addition, IEc has assumed that the incremental and decremental load in this example has the same load factor as the average existing load. If IEc were to change either of those parameters, the example would have little demonstration value, because the change in rates would be related to several factors, and not just consumption mix. While IEc agrees with the implication of the interrogatory that the specific example presented herein is not likely to occur exactly as simulated, the example accurately shows the directional impact of more modest shifts in energy consumption, such as that experienced by Hydro Québec over the past several years. Further, it is more reasonable to assume that incremental industrial load, for example, will have the same load factor as the existing industrial load, than to assume that an increase in industrial load will increase or decrease the industrial class load factor.

8. Classification des coûts

Référence : i) Rapport d'expertise de Robert Knecht, page 13, 3e paragraphe, 3e et 4e phrases

Préambule :

« First, as suggested in the preceding section, the use of a system load factor classification methodology penalizes the higher load factor classes if load factor improves, and rewards the higher load factor classes if system load factor declines. At a minimum, IEc strongly recommends that the Régie require HQ to use a fixed classification methodology, to avoid these perverse impacts.»

Questions :

8.1 Veuillez prouver votre affirmation selon laquelle le fait d'avoir des parts fixes pour le partage de l'énergie et de la puissance au niveau de la formule d'allocation permet d'éliminer les effets pervers que vous mentionnez.

8.2 Quel effet a l'utilisation du facteur d'utilisation pour le partage de l'énergie et de la puissance sur les catégories de consommateurs avec facteur d'utilisation plus faible?

Response:

8.1 Based on additional analysis (as suggested in the interrogatory), IEc concludes that a fixed demand-energy split will mitigate the perverse second-order effects referenced, but will not eliminate them entirely.

To demonstrate the effects, IEc developed Exhibits 19 through 21, attached to this response.

Exhibit 19 is an alternative version of Exhibit 5 in IEc's original report. Exhibit 5 showed the impact on cost rates in the Hydro Québec methodology associated with a 20 percent increase in industrial load and a commensurate kWh decline in residential load. Exhibit 19 simulates the same scenario, except that the demand-energy classification split is fixed at the level of the base case scenario (67.3%). Increasing the industrial load mix (at the same class-specific load factor) increases system-wide load factor, implicitly increasing the energy component of costs in the Hydro Québec methodology.

As shown in the table below, Exhibit 19 demonstrates that, even with a fixed demand-energy split, rates increase for all rate classes. However, because the Hydro Québec cost rate formula is not fully linear with load factor, there is still some variation in the magnitude of the percentage increases. The variation, however, is lower than that in Exhibit 5. Note also that the relative effect from Exhibit 5 is reversed -- the increase for the low load factor classes is slightly less than for the high load factor classes.

Impact of Fixed Energy-Demand Classification Increased Rate L Load Scenario Percent Change in Cost Rates from HQ Base		
	HQ Method	***Fixed D-E Split***
D et DM	0.7%	1.8%
G et à forfait	1.3%	1.6%
M	1.7%	1.4%
L	2.0%	1.3%
DT	1.7%	1.4%
Contrats spéciaux	2.1%	1.2%
Distributeur	***0.0%***	***0.0%***

Exhibits 20 and 21 show parallel comparisons of a 20 percent increase in Rate D consumption, and a commensurate reduction in Rate L kWh. Because low load factor residential load increases, the system load factor declines, and the implicit energy weighting in Hydro Québec's methodology also declines. Exhibit 20 depicts the Hydro Québec variable classification methodology, while Exhibit 21 uses a fixed approach. As in the example of higher industrial load, the variation between classes associated with the increase is less variable with a fixed classification split than with a variable split.

Impact of Fixed Energy-Demand Classification Increased Rate D Load Scenario Percent Change in Cost Rates from HQ Base		
	HQ Method	***Fixed D-E Split***
D et DM	-1.1%	-2.0%
G et à forfait	-1.6%	-1.7%
M	-2.0%	-1.5%
L	-2.3%	-1.4%
DT	-2.1%	-1.5%
Contrats spéciaux	-2.4%	-1.3%
Distributeur	***2.79***	***0.0%***

8.2 Please see response to interrogatory 8.1. The directional impact on low load factor classes is the reverse of that for high load factor classes.

9. Vue d’ensemble et taux de pertes en pointe

Références :
i) Rapport d’expertise de Robert Knecht, page 4, 4e paragraphe, 2e phrase
ii) Rapport d’expertise de Robert Knecht, page 17, dernier paragraphe, 4e et 5e phrases

Préambule : « Energy losses tend to increase with the square of the power transmitted, and therefore loss factors are higher at peak than on average. » [référence i)]
« While IEc does not claim expertise in power system engineering, we note that HQ's approach is inconsistent with the laws of physics. Electric power losses tend to be incurred in proportion to the square of the power flow through a circuit, and thus loss factors tend to be higher on-peak than off-peak. » [référence ii)]

Questions :

9.1 Compte tenu que vous ne prétendez pas avoir de l’expertise en ingénierie des réseaux électriques mais que vous indiquez que les pertes d’électricité tendent à survenir en proportion du carré de la charge, dans quelles circonstances précises peut-on appliquer la relation entre les pertes d’électricité et le carré de la charge et comment peut se faire la répartition des pertes sur cette base?

9.2 Selon vous, les pertes en pointe seraient de combien de fois supérieures aux pertes hors pointe?

Response:

9.1 The need for generating capacity is determined by customer coincident peak load at the meter plus transmission and distribution losses during that peak. As stated at page 17 of IEc's report, we recommend that Hydro Québec conduct a study of loss factors during peak periods by rate class to determine each class' contribution to the peak demand at the generator. IEc believes that such a study would incorporate the physics of energy transmission in computing loss factors by rate class, including the referenced relationship between line losses and power flow.

Once loss factors for peak demand are derived by rate class, IEc recommends that they be used to derive class-specific peak demands at the generator. Class-specific peak demands at the generator can be combined with class-specific energy consumption at the generator (using the average loss factors) to derive class-specific load factors. These load factors can then be applied in Hydro Québec's formula for cost rates. Please see pages 4 to 5 of the IEc report for the algebraic logic for why the Hydro Québec load factor should be based on load factor at the generator. Please see also Exhibit 12 of IEc's report, which demonstrates how alternative loss factors can be incorporated into Hydro Québec's methodology, as well as showing the impact of IEc's estimated losses.

9.2 Since IEc recommends that the on-peak period for cost allocation be based on a single coincident peak, and because the loss factors on any particular circuit will increase as load flow on that circuit increases, IEc considers it extremely likely that the loss factor in the peak hour will be higher than in an average of the off-peak hours. As stated, IEc has not retained engineering or power systems specialists in reaching this conclusion in respect of Hydro Québec's system, and has specifically recommended that Hydro Québec be responsible for the analysis.

10. **Taux de pertes en pointe**

Référence : i) Rapport d'expertise de Robert Knecht, page 18, 5[e] paragraphe

Préambule : « Second, IEc employed a methodology used in a study prepared by UtiliCorp Networks Canada (UNC) that allocated average and peak demand distribution losses to the various rate classes.[19] In that study, UNC employed the following formulation to relate average and peak losses for distribution feeders:[20]

"Annual Energy Losses (GWhrs) = 8760 hrs x Peak Loss x Loss Factor (LsF)
Where Loss Factor (LsF) = 0.15 x Load Factor + .85 x (Load Factor)2" »

Questions :

10.1 Veuillez fournir une copie du document cité à la référence numéro 19 ou des extraits de ce document et indiquer à quel endroit est présentée la méthode d'établissement des taux de pertes que vous proposez.

10.2 Le modèle que vous utilisez pour l'établissement des pertes en pointe est-il applicable de façon identique aux pertes de transport et de distribution?

10.3 Pour quelles raisons considérez-vous que ce modèle est approprié dans le cas d'Hydro-Québec Distribution?

10.4 Veuillez expliquer le calcul des facteurs de 15 % et de 85 % dans ce modèle?

10.5 Selon vous, quelles sont les raisons principales qui incitent certaines entreprises nord-américaines à effectuer la répartition des pertes d'électricité sur une base horaire? Est-ce qu'il s'agit des pertes de transport, de distribution ou autres?

10.6 En utilisant le modèle que vous proposez, quels taux de pertes en pointe obtenez-vous pour les catégories aux tarifs D et DM, G et à forfait, M, L et DT pour les années 2001 et 2002? À combien de mégawatts estimez-vous les pertes en puissance pour le Distributeur à la pointe des années 2001 et 2002?

10.7 Pour chacune des années 2001 et 2002, veuillez spécifier quel est l'impact (en ¢/kWh) sur le coût des catégories aux tarifs D et DM, G et à forfait, M, L et DT de l'utilisation de taux de pertes en pointe pour l'établissement des facteurs d'utilisation par rapport à l'utilisation de taux moyens annuels.

Response:

10.1 Please see the attached document (in MS Word electronic format), denoted Exhibit 23.

10.2 Please note that IEc has not proposed to use the referenced model. IEc has used this model as a rough approximation in the absence of any better information from Hydro Québec. The specific formulation referenced in the interrogatory is, as stated in the preamble to this interrogatory, used by UNCA for distribution feeder losses.

10.3 IEc has not recommended that this model be appropriate for Hydro Québec, unless Hydro Québec is unwilling to develop class-specific loss factors.

10.4 These values were used by UNCA in its study. Please see Exhibit 23 attached.

10.5 Traditionally, utilities needed to develop loss factors for peak periods to define generating capacity needed to meet peak periods. In that context, both transmission and distribution losses must be considered. As hourly pricing of electric energy has become more common, and some generation markets have deregulated, hourly loss factors can be incorporated into rates paid by consumers (if consumers have the opportunity or requirement to purchase their own losses), and can be incorporated into the derivation of locational marginal pricing for short-term management of transmission congestion. In that context, transmission losses are probably more important than distribution losses. Further, as suggested by the UNCA study, peak period analysis of loss factors is also used for cost allocation purposes at wires utilities for both transmission and distribution, to properly assign the cost of losses to rate classes.

10.6 Please note that IEc has not proposed any specific loss factors -- we have constructed a rough approximation as a proxy for a more detailed study by Hydro Québec. The peak hour loss values in this approximation for 2001 and 2002, as shown in Exhibits 13 and 15 are approximately 4,200MW and 4,400 MW, respectively. The comparable values for Hydro Québec's analysis are 2,200 and 2,300 MW respectively.

10.7 IEc interprets this interrogatory to request the impact on cost rates associated with adopting IEc's approximation of peak loss factors, and not the impact of adopting any other IEc-proposed modifications. For 2001, please see Table 9 and Exhibits 2 and 12 of IEc's report. For 2002, please see Exhibit 3 in IEc's report and Exhibit 22 in the attached spreadsheet. The results for 2002 are sumarized in the table below.

Impact of Incorporating Estimated Peak Demand Loss Factors Major Rate Classes, cents per kWh 2002 Base			
	2002 Base	***Scenario***	***Percent***
D et DM	3.23	3.29	+2.0%
G et à forfait	2.91	2.92	+0.4%
M	2.69	2.68	-0.7%
L	2.48	2.44	-1.7%
DT	2.70	2.69	-0.7%
Contrats spéciaux	2.43	2.39	-1.9%
Distributeur	***2.79***	***2.79***	***0.0%***