BEFORE THE

RÉGIE DE L'ÉNERGIE

IN THE MATTER OF:

HYDRO QUÉBEC DISTRIBUTION

Demande relative à la détermination du coût du service du Distributeur et à la modification des tarifs d'électricité

DOSSIER R-3492-2002

Phase 2

Prepared Report of:

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On Behalf of:

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Conseil de l'industrie forestière du Québec (CIFQ)

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1.0 Introduction and Summary of Conclusions

Industrial Economics, Incorporated (IEc) was retained by l'Association québécoise des consommateurs industriels d'électricité (AQCIE) and the Conseil de l'industrie forestière du Québec (CIFQ) to review the filing of Hydro Québec Distribution (HQD) regarding its proposed across-the-board increase for bundled electricity rates. IEc's analysis focuses on the issues of (a) how fast HQD proposes to increase its rates to achieve the approved revenue requirement, and (b) whether the proposed increase is consistent with the guidelines for maintaining historical cross-subsidization between the rate classes established in Phase 1 of these proceedings.[1]

In sum, IEc concludes that HQD's new strategy of moving to full revenue requirement recovery within the next six months through a large distribution rate increase is inconsistent with stable public policy and regulatory economics principles. More specifically, IEc concludes:

- HQD's proposal to completely eliminate its historical deficiency in one "sudden leap" constitutes a radical change in public policy from what electric customers had anticipated. This change in policy will increase the perceived riskiness of Québec as a location for industrial investment.

- Even without a rate increase, HQD forecasts that its overall revenue deficiency will be substantially reduced in 2004 compared to 2002, as a result of load growth, reductions in the cost of capital and limited growth in costs.

- On an annualized basis, HQD's proposed rate increase exceeds its own proposed revenue requirement by at least $75 million.

- On an annualized basis, HQD has proposed a 27 percent increase for distribution rates for regular tariff customers, with large industrial customers facing a distribution rate increase of 45 percent. This increase for large industrial customers is particularly onerous because these customers are more exposed to potential future production and transmission cost increases than other rate classes.

- HQD's comparison of electricity prices with inflation is irrelevant for industrial customers; a fairer comparison of HQD's electric prices with the prices earned by Québec manufacturers indicates that electricity rates will increase relative to industrial product prices.

[1] For the most part, IEc has not addressed the issue of the magnitude of the overall revenue requirement. However, IEc is currently in the process of reviewing load forecast documentation, and will advise HQD, the Régie and the other parties promptly of any conclusions drawn from that review.

- HQD's proposed increase in electric rates on the heels of a significant strengthening of the Canadian dollar will increase the competitive pressure on industrial customers, leading to reduced investment in Québec.

- HQD's proposed rate increase will, in the longer term, result in lower electricity consumption, particularly in the industrial sector. It is likely that such lower industrial electricity consumption will lead to reduced manufacturing activity and employment. As a government-owned and highly profitable utility, and one that has mandated cross-subsidy policies built into its tariff structure, HQD should have greater concerns about longer term economic and employment implications of its rates than a privately-owned utility.

- HQD's proposal to establish a deferral mechanism for the Rate BT shortfall (a) requires the establishment of a significant cross-subsidy from regular rate customers to Rate BT customers, (b) is not consistent with the regulatory treatment of special contracts customers, and (c) will exacerbate the other public policy and economic problems associated with HQD's proposed rate increase.

Based on these conclusions, IEc recommends that the Régie develop a program by which the current HQD revenue requirement deficit is reduced over a period of at least five years, through a combination of load growth and below-inflation rate increases. For 2004, if HQD's full proposed revenue deficiency is approved ($402 million for regular rate customers), IEc recommends that the maximum increase be 1.0 percent of all electric charges (or approximately 4.5 percent of distribution rates), effective 1 April 2004. This increase will reduce HQD's forecast deficiency by approximately $79 million on an annualized basis. In contrast to the HQD proposal, to maintain reasonably constant cross-subsidization rates, this increase should vary somewhat between rate classes. IEc recommends that, consistent with the need to recognize both historical cross-subsidization levels and other rate design criteria, the rate increase for the residential class should be 0.9 percent, for the small commercial class 2.0 percent, for the medium commercial class 0.6 percent, and 0.9 percent for the large industrial class. Further, IEc recommends that the Régie reject HQD's proposal to defer the Rate BT deficiency for future recovery from regular ratepayers.

The balance of this report is organized into four additional sections. Section 2 summarizes the nature and magnitude of HQD's proposed rate increase, in the context of HQD's previous policy regarding reaching its full revenue requirement. It includes an explanation of why HQD's proposed increase improperly exceeds the revenue requirement. Section 3 addresses the implications of the proposed rate increase on the demand for electricity in Québec, particularly in the industrial sector. Section 4 addresses the cross-subsidization issues, and Section 5 presents IEc's recommendations in this matter.

2.0 Magnitude of the Rate Increase

2.1 Overview of the Proposed Rate Increase

In its original filing, HQD proposes two "across-the-board" rate increases designed to produce revenues that equal HQD's revenue requirement in calendar year 2004. HQD proposed rate increases to its regular[2] bundled rates of 3.0 percent effective 1 October 2003 and 2.98 percent effective 1 April 2004. Following the Régie's rejection of the 1 October increase, HQD now proposes to implement the 3.0 percent increase at 15 days following the Régie's decision for this proceeding, to be followed by the 2.9 percent increase on 1 April 2004. In total, the proposed rate increase amounts to approximately 6.0 percent of bundled rates, to be implemented in full within a very short time period.

In evaluating this proposed rate increase, it is important to recognize why the rate increase is needed. Based on the information provided in HQD's filing for the years 2002 to 2004, IEc concludes that the rate increase is motivated almost entirely by the desire to reduce HQD's historical under-recovery of its revenue requirement. Unlike most proposed rate increases in utility proceedings, this rate increase is not necessitated by the need to recognize increases in HQD's costs. Table IEc-1 summarizes the trend in HQD's cost performance for the regular rate classes for 2002 to 2004.

Table IEc-1
HQD Unit Cost Summary -- Regular Rate Classes
(cents per kWh)

	2002	*2003*	*2004*
Production	2.83	2.83	2.83
Transmission	1.57	1.50	1.49
Distribution Opn's. (1)	0.66	0.64	0.64
Customer Service	0.40	0.36	0.36
Distribution Return	0.54	0.48	0.48
Total Costs	***6.00***	***5.82***	***5.80***
Current Rates	***5.52***	***5.53***	***5.52***
Deficiency	**0.48**	**0.29**	**0.28**

(1) Includes costs for autonomous networks.

As shown in Table IEc-1, HQD's revenue deficiency at current rates has declined substantially from 2002 to 2004 *without the need for any rate increase.* Unit production costs

[2] Except where specifically noted, this report addresses costs and rates for the "regular" HQD rate classes, excluding the special contracts, Rate BT and Rate LD/LP classes. In most cases, the regular rate classes are aggregated into the residential, small commercial, medium commercial and large industrial rate categories.

remain approximately constant under the requirements of the Act. Unit transmission costs decline with load growth, because the dollar value of transmission costs for all classes increases at a lower rate than that of load growth. Unit distribution costs have also declined, as a result of load growth, a lowering of the cost of capital, and fairly constant customer service costs. (These cost effects are partially offset by increases in distribution operating costs and rate base.)

Thus, in evaluating the magnitude of HQD's rate proposal, a key question that must be addressed is "how fast is fast enough" for HQD to phase out the historical revenue deficiency. Further, the answer to this question is much more a matter of public policy and the public interest than one of regulatory economics.[3] It is IEc's understanding that the Régie has the responsibility to weigh the relative interests of the utility shareholders and the ratepayers, and to determine the appropriate level of revenue requirement recovery in these proceedings.[4] Therefore, one primary purpose of this paper is to identify issues for the regulator to consider in addressing this question.

In considering this "how fast" question, it must be recognized that the proposed increase relates only to distribution costs. While the proposed 6.0 percent increase is already some four times the rate of inflation in Québec, it includes no cost increases for generation and transmission costs, which are possible in the future. Using the relevant basis for comparison, namely distribution costs, HQD's proposed increases are enormous. On an annualized basis, the implications of HQD's proposed overall increase on distribution rates paid are summarized in Table IEc-2 below.

[3] Most regulatory proceedings involve the determination of (a) the overall revenue requirement for the utility, and (b) the rates necessary to recover that requirement. This matter requires the regulator to also determine how much of the revenue requirement should properly be recovered in the test year.

[4] See, for example, Article 5 of the Act. *"The Régie shall also foster the conciliation of the public interest, consumer protection and the fair treatment of distributors."*

Table IEc-2
Annualized Implications of HQD Proposed Rate Increase
Calendar Year 2004 Basis
$millions

	Current Revenues	Gener. Costs	Trnsmsn Costs	Curr. Dist'n Revs.	Prop. Incr. (6.1%)	Pct Dist'n Rate Incr.
Residential	$3,426	$1,786	$1,168	$ 472	$205	43.48%
Small Comm.	1,085	400	218	467	65	13.9%
Med. Comm.	1,574	697	327	550	94	17.1%
Large Ind.	1,881	1,202	431	248	113	45.4%
Reg. Tariff	***$7,966***	***$4,085***	***$2,144***	***$1,737***	***$477***	***27.5%***

Note: Rate increase calculated as if the proposed increase were applied on an annualized basis; i.e., effective 1 January 2004. The reason for a consistent comparison of rates and costs on an annualized basis is explained in Section 2.2 below.

As shown in Table IEc-2, HQD's annualized increase amounts to about $477 million for calendar year 2004, or approximately 6.0 percent of its total current revenues of $7,966 million. However, of that $7,966 million, only $1,737 million relate to distribution and customer service costs. Thus, HQD's proposed increase implicitly amounts to an average of nearly 28 percent of its existing distribution service revenues. Moreover, on a class basis, the percentage increases are much larger. For the residential class, the percentage increase is very large due to the very high "cross-subsidy" it receives from the other rate classes. For the industrial class, the percentage increase is very high because that class causes HQD to incur only minimal distribution costs, and the existing distribution revenues are primarily related to providing the cross-subsidy to the residential class.

This distinction between a distribution rate increase and an overall increase is particularly important for industrial customers. The increase proposed by HQD is approximately 6.0 percent of total electricity costs for each class of customer, which might be considered to be "fair," because all customers receive a rate increase. However, it is necessary to recognize that the large industrial customers are much more exposed to production and transmission cost increases than residential and small commercial customers. If, for example, production cost increases (associated with exhaustion of the heritage pool) require a production rate increase of 5 percent, small commercial customers would see an increase in current overall electricity rates of about 1.8 percent, but large industrial customers would face an increase of 3.2 percent.[5] Thus, in

[5] These increases could potentially be greater, if the Regie rigidly maintains constant revenue-cost ratios to implement the cross-subsidization mandate in the Act. That is, any increase in allocated production or transmission costs could potentially get a cross-subsidy "adder" effect associated with an effort to retain historical revenue-cost ratios. This potential adder effect increases the exposure of all non-residential rate classes to increases in production and transmission costs.

evaluating the rate shock associated with HQD's proposed *distribution* rate increase on different customer classes, the Régie should recognize the higher risk faced by large industrial customers associated with production and transmission cost increases.

2.2 The Test Year/Rate Increase Mismatch

Before turning to the specific issues relating to "how fast" HQD should increase rates to recover its full revenue requirement, IEc observes that HQD's proposed increase is greater than that necessary to recover its full revenue requirement. For calendar year 2004, HQD's rate increase proposal involves a 3.0 percent increase effective at the beginning of the year, combined with an additional 2.9 percent increase imposed at 1 April 2004. HQD justifies these two increases on the basis that, for the calendar year 2004, the rates will be sufficient to recover the 2004 calendar year revenue requirement.

This approach is not consistent with normal regulatory practice, in IEc's experience. The normal practice is for the utility to specify a test year to which the entire rate increase applies. The regulator then determines what the appropriate revenue requirement for the utility will be for that test year, and the new utility rates are set such that they recover that revenue requirement over the whole year.

HQD's proposal, however, involves a mid-year rate increase. In effect, the proposal contains a mismatch between revenue requirement and proposed rates. By so doing, HQD's rate increase is more than that necessary to recover test year costs on an annualized basis. By setting new rates at the higher level, HQD will be over-recovering its approved revenue requirement effective 1 April 2004.

Because HQD has not filed cost information for a test year beginning 1 April 2004 or for any of 2005, the magnitude of this over-recovery can only be estimated. However, for calendar year 2004, HQD indicates that the 3 percent increase will produce additional revenues of $244 million over 12 months, while the follow-up 2.9 percent increase will produce additional revenues of $165 million, totaling the full $409 million (excluding the BT deficiency, discussed below).[6] However, had the full increase applied for the whole year, IEc estimates that the revenue increase would be $484 million,[7] some $75 million greater than the revenue requirement. Thus, had HQD developed a test year that is consistent with the timing of the rate increase, namely one beginning at 1 April 2004, its proposed rate increase would likely over-recover the revenue requirement by at least $75 million.

[6] See Exhibit HQD-9, Document 1, page 17, Table 7.

[7] This figure represents approximately $477 million from regular rate classes and the $7 million estimated by HQD for special contracts and real time/backup rate classes.

Thus, even if HQD's proposed revenue requirement is approved in full, and its proposal to fully eliminate the revenue deficiency is also approved, the overall rate increase should be no more than 5.05 percent.[8]

2.3 Stability of Public Policy

Hydro Québec is a state-owned utility. As such, it has characteristics that are different than those of investor-owned utilities. In IEc's experience, state-owned utilities often use the utility to attempt to achieve public policy objectives. These efforts often result in differences between the revenue requirement for state-owned and investor-owned utilities. One such difference is income taxes, to which state-owned utilities are often exempt. Similarly, state-owned utilities may provide other low-cost access to public goods, such as rights-of-way. However, state-owned utilities may also assume costs that investor-owned utilities do not, such as extensive customer assistance programs.

The legislative and regulatory environment for Hydro Québec also involve public policy issues. First, the Act's provisions regarding the legislated prices for generated electric power and the maintenance of historical cross-subsidization constitute explicit public policy decisions. In addition, IEc notes that in traditional utility regulation, profits earned by a utility on "off-system sales," such as Hydro Québec's exports, are often assigned to or shared with ratepayers, rather than being retained by the shareholder. However, in Hydro Québec's case, these profits are primarily retained by the shareholder.[9]

Similarly, Hydro Québec's historical under-recovery of its full revenue requirement has been a public policy decision, albeit one that is now under the jurisdiction of the Régie.

In that light, it must be recognized that the question of how long it takes to eliminate HQD's revenue deficiency is a matter of public policy, not a matter of providing a reasonable return to an investor owned utility. And in that light, IEc recommends that the Régie consider the implications of this proposal in respect of the stability of public policy.

Prior to the current filing, HQD espoused a very different strategy for the transition to full recovery of its revenue requirement.[10] For example, from the Plan stratégique 2002-2006:

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[8] This figure is computed as the $409 million 2004 deficiency, less approximately $7 million recovered from the non-regular classes, divided by the $7,966 million 2004 regular rate class revenues at current rates.

[9] In fact, it is possible that Hydro Québec recovers more than its actual cost for production from domestic ratepayers. While IEc is not privy to Hydro Québec's detailed production cost information, the "Merrill Lynch Report" suggests that the legislated 2.79 cent per kWh generation rate assigned to domestic customers will produce a rate of return on generation assets well in excess of the cost of capital. In addition, Hydro Québec earns significant profit on export sales, much of which is forwarded to the shareholder in the form of cash dividends.

[10] The citations in this section, except as otherwise noted, have been provided by AQCIE, CIFQ and counsel.

"Hydro-Québec Distribution entend proposer des hausses de tarifs en évitant des chocs tarifaires à sa clientèle. Les prix de l'électricité au Québec seront beaucoup plus stables à long terme que ceux plus volatils des autres sources d'énergie. À titre indicatif, des hausses tarifaires alignées sur la croissance des prix à consommation (IPC) à partir de 2004 sont reflétées dans la section Perspectives financières."

Also, from an HQD press release in March, 2003:

Hydro-Québec Distribution enregistre une perte nette de 399 M$. Il s'agit d'une amélioration de 134 M$ par rapport à la perte de 533 M$ enregistrée en 2001. La bonne performance de l'économie québécoise, en particulier en matière de construction résidentielle, et les températures plus froides du dernier trimestre ont entraîné une augmentation des ventes d'électricité au Québec de 6,1 TWh ou 4,0% par rapport à 2001."

The former president of Hydro-Québec Distribution, Monsieur Yves Filion, in a presentation to Commission permanente de l'économie et du travail on January 23, 2002 indicated:

M. le Président, notre objectif de réduction du déficit est à 250 millions en 2006. Durant cette période, nous avons intégré dans le plan stratégique une augmentation tarifaire à l'inflation, c'est-àdire de 1,5 % en 2004, 1,6 % en 2005 et 2 % en 2006. Si vous faites le total de ces hausses tarifaires, ça représente une addition de 354 millions, en 2006, des revenus d'Hydro-Québec. De ces 354 millions, 250 millions seront requis pour supporter le coût de l'approvisionnement additionnel en électricité, au-delà de l'électricité patrimoniale. Environ 40 millions seront requis pour supporter la hausse du coût de service du transport. Donc, il reste moins de 70 millions qui contribuent à la rentabilité d'Hydro-Québec Distribution. Et je n'ai pas compté les coûts additionnels reliés à l'enfouissement du réseau de distribution ou à la l'efficacité énergétique ou autres."

In contrast to this previously stated strategy, HQD now proposes to effect the transition to full recovery[11] of the deficiency effective 1 April 2004. In effect, HQD proposes to change the previously announced public policy. In evaluating this proposal, IEc recommends that the Régie consider the implications of this lack of stability.

As discussed further below, large industrial concerns who are evaluating alternative locations for investment are particularly concerned about the relative risks that they face associated with significant changes in government policies. Many of HQD's large industrial customers have either operations or investment opportunities in developing countries, or they compete with firms in developing countries. One of the competitive advantages of Québec is the stable government and policy climate, compared to these developing countries.

Significant changes in stated public policies, such as the one proposed by the state-owned electric utility in this proceeding, will have a negative effect on industrial investment in two

[11] In fact, as detailed above, HQD proposes to transition to over-recovery of the deficiency.

ways. First, the higher electric rates will discourage investment in both existing and new facilities, as other locations will be more economically attractive. Second, the abrupt shift in policy regarding electric rates will increase the relative riskiness of Québec as a location for industrial investment. While it is impossible to quantify the effect of these two factors with any precision, the directional effect of this change in policy will, in the longer term, reduce investment and employment in the industrial sector of the provincial economy.

2.4 HQD's Load Forecast for the Test Year

To determine the magnitude of the rate increase necessary to meet a utility's revenue requirement, the utility and the regulator need to develop a load forecast for the test year. In IEc's experience, load forecasts are often subject to some debate in the regulatory arena, with ratepayers often arguing for higher expected future load and utilities for lower growth.

IEc has only recently obtained the load forecasts that underpin HQD's filing in this matter, and is currently in the process of reviewing them. To the extent this review results in any concerns, IEc will submit them as soon as possible. Table IEc-3 below summarizes HQD's load growth for the 2000 to 2004 period. As shown, HQD forecasts a reduction in residential load in 2004, and only modest load growth in the other sectors. While the forecast load reduction for the residential class is presumably related to weather normalization effects, it does not appear that HQD is overly optimistic about load growth in 2004, perhaps as a result of its multiple proposed rate increases.

TABLE IEc-3
Summary of HQD 2004 Load Forecast

	Load (GWh)			*Percent Change*	
	2002	*2003*	*2004*	*'02-'03*	*'03-'04*
Residential	52,969	55,544	55,884	4.9%	0.6%
Small Commercial	13,859	13,863	13,916	0.0%	0.4%
Medium Commercial	24,361	25,301	25,952	3.9%	2.6%
Industrial	45,171	47,937	48,467	6.1%	1.1%
Regular Rates	**136,360**	**142,645**	**144,219**	**4.4%**	**1.1%**

Source: HQD-8, Documents 2, 3, 4, Table 8.

By way of contrast, if load increased by one percentage point more than HQD forecasts, IEc estimates that HQD's deficit would be $39 million lower.

3.0 Impacts of the Rate Increase on Demand and Industrial Competitiveness

3.1 The Nature of Electricity Demand

HQD proposes to increase its price for electric power to domestic customers. An economist will conclude that this increase in price will necessarily result in a reduction in the demand for electricity, below the level that would occur in the absence of the price increase. A key consideration for the Régie, particularly when evaluating the rates for a state-owned utility, is the magnitude of this demand response.

Economists address the question of the magnitude of this demand response to price with the concept of "the price elasticity of demand," or in its common short form, "price elasticity."

The price elasticity of demand is defined as the ratio of the percentage change in demand to the percentage change in price. For example, if HQD's electricity demand declines by 3 percent as a result of a price increase of 6 percent, the price elasticity is -0.5.

Unfortunately, the concept of price elasticity is often over-simplified. A price increase for a particular good has two effects on customers. First, the economic attractiveness of substitute products is increased. For example, increasing the price for beef will increase the economic attractiveness of pork and chicken. The more similar the characteristics of the available substitute, the larger will be the substitution response. Second, the price increase will have an effect on consumer income. To the extent that the customer cannot substitute alternative products, the customer must continue to purchase the higher-priced good. However, the higher prices eat deeper into the customer's income, and he cannot afford to purchase as much of the good as he did before the price increase. Thus, the demand reaction to a price change has both a substitution effect and an income effect.[12]

In considering what the price elasticity of demand is for electricity consumption, it is necessary to understand the nature of the demand for electricity. Electricity is a nearly ubiquitous commodity in modern society, used in all sectors of the economy and for a wide variety of purposes. As such, the various different uses of electricity all have different demand patterns and price elasticities. However, we can reach a few generalizations about the nature of the demand for electric power:

- Electric power is not consumed directly. It must be used in some form of appliance or capital equipment to provide any useful service to the customer. Thus, to some extent, capital goods and electric power are what economists call "complementary" goods, in that they are consumed together.

[12] Note that this is a price-related effect on the consumer income constraint -- it is different from the demand response to a change in income. Higher income generally leads to increased demand for goods, measured by a concept known as the income elasticity of demand. In most cases, demand has a positive income elasticity and a negative price elasticity.

- Over the longer term, however, capital can be a substitute for electric energy. If electric prices rise, consumers may, over time, replace their existing equipment with more energy efficient equipment. In addition, consumers may replace existing capital equipment with capital equipment that uses a lower cost fuel.

- Because of the need for capital, the near-term response to a change in electricity demand is relatively limited. For residential customers, the near term response is basically one related to the income constraint -- thermostats get turned down and heating load declines. (We also see some "substitution" in the form of more sweaters!) However, in the longer term, the price response is much greater as the capital stock turns over and capital is substituted for electric energy, or a change in capital increases the potential for fuel switching.

- For some uses, electricity has very limited substitution possibilities, particularly in the residential and small commercial sectors. Few (but not zero) substitutes are available for refrigeration, lighting, air conditioning, electric motor appliances, etc. Thus, demand for residential electricity for those uses tends to be relatively price inelastic.

- The price elasticity of industrial demand for electricity tends to be higher than that for residential or commercial demand in both the short-term and the long-term, for a variety of reasons. As discussed in more detail below, these include the greater ability of industrial customers to substitute alternative fuels at locations facing a price increase, greater ability to move manufacturing output to locations not facing a price increase, and reductions in product output related to loss of business to competitors who do not face the price increases.

- The breadth of the impact of a price change is a significant determinant of the price elasticity. A very broad price increase, such as a national tax on all forms of energy, will result in a much smaller percentage demand response than a narrow price increase, such as a provincial price increase in electric power only. The hypothetical tax on energy has a much lower elasticity because substitution possibilities are much smaller -- the price increase cannot be avoided by switching to alternative fuels and the price increase cannot be avoided by relocating business operations to other provinces. Thus, it is difficult to put a precise figure on the likely elasticity response to HQD's proposed increase.[13] Moreover, as noted above, any such response will be much greater in the longer term than the near term.

Demand for electric power in the industrial sector, particularly in relatively low electric cost locations such as Québec, has some additional characteristics that are important. These include:

[13] IEc has only recently obtained HQD's load forecast information and is currently in the process of reviewing it. It is not clear whether HQD has made any assessments of the demand response that it expects associated with the proposed rate increase.

- For the most part, industrial electricity consumption is associated with massive capital investment. Thus, future electricity consumption is directly related to (a) investment in new industrial facilities, and (b) re-investment in existing industrial facilities.

- Because Québec has historically been a location with relatively low electric rates, a large share of industrial load is related to processes that require low-cost electric power. Therefore, from an industrial customer's perspective, it is nonsensical to compare HQD industrial rates with those in Boston, New York and Chicago. For similar reasons, electricity costs represent a fairly significant percentage of the operating costs of many of HQD's industrial customers.

- The prices for industrial commodities produced by most of HQD's industrial customers are set on world markets -- HQD industrial customers cannot easily pass on electricity cost increases to their customers.

- In the short run, industrial facilities continue to operate if their short term variable costs are lower than both (a) the market price for the commodity being produced, and (b) the short term variable cost of an alternative production location. If an industrial plant is operating at low margin, a price increase could potentially cause the plant to close quickly. Moreover, over the longer term, industrial plants require capital investment that must also be recovered from operating margin. Increases in electric energy costs will reduce the margins earned by industrial companies, and will therefore also reduce the ability of these companies to recover future capital investment costs.

- To continue in regular operation, industrial facilities require regular maintenance capital, as well as infrequent major upgrades or refurbishments. Facilities that do not receive regular capital investment are implicitly being phased-out by industrial companies. Thus, the long term level of industrial demand is determined significantly by the capital budgeting processes of industrial companies. In particular, many of these companies compare the relative attractiveness of numerous locations around the globe for the investment of their capital budgets.

- Industrial firms consider many factors when evaluating capital budgeting alternatives. However, in IEc's experience, the important factors include the relative performance of various locations based on (a) historical profitability (or cash flow) of existing operations, (b) potential future profitability of operations, and (c) the security of the investment climate. Increasing electric rates, particularly resulting from a change in public policy, will have a deleterious effect on all of these factors.

- A price increase to industrial customers will have a short-term effect and a long-term effect. The short-term effect will be related to near-term reductions in plant output due to the reduction in the plant's international competitiveness. In some circumstances, a price increase can lead to a plant being closed or mothballed. In the longer term, the price increase will reduce the actual and potential future profitability

of the plant, which in some cases will lead to reduced maintenance capital investment and eventually plant closure. In addition, electricity price increases will reduce future investment in new plant and equipment.

In summary, from an economics perspective, industrial customers are generally the most price elastic market served by electric utilities. While it is difficult for an outside consultant to say that a price increase will result in any near term plant closures or significant reductions in load in the near term without intimate knowledge of the economics of a specific plant, a wide variety of economic and econometric analyses confirm that load reductions will take place.

To conclude this digression into the concept of elasticity, IEc notes that price elasticity of demand is often either an explicit or implicit consideration for determining the level of a rate increase. Most regulators deem that "value of service" is an important consideration in developing public utility rates.[14] From an economist's perspective, value of service is determined by the price elasticity of demand -- the higher the elasticity, the lower the value of service. This definition is recognized in the economics concept of "Ramsey Pricing," under which the difference between the utility rate and the short-run marginal cost for serving a particular rate class is (generally) proportional to the inverse of the price elasticity of demand for that class.[15] That is, classes with relative inelastic demand, such as the residential class, tend to face relatively higher cost markups under Ramsey Pricing than classes with relatively elastic demand, such as the industrial classes. While few regulators explicitly adopt Ramsey pricing for setting utility rates, most regulators consider the effects of rate increases and losses of load, particularly for industrial customers, when imposing rate increases.

3.3 Exchange Rates, Product Prices and Electricity Rates

As part of its justification for its "sudden leap" approach to eliminating its deficiency, HQD provides a comparison of its bundled electricity rates to the rate of inflation at HQD-9, page 5. This comparison indicates that despite a general price increase of 12.5% between 1998 and 2003, electricity rates have remained constant in nominal terms. While this comparison may be relevant for the relative cost of electricity to residential customers, it has little meaning for HQD's industrial customers.

The prices for commodities produced by most of HQD's industrial customers are set in international markets, which are unaffected by Canadian inflationary factors. A more accurate comparison for the impact of industrial sector is one made between electricity prices and industrial product prices. As suggested above, the difference between product prices and variable costs (including electricity) determine the margin earned by industrial firms, the

[14] See, for example, Principles of Public Utility Rates, Bonbright, Danielsen and Kamerschen, Second Edition, Chapter 6, 1988.

[15] This explanation is by no means a complete description of the mathematics of Ramsey pricing, but it is a useful approximation. IEc does not advocate the adoption of Ramsey pricing in Québec, but does encourage the Régie to consider value of service when evaluating rate increases in this matter.

contribution to fixed capital cost, and the attractiveness of the Québec location for additional investment.

Figure IEc-1 presents a comparison of the prices for various key commodities produced by HQD's industrial customers with the heretofore flat electricity rates.[16] As the figure shows, the prices for most of these commodities rose at least modestly in 2000, but have subsequently returned to levels at or below those in 1998. Thus, from an industrial customer's perspective, the price of electricity has not fallen in any significant way relative to the prices that customer earns for its own products. Moreover, HQD's proposed increase of 6 percent for 2004 will imply that virtually all industrial producers will have incurred a greater increase in electricity costs than in product prices.

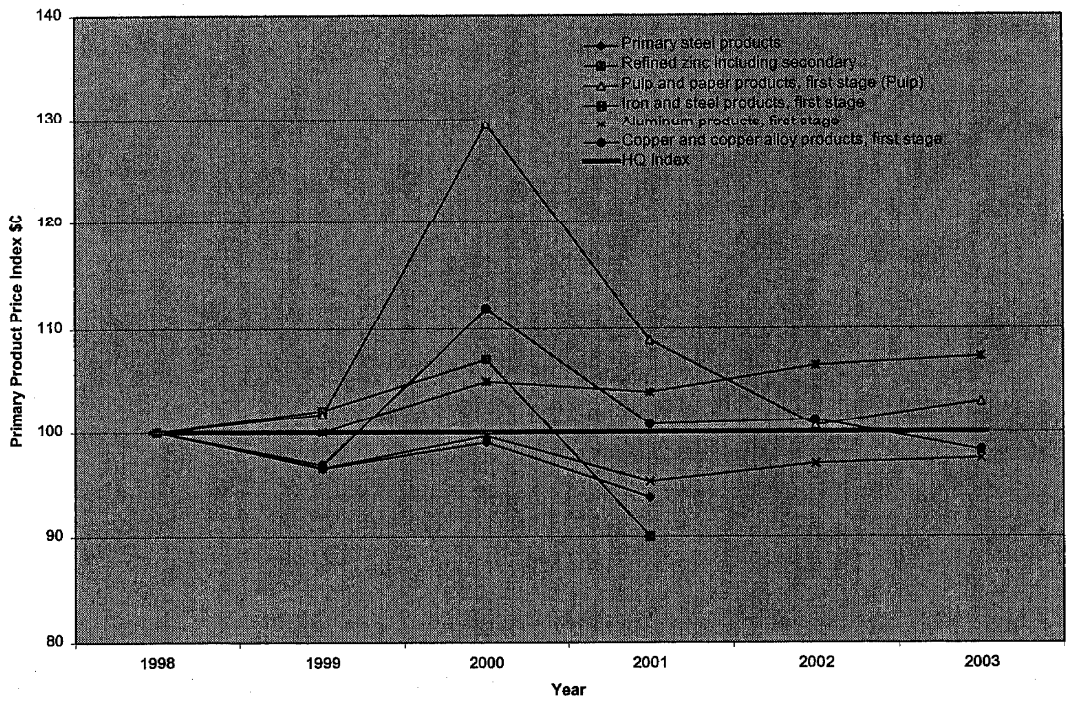

Figure IEc-1: Primary Product Price Index (Index, 1998 = 100)

Further, HQD appears to have chosen a particularly inopportune time to impose a significant price increase on its industrial customers. Many of the commodities that these

[16] The data source for the commodity product price indices is Statistics Canada information, based on its calculations of actual prices earned by Canadian companies f.o.b. mill. See Statistics Canada, CANSIM, " Table 329-0039 - Industry price indexes, by major commodity aggregations and stage of processing, monthly (Index, 1997=100)" and "Table 329-0007 - Industry price indexes for primary metal products and metal fabricating products, monthly (1992=100)."

customers produce are priced in US dollars in international markets. The recent weakness in the US dollar, particularly vis-a-vis the Canadian dollar, decreases the international competitiveness of Canadian producers. When the Canadian dollar rises, the prices earned by domestic producers in Canadian dollars falls, and the companies cost competitiveness in respect of all Canadian dollar denominated costs declines. Thus, when the Canadian dollar strengthens, Canadian labor (for both operating and capital) becomes less competitive. The same conclusion is true for Canadian dollar-denominated electric costs. As shown in Figure IEc-2, the Canadian dollar has recently strengthened significantly compared to the U.S. dollar, and the full impact of that change is likely not fully recognized in the official price statistics shown in Figure IEc-1.

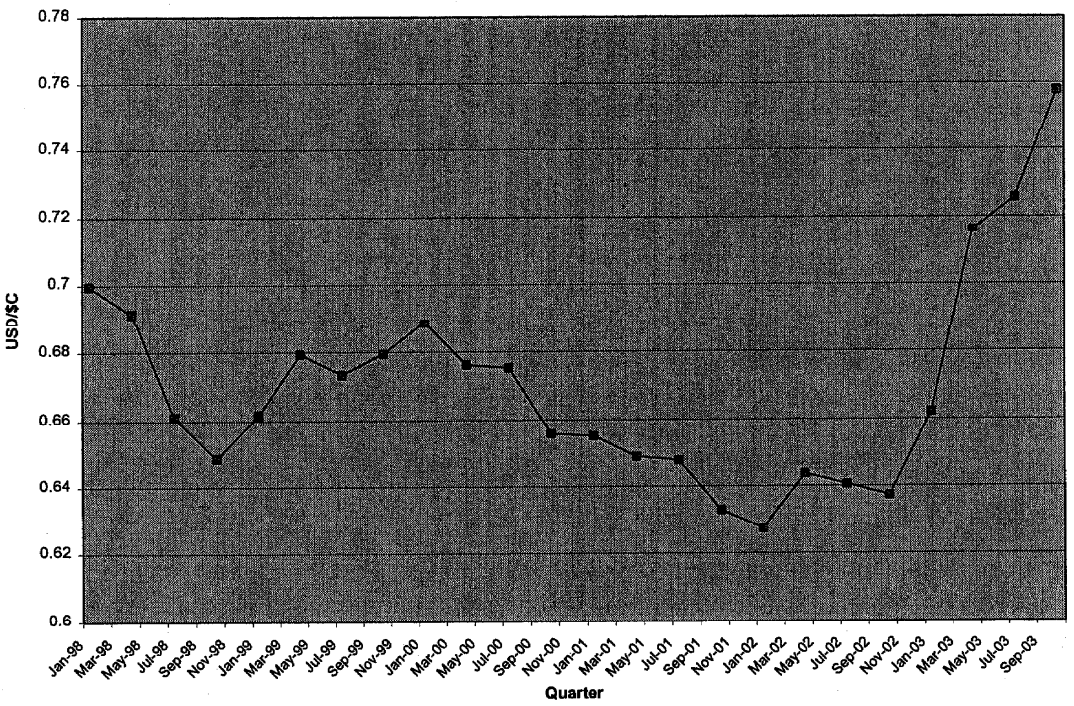

Figure IEc-2: US/Canadian Dollar Exchange Rate by Quarter

3.4 Implications of Reduced Electricity Demand

For the reasons detailed above, it is difficult to ascertain the long-term price elasticity of demand associated with the specific rate increase proposed by HQD. Unsurprisingly, the price elasticity of demand estimates for electric consumption from the extensive economic literature vary widely from study to study and location to location. Because the HQD proposed increase applies only in Québec, it is a relatively narrow increase geographically, compared to an increase such as one resulting from higher natural gas prices which would affect more and broader areas. Thus, it should be expected that the elasticity effects would be relatively high for this increase, particularly in the industrial sector.

As an example of the long-term price elasticity impacts, Table IEc-4 below shows rough estimates of the short-term and long-term effects of a price increase on HQD margins. This example uses "conservative" estimates of price elasticities, meaning values at the relatively low end of the range for price elasticities. In this table, the immediate price impact on demand is assumed to be zero; for the longer term, the price elasticities are estimated at -0.75 for residential and small commercial, -1.0 for medium commercial and -1.25 for large industrial.

TABLE IEc-4
Impact of Long-Run Price Elasticity on Net Revenues Earned
From HQD Proposed 6.0 Percent Rate Increase (Annualized)

	2004 Volume (GWh)	*Short-Run Revenue Increase ($mm)*	*Long-Run Annual Volume Loss (GWh)*	*Long-Run Annual Margin Loss ($mm)*	*Net Long Run Impact of Increase ($mm)*
Residential	55,884	$205	(2,509)	(83)	122
Small Commercial	13,916	65	(625)	(34)	31
Medium Commercial	25,952	94	(1,554)	(58)	36
Industrial	48,467	113	(3,627)	(59)	53
Regular Rates	**144,219**	**$477**	**(8,315)**	**(234)**	**243**

Note: Lost margin associated with the volume decline assumes that neither HQD's transmission nor its distribution costs will decline as a result of the lost volume.

As shown in Table IEc-4, based on the long-run price elasticity estimates specified above, the long-run impact of HQD rate increase proposal would be an increase of approximately half the short term effect, and significantly less than half of the revenue increase expected from the large industrial rate class. Moreover, the proposed increase implies a loss in volume (compared to where it would be without the increase) of about 5.8 percent in total and over 7.5 percent for the large industrial class.

If HQD were an investor-owned utility, it would reasonably be entitled to earn a full return on its invested capital in the short-run, and the longer term volume implications might be a public policy matter in which it had little interest.[17] However, in the particular circumstance of this hearing, IEc encourages the Régie to consider the longer term public policy implications of load loss and reduced industrial output in evaluating whether HQD's "sudden leap" proposal should be approved.

[17] In practice, in many rate proceedings, utilities are very concerned about loss of volume for industrial rate classes, and often offer rate proposals for which large industrial customers rates are at or below allocated cost.

4.0 Cross-Subsidization Impacts

4.1 Cross-Subsidy Implications of HQD's Proposal

HQD proposes to effect the rate increase using an "across-the-board" strategy, meaning that all regular rate classes face the same percentage increase in revenues and in each bundled tariff charge.[18] The Act mandates that the rate proposal result from a specific intent of reducing cross-subsidization between the rate classes. Table IEc-5 below summarizes the implications of HQD's proposal, on both the HQD adjusted revenue-cost ratio basis, and on the adjusted[19] dollar basis.

TABLE IEc-5
HQD CROSS-SUBSIDY TRENDS

	M-L 2000	*Adj. 2000*	*2002*	*2003*	*Prop. 2004*
HQD Index					
Residential	81%	80%	80%	81%	81%
Small Commercial	124%	125%	123%	121%	122%
Medium Commercial	133%	134%	131%	130%	131%
Industrial	113%	118%	117%	116%	116%
Total	**100%**	**100%**	**100%**	**100%**	**100%**
Dollar Value					
Residential	$(813)	$(883)	$(867)	$(839)	$(866)
Small Commercial	228	232	220	200	205
Medium Commercial	375	385	374	371	389
Industrial	210	265	273	268	272
Total	**$ 0**	**$ 0**	**$ 0**	**$ 0**	**$ 0**

Notes:
1) Merrill Lynch report figures for 2000 are from Phase I undertaking HQD 12, Document 4.2.2.
2) HQD has refused to provide the backup materials for any of the Merrill Lynch cross-subsidy figures. IEc therefore cannot comment on whether the unadjusted or the adjusted figures are consistent with the cost of service study method used in the current proceedings.
3) The 2002 and 2003 figures are at current revenues; the 2004 figures are based on HQD's proposed increases.

[18] HQD has declined to provide the billing determinants for each tariff in its filing. In most cases, this failure would make it impossible for hearing participants to evaluate what additional revenues would be generated by the proposed increase. However, because HQD proposes to apply the same percentage increase to all tariff blocks, the detail is not necessary to estimate the magnitude of the revenue increase. IEc observes that it is normal practice for a utility to produce billing determinants in basic rate-setting proceedings.

[19] For reasons detailed *ad nauseum* in Phase 1 of these proceedings, the cross-subsidy is evaluated by proportionately scaling actual revenues for each rate class such that the adjusted revenues equal the full revenue requirement. Otherwise, the comparison would confuse the "subsidy" (from the distributor to the rate classes) with the "cross-subsidy" (from the non-residential to the residential rate classes).

In its Phase 1 decision in these proceedings, the Régie accepted the use of the HQD index as the appropriate measure of cross-subsidization. The Régie also indicated that the appropriate base year for determining the level of the cross-subsidy should be 2002, based at least in part on HQD's undertaking that demonstrated that the cross-subsidy changed little between 2000 and 2002. As HQD has refused to provide any detailed cost of service analysis for 2000 or for its undertaking 12 in Phase 1, IEc can only report the values with no independent assessment of their reasonableness.

Table IEc-5 indicates that HQD's "across-the-board" strategy does not result in very large changes, but does result in modest shifts in the cross-subsidy. Relative to 2002, the cross-subsidy to the residential class declines very slightly, but only by about $1 million. The large industrial class' contribution to the cross subsidy remains virtually constant between 2002 and 2004 in dollar terms, while its revenue-cost ratio declines by a small amount. Within the commercial classes, the cross-subsidy from the medium customers increases by some $15 million, while the cross-subsidy from small commercial customers decreases by about $15 million. However, both classes exhibit modest reductions in the HQD index, although the small commercial classes show a somewhat more marked decline. Strict adherence to the ban on changes in cross-subsidization would suggest that the rate increase should vary between rate classes.

In its decision in Phase 1 of this proceeding, the Régie determined that the appropriate measure for maintaining a constant level of cross-subsidization is the metric suggested by HQD, namely the normalized revenue-cost ratio. However, for the reasons detailed in that proceeding by IEc and HQD, it is algebraically impossible to maintain constant revenue cost ratios for each class of customer from year to year. Therefore, to use the normalized revenue-cost ratio metric, the Régie may need or want to exercise a certain amount of judgment in evaluating a proposed rate increase. HQD recognizes this issue, because its rate proposal allows revenue cost ratios to vary. For the purposes of deriving a constant cross-subsidy measure in this proceeding, IEc has computed the rate increases necessary to retain a constant dollar cross subsidy from 2002 to the test year, and then computed the normalized revenue-cost ratios to determine whether they are reasonable.

Specifically, to maintain the dollar values in cross-subsidy from 2002 to 2004, the average annualized rate increases at the full 2004 revenue requirement (excluding the Rate BT deficiency) are shown below. The resulting revenue cost ratios are shown in parentheses.

- Residential: 4.9% (81%)
- Small Commercial: 6.5% (124%)
- Medium Commercial: 4.2% (130%)
- Large Industrial: 5.1% (116%)
- Total: 5.1% (100%)

Note that these values would exactly maintain the level of cross-subsidy in 2002. The Régie should apply all of the other normal rate design criteria before reaching its decision. For

example, the more price elastic demand of industrial customers and their greater exposure to future production and transmission cost increases suggest mitigating the rate increase for that class.

Because IEc does not recommend the "sudden leap" transition to full recovery of the revenue requirement, a specific rate recommendation for full revenue recovery is not presented here. IEc's specific recommendation is presented in Section 5 below.

4.2 The Rate BT Deficiency Deferral

In its filing, HQD proposes to establish a deferral account for the difference between its proposed rates for Rate BT and the costs allocated to Rate BT. The differences that HQD proposes to defer are approximately $11 million in 2003 and $84 million in 2004.[20] While HQD proposes that the Régie specifically allow it to recover these deferred costs in the future from ratepayers, HQD declines to offer a proposal for what classes of customer should eventually pay for the deferred costs.

Rate BT is a special rate class designed to offer time-of-use rates for customers who have dual fuel capability and can take electric service primarily in off-peak periods. Because these customers have this flexibility, they can take advantage of the lower costs associated with supplying off-peak service. The primary cost advantage is that market prices for power are much lower in off-peak periods, generally because the marginal generating unit is a relatively low-cost facility. In addition, Rate BT customers typically will not contribute to system peak demands, and therefore they do not cause the transmission authority to incur the higher costs that it would if those customers were consuming power during on-peak periods. Finally, it is possible that Rate BT customers require lower distribution costs than on-peak customers, though any such determination is specific to the configuration of the distribution network serving these customers.

Rate BT therefore offers an attractive rate for off-peak consumption of power. In one sense, Rate BT is an economic incentive for off-peak consumption of power, and is therefore a load management technique. However, it is IEc's understanding that under the provisions of the Act, load management tariff customers are not eligible for heritage pool electricity. Therefore, the production cost charged by Hydro Québec Production (HQP) to HQD must generally be market-based. Effective 1 December 2003, the rate that HQD must pay to HQP for power for Rate BT load will increase substantially.

Faced with this rate increase, and asserting that Rate BT customers will not take service at such rates, HQD does not propose to increase Rate BT rates to match the higher costs. Rather, it proposes to set Rate BT rates well below its cost of providing service. That is, HQD proposes

[20] In HQD-3, HQD indicates that it proposes to establish a deferral account for December 2003 through September 30, 2004 amounting to $60 million. However, in response to AQCIE/CIFQ-1, HQD indicates that it is requesting approval of the full Rate BT shortfall for 2004.

to provide a new subsidy to Rate BT customers. Further, HQD proposes to accumulate the resulting deficit in a deferral account, to eventually be charged to other ratepayers.

In IEc's view, HQD's decision to offer a subsidy to this class of customers is its own decision -- if HQD deems that it is better off by retaining this load while providing a subsidy from its shareholders to certain classes of customers, it should be given reasonable regulatory flexibility to do so. However, the problem arises when HQD decides that other customers must pay for this subsidy. HQD's proposal is a straight-forward case of substantially increasing cross-subsidies from the regular classes of ratepayers to the Rate BT class. The magnitude of the cross-subsidies, resulting from the change in electricity costs in December 2003, amounts to approximately $11 million for 2003 and $84 million for 2004.

By proposing that this deficiency be deferred for future recovery from other classes of ratepayers, HQD's proposal transforms a "subsidy" from the shareholders into a "cross-subsidy" from other ratepayers. The Rate BT deficiency is not related to any costs caused by the other rate classes, and therefore cannot be allocated as a cost to the other rate classes under cost causation principles. It is therefore not properly a component of the revenue requirement for regular rate customers.

If the regular rate customers are required to pay for this deficiency, both the difference between revenues and allocated costs and the ratio of revenues to allocated costs for at least some of the regular rate classes must necessarily increase. Such an increase appears to IEc (in its non-legal opinion) to be inconsistent with the provisions of the Act against changes in cross-subsidization, as well as being inconsistent with the findings of the Régie in Phase 1 of these proceedings. Moreover, because HQD has not offered its proposal for how the deficiency will eventually be disposed of, it is impossible to determine the magnitude of the increased cross-subsidy on the other rate classes.

Note also that HQD's proposed treatment of the Rate BT deficiency is very different from the treatment of the special contracts rate class. For special contracts customers, the method used to develop production costs (approved by the Régie in R-3477-2001) generally produces a higher allocated cost than that actually specified in the contracts held by those customers. For purposes of cost allocation and computing cross-subsidies for that class, HQD simply adjusts the production costs down to the revenues actually earned from those customers. *These costs are not transferred to other customers -- they are simply absorbed by the shareholder.*[21] Comparable treatment for the Rate BT deficiency would be to reject the proposed deferral account, require the HQD shareholder to absorb the subsidy that it deems necessary, and prohibit the significant increase in cross-subsidies coming from the regular rate classes.

[21] It is not clear whether this difference applies to the distribution arm or the production arm of Hydro Québec, but the difference is irrelevant -- the issue is that the "deficiency" is absorbed by the shareholder.

Finally, HQD indicates that if it set Rate BT rates at cost, those customers could potentially switch to regular rate service or they may decide to rely completely on their alternative fuel supply. In IEc's view, neither of these possible eventualities is sufficient reason to provide a cross-subsidy from other rate classes.

First, IEc notes that if Rate BT customers decide to take service under the regular tariffs, HQD's costs will decline, because its production costs for those customers are priced under the requirements of the Act relating to heritage pool load. Thus, from the distributor's perspective, its rates will decline (relative to full-cost BT rates) and its costs will decline. In fact the conversion of some BT load to regular rates might reduce costs for other customer classes, as the fixed transmission and distribution costs are spread over a larger kWh volume.

Second, if the Rate BT customers switch to their alternative fuel, the impact on HQD cost recovery would be minimal. HQD's current revenue requirement for Rate BT for all non-generation costs is less than 0.5 cents per kWh, and thus there is very little margin for HQD to lose. It is very likely that the incremental margin that HQD would earn associated with BT customers switching some or all of their current load to regular rate service would offset any loss of Rate BT margin.

5.0 IEc Recommendations

In considering all of the factors discussed in this report, IEc recommends that the Régie establish a stated strategy for HQD's transition to full recovery of its revenue requirement, and that it adhere to that strategy in the future to the extent practicable. To avoid unnecessary loss of load and to avoid creating unreasonable uncertainty in the investment climate in the province, IEc recommends that the Régie select a target period of at least five years for the phase-in to full revenue requirement recovery. With such a period, and with the expectation of continued modest load growth, IEc believes that this target can be achieved with annual distribution rate increases that are less than 1.0 percent of total electricity costs per year, and less than 5.0 percent of distribution costs. For this specific proceeding, IEc recommends that the Régie approve an overall increase of 1.0 percent, effective 1 April 2004. On an annualized basis, that increase will produce an increase in revenues of approximately $79 million, or 4.5 percent of distribution costs. It will reduce HQD's revenue deficiency from the 0.48 cents per kWh in 2002 to 0.22 cents per kWh in 2004.

On a per-class basis, to retain the cross-subsidization dollar values from 2002 into 2004 (for the reasons discussed in Section 4.1 above), the following allocation of the rate increase would be necessary (with normalized revenue-cost ratios in parentheses):

- Residential: 0.9% (81%)
- Small Commercial: 2.4% (124%)
- Medium Commercial: 0.2% (130%)
- Large Industrial: 1.1% (116%)
- Total: 1.0% (100%)

In considering the price elasticity of demand effects discussed in this report, the additional exposure of the large industrial class to production and transmission cost increases, and the disproportionate increase required from the small commercial class to maintain the historical cross-subsidies, IEc recommends that the Régie temper the specific rate increases shown above. The details of IEc's rate proposal are shown in Table IEc-6 below.

Table IEc-6
IEc Proposed Rate Increases: Calendar Year 2004 Basis
$millions

	Current Revenues	Proposed Revenues	Percent of Total Revs.	Prop. HQD Index	Cross-Subsidy
Residential	$3,426	$3,457	0.9%	81%	$(866)
Small Commercial	1,085	1,107	2.0%	123%	215
Medium Commercial	1,574	1,583	0.6%	130%	381
Large Industrial	1,881	1,897	0.9%	116%	269
Regular Tariff	***$7,966***	***$8,045***	***1.0%***	***100%***	***$ 0***

Note: Rate increase are calculated as if the proposed increase were applied on an annualized basis; i.e., effective 1 January 2004, because HQD has declined to provide cost and revenue information for a test year beginning 1 April 2004. Thus, on an annualized basis, with load growth, this proposed increase will likely produce larger revenue than those presented in this table.

Finally, IEc recommends that HQD's proposal to defer the Rate BT deficiency be rejected. That proposal would require a substantial increase in the replacement of a subsidy from the shareholders to the Rate BT customers, which appears to be permissible under the Act, to a cross-subsidy from other ratepayers. which does not appear to be permissible under the Act. Moreover, deferring these costs will increase the burden on future ratepayers and increase the load loss associated with higher rates.

Report Prepared By and Under the Direction of:

_____ _____

Robert D. Knecht Date

EXHIBIT IEc-1

CURRICULUM VITAE AND APPEARANCE SCHEDULE

ROBERT D. KNECHT

ROBERT D. KNECHT

Robert D. Knecht specializes in the practical application of economics, finance and management theory to issues facing public and private sector clients. Mr. Knecht has more than twenty years of consulting experience, focusing primarily on the energy, metals, and mining industries. He has consulted to industry, law firms, and government clients, both in the U.S. and internationally. He has participated in strategic and business planning studies, project evaluations, litigation and regulatory proceedings and policy analyses. As Treasurer of IEc, Mr. Knecht is responsible for the firm's accounting, finance and tax planning, as well as administration of the firm's retirement plans. Mr. Knecht's recent consulting assignments include the following projects:

- For the Pennsylvania Office of Small Business Advocate, Mr. Knecht provides analysis and expert testimony in industry restructuring, base rates and purchased energy cost proceedings involving electric, steam and natural gas distribution utilities. Mr. Knecht has analyzed the economics and financial issues of electric industry restructuring, stranded cost determination, industry economics, cost allocation methods and rate design issues.
- For the New Jersey Board of Public Utilities, Mr. Knecht audited the cost and rate unbundling, cost allocation and rate design aspects of the industry restructuring filing of an investor-owned electric utility.
- For the U.S. Department of Justice, Mr. Knecht participated in an evaluation of the economic damage claims of a large forest products concern, in a breach of contract lawsuit. Mr. Knecht's analysis included a review of the economic claims of the plaintiff, and an evaluation of settlement alternatives.
- For the Independent Power Producers Society of Alberta and the Senior Petroleum Producers Association, Mr. Knecht provides analysis and recommendations regarding electric industry restructuring strategies. Mr. Knecht also provided expert testimony with respect to industry restructuring, cost allocation, rate unbundling methodologies and rate design.
- For a major South American iron ore mining company, Mr. Knecht assembled and managed an international team of consultants to review and evaluate the company's strategic plan. Mr. Knecht oversaw the development of recommendations in the areas of markets, the resource base, development of the resource, processing operations and finance.

Mr. Knecht holds a M.S. in Management from the Sloan School of Management at M.I.T., with concentrations in applied economics and finance. He also holds a B.S. in Economics from M.I.T. Prior to joining Industrial Economics as a principal in 1989, Mr. Knecht worked for seven years as an economic and management consultant at Marshall Bartlett, Incorporated. He also worked for two years as an economist in the Energy Group of Data Resources, Incorporated.

ROBERT D. KNECHT

Regulatory Economics

Mr. Knecht consults and provides expert testimony in the field of regulatory economics, focusing primarily on issues of industry restructuring, cost allocation and rate design. His clients include both utilities and the consumers, competitors, and regulators of public utilities. Representative assignments are listed below.

- For the Independent Power Producers Society of Alberta and the Senior Petroleum Producers Association, in a variety of regulatory proceedings, analysis and expert testimony regarding electric industry restructuring, market power mitigation, stranded cost determination, cost allocation, rate unbundling and tariff design for transmission and distribution utilities.
- Participation in an audit of the electric industry restructuring filing of the Atlantic City Electric Company, for the NJ Board of Public Utilities, evaluating the company's rate unbundling filing.
- For the Pennsylvania OSBA, evaluation of all aspects of the electric industry restructuring filings of Pennsylvania Power & Light and West Penn Power, focusing on impacts to customers in general and small businesses in particular.
- Analysis and expert testimony regarding system expansion and related customer contribution requirements of Centra Gas Manitoba, for a large industrial customer.
- For the Industrial Gas Users Association, analysis and expert testimony of the cost unbundling methods of Gaz Metropolitain.
- Analysis and expert testimony of cost allocation and rate design practices of the three major Ontario natural gas distribution utilities over several years, on behalf of the Ontario Energy Board staff and the Canadian Independent Gas Marketing Association.
- Cost allocation and rate design study and expert testimony for a small Ontario gas distribution utility.
- Analysis and litigation support regarding accounting, financial and capacity planning procedures of New Brunswick Power Corporation, and presentation of expert testimony on cost allocation and rate design, in a series of generic regulatory hearings, on behalf of a group of large industrial customers.
- Analysis of the cost allocation and rate design procedures of Consumers' Gas, Ltd., for the Canadian Independent Gas Marketing Association.
- Analysis of the cost allocation and rate design procedures of the three major Ontario natural gas utilities, for the staff of the Ontario Energy Board.
- Economic analysis and modeling of U.S. Postal Service proposals for allocation of peak load labor and equipment costs in 1987 and 1990, for the American Newspaper Publishers Association.
- Evaluation of the cost allocation and cost recovery procedures of a domestic telecommunications firm providing aircraft to ground data communications.
- Assessment of alternative methodologies for defining the electric rate classes of Maritime Electric Corporation, for the Prince Edward Island Ministry of Energy and Forestry.

Regulatory Economics (continued)

- Evaluation of the cost allocation and rate design procedures of the Nova Scotia Power Corporation, for a group of interruptible electricity consumers, and in a later proceeding, for a large industrial customer.
- Assessment of a proposed class-specific, risk-adjusted rate of return methodology for natural gas distribution utilities, for the staff of the Ontario Energy Board.
- Preparation of rebuttal analysis regarding management prudence in the construction of the River Bend Nuclear Generating Station, for Gulf States Utilities.

Economic Consulting

Mr. Knecht's practice includes the application of economics, finance and decision analysis theory to practical problems facing businesses, law firms and government. His assignments include industry and company planning, market forecasting, policy analysis and economic damage assessment. Representative assignments are listed below.

- For the US Department of Justice Civil Division, analysis of economic damages and participation in settlement negotiations associated with alleged breach of contract involving long-term timber supply contracts between the U.S. government and a large forest products company in Southeast Alaska.
- For the Electric Power Research Institute, analysis and adaptation of models that compute the economic costs of environmental externalities associated with electric generating stations.
- Economic, market and cost analysis for a team of international consultants preparing a restructuring study of the Polish steel industry, in conjunction with the World Bank.
- Economic and policy analysis for a U.S. engineering firm preparing a strategic planning study for the state-owned steel company in Venezuela.
- For the U.S. Environmental Protection Agency, evaluation of the impact of Clean Air Act amendments on major industrial facilities that are closing or are threatened with closure.
- Econometric analysis of world steel consumption patterns for a major international iron ore producer.
- Litigation support services relating to the business planning activities of a major West Coast construction and fabrication concern, in a fraudulent conveyance lawsuit.
- Review and analysis of direct and rebuttal evidence regarding economic damages to recreational activities, for the U.S. Department of Justice.
- Decision analysis and calculation of economic damages in an ERISA discrimination lawsuit, for a major domestic manufacturing company.
- Financial, econometric and strategic planning analyses for an international engineering firm, engaged in the preparation of a strategic plan for the steel industry of Nigeria.

Economic Consulting (continued)

- Economic analysis and econometric modeling of import behavior in the domestic carbon steel and wire rope markets, for hearings before the U.S. International Trade Commission.
- Financial analysis and damage assessment for a major domestic law firm, in support of a major anti-trust suit involving the potential construction of a coal slurry pipeline.
- Economic analysis of imports of iron ore pellets into the U.S., for a major international iron ore producer.
- Construction of an economic model of domestic metallurgical coke demand, for the U.S. Environmental Protection Agency.
- Econometric analysis of energy demand, by energy type, region and sector, and management of a sectoral supply-demand model of energy production and use.

Management Consulting

Mr. Knecht has also provided management consulting services to various basic industrial clients, focusing primarily on planning and decision-making. Representative assignments are listed below.

- Competitive dynamics analysis of the world iron ore industry and preparation of strategic recommendations for a major South American mining company.
- Task leader in a management audit of a New Jersey natural gas local distribution company.
- Development of a strategic plan and various business plans for a domestic specialized producer of carbon and alloy steel bars.
- Economic analysis and financial modeling of labor and employee benefits costs for a large integrated steel producer. Preparation of recommendations for labor relations and bargaining strategies.
- Analysis for the restructuring of the marketing function of a large domestic manufacturing company, including market segmentation analysis, field interviews and competitor comparisons.
- Market survey and analysis of the domestic hot finished seamless steel tube markets, for a U.S. producer.
- Strategic and business plan development for a major Polish steel producer.

ROBERT D. KNECHT

SCHEDULE OF APPEARANCES BEFORE REGULATORY AUTHORITIES

Docket #	Regulator	Utility	Date of Testimony	Client	Topic of Testimony
R-038168	Pennsylvania Public Utility Commission	National Fuel Gas	July 2003	Pennsylvania Office of Small Business Advocate	Cost allocation, deficiency assignment, rate design
R-3492-2002 Phase 1	Régie de l'Énergie, Québec	Hydro Québec Distribution	January 2003	AQCIE, AIFQ	Cost allocation; maintenance of historical cross-subsidization
M-021612	Pennsylvania Public Utility Commission	Philadelphia Gas Works	September 2002	Pennsylvania Office of Small Business Advocate	Natural gas restructuring, cost allocation, rate unbundling
R-027385	Pennsylvania Public Utility Commission	PG Energy (Southern Union)	July 2002	Pennsylvania Office of Small Business Advocate	Purchased gas cost incentive mechanisms.
1250932	Alberta Energy and Utilities Board	Aquila Networks Canada (Alberta) Ltd.	July 2002	Senior Petroleum Producers Association	Distribution plant and cost allocation, rate design.
R-027204	Pennsylvania Public Utility Commission	Columbia Gas of Pennsylvania	May 2002	Pennsylvania Office of Small Business Advocate	Purchased gas cost incentive mechanisms, rate design
R-3477-2001	Régie de l'Énergie, Québec	Hydro Québec Distribution	May 2002	AQCIE, AIFQ	Classification/allocation of generation costs, subject to constant unit cost constraint.
1248859	Alberta Energy and Utilities Board	ESBI Alberta Limited	March 2002	IPPSA	Transmission congestion management principles
R-016378	Pennsylvania Public Utility Commission	Philadelphia Gas Works	August 2001	Pennsylvania Office of Small Business Advocate	Cost of gas; commodity price forecasting
R-016179	Pennsylvania Public Utility Commission	Columbia Gas of Pennsylvania	May 2001	Pennsylvania Office of Small Business Advocate	Recovery of CAP costs; PGC treatment of pipeline credits

ROBERT D. KNECHT

SCHEDULE OF APPEARANCES BEFORE REGULATORY AUTHORITIES

Docket #	Regulator	Utility	Date of Testimony	Client	Topic of Testimony
R-005277	Pennsylvania Public Utility Commission	PFG Gas Inc. and North Penn Gas Company	November 2000	Pennsylvania Cffice of Smal Business Advocate	Cost allocation, rate design.
R-3443-2000	Régie de l'Énergie, Québec	Société en commandite Gaz Métropolitain	November 2000	Industrial Gas Users Association (ACIG)	Tariff unbundling
990005	Alberta Energy and Utilities Board	ESBI Alberta Limited	November 2000	IPPSA	Location-based credits for transmission rates
R-005119	Pennsylvania Public Utility Commission	PG Energy (Southern Union)	July 2000	Pennsylvania Cffice of Smal Business Advocate	Cost allocation, rate design, weather normalization
R-994788	Pennsylvania Public Utility Commission	PFG Gas, Inc. and North Penn Gas Company	February 2000	Pennsylvania Cffice of Smal Business Advocate	Natural gas restructuring, retail access, tariff design
R-994785	Pennsylvania Public Utility Commission	National Fuel Gas Distribution Corp.	December 1999	Pennsylvania Cffice of Smal Business Advocate	Natural gas restructuring, retail access, tariff design
R-994783	Pennsylvania Public Utility Commission	PG Energy, Inc.	November 1999	Pennsylvania Cffice of Smal Business Advocate	Natural gas restructuring, retail access, tariff design
99005	Alberta Energy and Utilities Board	ESBI Alberta Limited (Transmission Administrator)	September 1999	IPPSA	Transmission tariff cost allocation, rate design, industry restructuring
RE95080	Alberta Energy and Utilities Board	Alberta Power Limited	December 1998	Independent Power Producers Society of Alberta and SPPA	Electric industry restructuring, rate unbundling, cost allocation and rate design.
RE95081	Alberta Energy and Utilities Board	TransAlta Utilities Corporation	November 1998	IPPSA and Senior Petroleum Producers Assn.	Industry restructuring, cost allocation, rate design.

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SCHEDULE OF APPEARANCES BEFORE REGULATORY AUTHORITIES

Docket #	Regulator	Utility	Date of Testimony	Client	Topic of Testimony
Expansion Feasibility Test	Public Utilities Board of Manitoba	Centra Gas Manitoba	August 1998	Simplot Canada Limited	Expansion feasibility and customer contribution methodology
R-984280	Pennsylvania Public Utility Commission	PG Energy, Inc.	August 1998	Pennsylvania Office of Small Business Advocate	Cost allocation, revenue deficiency assignment, rate design
EO97070455	New Jersey Board of Public Utilities	Atlantic City Electric Company	February 1998	New Jersey Board of Public Utilities	Industry restructuring, audit of unbundled rates
R-973981	Pennsylvania Public Utility Commission	Allegheny Power (West Penn Power)	January 1998	Pennsylvania Office of Small Business Advocate	Industry restructuring, cost unbunding, cost allocation, and rate design.
R-973954	Pennsylvania Public Utility Commission	Pennsylvania Power & Light	August 1997	Pennsylvania Office of Small Business Advocate	Restructuring, stranded costs, market price forecasting, cost allocation, and rate design.
1996 Electric Utility Tariff Applications	Alberta Energy & Utilities Board	TransAlta Utilities Alberta Power Edmonton Power Grid Company of Alberta	October 1996	Independent Power Producers Society of Alberta (IPPSA)	Industry restructuring; transmission cost allocation and rate design.
R-963612	Pennsylvania Public Utility Commission	PG Energy, Inc.	October 1996	Pennsylvania Office of Small Business Advocate	Cost allocation and rate design -- direct and rebuttal.
R-953444	Pennsylvania Public Utility Commission	Trigen-Philadelphia Energy Corp.	November 1995	Pennsylvania Office of Small Business Advocate	Steam energy cost rate -- direct and rebuttal.
R-953406	Pennsylvania Public Utility Commission	T.W. Phillips Gas & Oil Company	October 1995	Pennsylvania Office of Small Business Advocate	Weather normalization, cost allocation and rate design.

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SCHEDULE OF APPEARANCES BEFORE REGULATORY AUTHORITIES

Docket #	Regulator	Utility	Date of Testimony	Client	Topic of Testimony
R-953297	Pennsylvania Public Utility Commission	UGI Utilities, Inc. (Gas Division)	May 1995	Pennsylvania Office of Small Business Advocate	Cost allocation and rate design -- direct and surrebuttal.
R-943271	Pennsylvania Public Utility Commission	Pennsylvania Power & Light	April/May 1995	Pennsylvania Office of Small Business Advocate	Cost allocation and rate design -- direct and rebuttal
EBRO 488	Ontario Energy Board	Natural Resource Gas Limited	November 1994	Natural Resource Gas Limited	Customer classification, cost allocation and rate design.
RE92071	Alberta Public Utilities Board	Alberta Power Limited	November 1994	Independent Power Producers Society of Alberta	Cost allocation and rate design for export transmission service.
R-942986	Pennsylvania Public Utility Commission	West Penn Power Company	August 1994	Pennsylvania Office of Small Business Advocate	Cost allocation and rate design.
R-932862	Pennsylvania Public Utility Commission	UGI Utilities, Inc. (Electric Division)	March 1994	Pennsylvania Office of Small Business Advocate	Cost allocation and rate design -- direct, rebuttal and surrebuttal.
EBRO 485, and Generic Direct Purchase Hearings	Ontario Energy Board	Consumers' Gas Company, Ltd.	August 1993, September 1993.	Canadian Independent Gas Marketing Association	Classification and allocation of marketing and administrative costs.
Hearings for Cost of Service and Rate Design	Nova Scotia Utility and Review Board	Nova Scotia Power, Inc.	May 1993	Bowater Mersey Paper Company, Ltd.	Classification of bulk power costs, rate design for interruptible service and other rate design issues.
Generic Hearing #4	Board of Commissioners of Public Utilities, Province of New Brunswick	New Brunswick Power Corporation	November 1991	Large Power Users Group	Review of cost allocation and rate design.

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SCHEDULE OF APPEARANCES BEFORE REGULATORY AUTHORITIES

Docket #	Regulator	Utility	Date of Testimony	Client	Topic of Testimony
EBRO-470	Ontario Energy Board	Union Gas, Ltd.	February 1991	Ontario Energy Board Staff	Cost allocation and rate design; evaluation of load shifting study.
Rate Area Boundaries Hearings	Prince Edward Island Public Utilities Commission	Maritime Electric Co., Ltd.	February 1991	Prince Edward Island Department of Energy and Forestry	Customer classification by geographical area.
EBRO-467	Ontario Energy Board	Centra Gas, Ltd.	January 1991	Ontario Energy Board Staff	Cost allocation and rate design for technology, cogen and bypass.
Arbitration Hearings	Arbitrator	ARINC, Inc.	July 1990	ARINC Inc.	Cost allocation and rate design for aircraft to ground data communications service.
EBRO-462	Ontario Energy Board	Union Gas, Ltd.	January 1990	Ontario Energy Board Staff	Seasonal cost allocation study, and allocation of costs to export markets.
NSPC-857	Nova Scotia Board of Commissioners of Public Utilities	Nova Scotia Power Corp.	February 1989	Interruptible industrial customers	Cost allocation and rate design of interruptible electric service.

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