Concerning:

# DEMANDE D'APPROBATION DU PLAN D'APPROVISIONNEMENT 2002-2011 DU DISTRIBUTEUR R-3470-2001 [Second Phase]

Submitted by

Dr. Zak El-Ramly
President of
ZE PowerGroup Inc.

Ken Epp
Managing associate, ZE PowerGroup Inc.
And President
CBT Energy

On behalf of
**AQCIE and AIFQ**

19 March 2002

**Q1** **Please state your name and occupation.**

A1 Zak El-Ramly. I am the President of ZE PowerGroup Inc., a British Columbia based energy consulting firm.

Ken Epp. I am a Managing Associate of ZE PowerGroup Inc. and President and CEO of CBT Energy a British Columbia based power company.

**Q2** **Please detail your qualifications as they pertain to this application.**

**A2** **<u>Zak El-Ramly</u>**

Over the past seven years as the President of ZE PowerGroup, I have guided activities related to competitive electricity market development, regulatory hearings and strategic operational support.

Previously, I was the Executive Vice President of Marketing for Powerex, the export arm of BC Hydro and I also acted as its Vice President of Development. Before joining Powerex, I worked in BC Hydro in several managerial positions including the management of Business Development, Policy Development, Rates, Forecasting, Load Research, Residential and Commercial Energy Management. A more detailed copy of my resume is attached as Appendix 1.

**Ken Epp, P. Eng.**

I am Executive Director of ZE PowerGroup and the CEO of CBT Energy (a public energy company based in BC). I have thirty-five years experience in the energy industry. I have been involved in all aspects of the industry including generation, transmission, distribution, production, system operation, and resource management. I have also held such key positions as President and CEO of Powerex and Vice President of Production, Vice President Resource Management, and

Manager of System Operation at BC Hydro. I was integral in the creation of BC Hydro's power-marketing subsidiary, Powerex, along with its transfer pricing methodology. I have been an expert witness testifying in front of regulatory bodies such as BCUC and the National Energy Board (NEB). I have also held many prestigious positions in support of the industry, such as President of NWPPA, a representative on the Western Systems Coordinating Council Board of Trustees and the Regional Planning Policy Committee and the Canadian representative on the NERC Board of Trustees. A more detailed copy of my resume is attached as Appendix 2.

While working together at BC Hydro and Powerex we negotiated several major contracts, such as the interconnection agreement between TransAlta and BC Hydro, the interconnection agreement between BC Hydro and BPA, long-term sales to West Kootenay Power etc. Our initial mandate at Powerex was to help develop an Independent Power Producer community that could flourish and export power. Together we developed the concept of the Power Exchange Operation to facilitate the development of a new effective and efficient market in British Columbia and the Western Systems Coordinating Council in general.

**Q3 Have you testified in front of the Régie of Energy before?**

A3 Zak

A3 Yes. I have testified in front of the Régie of Energy before on the Supply Rates hearing in 1998 (R-3398-98) and the Transmission Principles hearing in 1999 (R-3405-98), and more recently the transmission tariff hearing (R-3401-98).

A3 Ken

A3 No.

**Q4 Who do you represent?**

A4 We represent the AQCIE and AIFQ

**Q5 What is your overall assessment of the application?**

A5 The Hydro-Québec Distribution application is presented in a sufficiently clear format, and it contains enough information to allow independent review of its core features, and Hydro-Québec Distribution's approach to resource procurement.

Hydro-Québec Distribution is moving into a new business paradigm. As a result information about the new environment is imperfect, incomplete and uncertain. Hydro-Québec Distribution acknowledges the challenge in its application. In such an environment irreversible long-term commitments must be limited to avoid making imprudent or sub-optimal decisions. We believe that level and quality of resources, for which Hydro-Québec Distribution is seeking Call For Tenders approval, is extensive given its current experience in the new market place. Many factors solicit a more conservative approach. These factors include:

- Absence of a proper avoided cost estimates
- The degree of market liquidity is unknown
- The role that Hydro-Québec Production will play in the market is undefined
- The economy is still adjusting to the post September 11 conditions; and most importantly
- Hydro-Québec Distribution has no experience operating in an environment dominated by the Heritage Pool Electricity (HPE), as the concept has only recently been defined.

Our examination of the Application, additional information available to us, and the responses to the information requests, lead us to believe that the flexibility inherent in the current resources available to Hydro-Québec Distribution, namely the Heritage Pool Electricity, is understated. Hence we believe that the full value of the Heritage Pool Electricity may end up being under utilized if Hydro-Québec Distribution proceeds to procure additional supply as presented in the application and additional amendments.

We also believe the Hydro-Québec Distribution may be overly conservative in its preparation for meeting high demand scenarios, and responding to other demand uncertainties; hence additional costs might be imposed on rate payers if the application is approved in its current form. The additional cost of mitigating future supply risk should be carefully measured against the cost of responding to the higher demand later (when the higher demand becomes more likely and starts to materialize). The potential cost to consumers, if the higher demand does not materialize, (low demand scenario) and resources have already been acquired, should be recognized.

Given the nature of the Quebec load, the demand side of the business, and the characteristics of Heritage Pool Electricity (namely the implied options associated with its dispatch) well-designed interruptible programs would allow Hydro-Québec Distribution to minimize the cost of power procurement. We are surprised by the absence of the use of this option in the procurement plan, the limited analysis of this flexible option, and the apparent reluctance of Hydro-Québec Distribution to commit to exploiting the benefits of this option.

The Québec transmission system is well interconnected to several jurisdictions, which are moving toward liberalization of their markets, and are experiencing high levels of new resource development. We

believe that the Hydro-Québec Distribution procurement strategy undervalues the access to such markets.

Overall we believe that the plan as presented by the Distributor could result in over-procurement of resources, particularly dispatchable resources, and/or the acquiring of a higher-cost resource mix than would be the case if a staggered approach were used.

Most of our independent observations are generally in agreement with the issues identified by the Régie in the decision of January 21, 2002 (D2002-17, section 3.3 third paragraph – in translation), when the Regie said:

> *The Régie intends to examine this question over the course of the next phase, in order to consider more in depth the limitations of the capacities of interconnections, the possibilities of storage contracts, the recourse to contracts of interruptible power, the possibilities that the short-term contracts offer and the short-term capacities available to Quebec*.

**Q6 How do you appraise the challenges facing Hydro-Québec Distribution in the New Paradigm**

A6 Hydro-Québec and the province of Quebec are confronting the need for a new business paradigm in the electric utility industry. Hydro-Québec recognizes that "*The introduction of the notion of heritage pool electricity and the competition in the domain of electricity supply to satisfy the needs of the Distributor brings, as a consequence, a change in the paradigms of the planification of the electricity supply. Certain dimensions of the electricity needs take a new acuteness, from the simple fact that the Distributor does not have any means of storage, which traditionally allowed the management of hourly variations of the demand curve, the variations caused by risks related to weather and*

*the variations of the short term demand."* (Référénce: HQD –1, document 2, page 13 of 14, Lines1-11; in translation)

A6 Because this new paradigm has not been in existence for long, a strong independent power production and a liquid market have not emerged yet in Quebec

**Q7 How will this environment affect Hydro-Québec Distribution and its ratepayers?**

A7 We do not believe that it will have an immediate effect on the ratepayers of Québec, as they are blessed with a heritage pool that preserves their low cost entitlement to hydroelectric power. The Heritage Pool Electricity is made available to Hydro-Québec Distribution with a high level of capacity and flexibility reflective of the hydroelectric-based system. Moreover the Heritage Pool Electricity is sufficient to meet the needs of Hydro-Québec Distribution for a few years into the future. The Distributor, as a result, has some leeway to adapt to the new environment before the heritage pool is fully utilized. The Challenge for the Distributor is to use the time productively to prepare and learn, and make minimal commitment during the adjustment process.

In resource planning, and in business in general, one has to move forward with imperfect information and make crucial decisions with that information. One must however guard against making all of one's decisions too early and simultaneously, and precluding future options or one's ability to adjust. Rather one should make the minimum commitment necessary. Managing these uncertainties is the main challenge facing Hydro-Québec Distribution.

**Q8 What is Hydro-Québec Distribution's responsibility in the New Business Environment?**

A8 The Heritage Pool has two significant and relevant effects in this context.

- It preserves the entitlement to low-cost power and provides a certain level of hedging against future market costs.
- It places the incremental consumption of the consumers (as represented by the Distributor in the absence of retail access) on the market. Hence the consumers are exposed, at the margin, to market prices. The distributor manages such exposure.

Within this context the Distributor has a responsibility to encourage an efficient market, as only through efficiency will the consumers achieve the lowest marginal cost. An efficient market is broadly characterized by the following features

- An absence of market power
- A liquid power market characterized by many producers, each one unable to move the market on their own
- Efficient price signaling in that the cost of incremental power should reflect the incremental cost of resource acquisition, and this price signal should reach the consumer
- Demand elasticity meaning that price excursions should result in changes in the demand pattern due to price signals reaching the incremental users.

**Q9 Why do you conclude that value of the Heritage Pool Electricity is understated?**

A9 One of our concerns was trying to determine the extent to which Hydro-Québec Distribution had access to that storage system. From

our reading of the answers to the Information Requests (Référénce: HQD –1, document 2, page 13 of 14, Lines 7-10) it appears that the Distributor does not have direct access to storage and believes it does not have the benefits of a storage based system. In the application Hydro Québec Distribution states that *"the Distributor does not have any means of storage, which traditionally allowed the management of hourly variations of the demand curve, the variations caused by risks related to weather and the variations of the short term demand ."* (Référénce: HQD –1, document 2, page 13 of 14, Lines8-11; in translation)

On the other hand, reference to Information Requests aimed at explaining how the Heritage Pool Electricity will be dispatched makes it clear that the level of flexibility offered makes access to storage unnecessary. The Heritage Pool Electricity dispatch process offers all the flexibility that one would have used access to storage to achieve. The Distributor starts the year with virtually all its entitlement to the Heritage Pool Electricity already in storage and withdraws energy at its prerogative, subject only to certain capacity limitations (Référénce: HQD-6, Document 7, Page 21-24, Question 9.1 - 9.4). The flexibility embodied in the heritage pool and the manner in which disbursements are accounted for in the heritage pool result in Hydro-Québec Distribution having flexibility which is equivalent to storage.

**Q10 Please explain your assertion that Hydro-Québec Distribution has flexibility functionally equivalent to storage?**

A10 One of the determining features of a hydroelectric system is the flexibility embodied in the resource. This flexibility is a function of storage allied to the ability to ramp capacity up and down, and this is the true advantage of a hydroelectric system.

Although Hydro-Québec Distribution has to schedule day-ahead, TransÉnergie has the right to change that schedule, within the parameters communicated by the Distributor, to ensure system stability. The result is that withdrawal from the pool is determined by the actual energy used, rather than by the energy scheduled (Référénce: HQD-6, Document 7, Page 21-24, Question 9.1- 9.4 & Référénce: HQD 6, Document 3, Page 5-6, Question 2).

The accounting for withdrawals from the pool is thus retrospective. Hydro-Québec Distribution is only charged for the actual energy dispatched on its behalf by TransÉnergie. Energy imported at any time by Hydro-Québec Distribution or curtailment of load by any of the users (interruption) will result in less take from the Heritage Pool Electricity. This measure of flexibility, which is afforded the Distributor, is tantamount to storage, and in fact is superior to storage. The Distributor does not have to store the purchased energy from the market and arrange for that storage. Instead an equivalent amount of its Heritage Pool Electricity is stored automatically.

The duration curve specified is essentially 8760 options from Hydro-Québec Production to Hydro-Québec Distribution. Put another way, the Heritage Pool Electricity is literally stored with Hydro-Québec, subject to the maximum capacities specified by the duration curve.

This also has implications for the type of power that the Distributor should be looking to purchase. As Hydro-Québec Distribution has access to the flexibility inherent in the hydroelectric assets there should be a strong bias towards baseload power. Baseload power is cheaper and it would be easier for the IPPs to build baseload than to build dispatchable.

**Q11 What are the implications of this virtual storage?**

A11 Should the Distributor purchase energy from the energy market it is de facto storing power, because it allows an equivalent quantity to stay in the Heritage Pool Electricity. This purchase is of particular importance if it occurs near peak consumption, which we will refer to as High Capacity Allocation Hours [HCAHs]. By saving HCAHs through purchases (or by invoking interruptible contracts) the Distributor can effectively store valuable energy (more specifically - the associated capacity) within its allocation without incurring the associated storage cost.

This virtual access to storage allows for extreme flexibility and opportunistic purchases of energy whenever the price is low. The purchased energy does not need to be stored, merely consumed, thus saving an HCAH for a later period in the year. Similarly, an interruption or curtailment of an existing load, will have the same effect on shaving. The only real effect is that, for that particular hour, the pool is just called on less. One is essentially shifting the Heritage Pool Electricity sideways to match the needs of the load duration curve. This is completely within the rights of Hydro-Québec Distribution as defined by the decree.

**Q12 Is it difficult to predict and manage these HCAHs?**

A12 No. The nature of the load in Québec is such that the HCAHs are likely to fall during the winter peak, that is either at the beginning of the year or at year end. The need for load curtailment will be predictable from the perspective of Hydro-Québec Distribution and the interrupted customer.

As the Heritage Pool Electricity is awarded on a calendar basis, the management of the winter peak is effectively split into two different planning or Heritage Pool Electricity cycles. Part of the winter peak will occur near the end of one cycle (November/December), while the

remaining part of the winter (January/February) will occur at the beginning of the awarding of a new cycle of Heritage Pool Electricity when all the HCAHs are renewed and become available. This characteristic of the Heritage Pool Electricity allows for hedging and better manageability:

- If a particular January is very cold and HCAHs are used up then the Distributor has the entire year to arrange for extended interruptible programs, spot purchases or term (few month) contracts to replenish the entitlement.

- Conversely, if a winter is particularly warm the HCAHs are kept and used in the following winter. Since Hydro-Québec Distribution is aware of this fact, it allows for more optimized management of resources.

**Q13 What implications does this have for the management of the Heritage Pool Electricity and this application?**

A13 This analysis has implications for the characterization of the Heritage Pool Electricity. The Distributor has previously characterized its constraints (and hence its current procurement strategy) as not having access to storage or capacity to balance load. In actuality, the Distributor has, through its Heritage Pool Electricity, 11 420 MW of baseload capacity and 22 922 MW of dispatchable capacity. The size of the dispatchable capacity is merely the difference between the smallest capacity hour (Hour 8760 – 11 420 MW) and the largest capacity hour (Hour 1 – 34 342 MW) (Reférénce: Décret 1277-2001 October 24, 2001, http://www.regie-energie.qc.ca ). The difference is considered dispatchable since it is an option exercisable on an hourly basis, at the Distributor's request, at the beginning of every hour, (Reférénce: HQD 6, Document 3, Page 8-10, Question 4) to the extent

an equivalent capacity hour is still available. Most dispatchable resources cannot offer that level of optionality.

Consequently the Heritage Pool Electricity embodies sufficient flexibility that we believe that no additional dispatchable resources are required, within the immediate planning horizon to meet capacity requirements if an effective interruptible program is launched as discussed. Hydro-Québec Distribution needs energy rather then capacity. In particular, it needs baseload power.

Baseload resources are invariably more efficient (and less polluting) than dispatchable resources; hence cheaper to operate. Thus it always makes sense to contract for baseload power in preference to dispatchable power whenever possible. Furthermore, purchase of blocks of power, for example during the winter period only, could further reduce the need for dispatchable resources.

Hence our belief that the flexibility inherent in the Heritage Pool Electricity is under- appreciated, and further, that the potential for interruptibles amongst the Distributor's industrial load is under utilized. We further assert that it would be in the interests of Hydro-Québec Distribution and its industrial customers to explore these avenues.

**Q14 What constraints are there on the purchase of baseload power?**

A14 The only issue, which is vitally important, is whether or not the pool might run out of capacity to withdraw the available energy in the Heritage Pool Electricity. This highlights the need to manage (shave) peak demand, if the Distributor runs out of HCAHs. To the extent shaving the peaks is possible, the nature of the Call For Tenders can be redesigned to favor baseload power more, with little if any dispatchable power.

From a sheer system efficiency perspective; the lower the level of utilization of peak capacity the greater the need to shave that peak, and the greater the benefits that accrue from shaving that peak, and associated cost of meeting it. In addition, if one fails to shave the peak then one builds capacity (or contracts for capacity) to run for only a few hours a year, or perhaps not at all

**Q15 How important is this to the Distributor?**

A15 Figure 1 below shows the expected load duration curve for Hydro-Québec Distribution for the years 2005, 2007, and 2011. (Reférénce: HQD-2, Document 1, Page 23 of 28, Title: GRAPHIQUE 2.1: Évolution des courbes de puissances classes Exemples de 2005, 2007 et 2011). It is clear that the Heritage Pool Electricity resembles the load duration curve for Hydro-Québec Distribution as is shown in Figure 2 thereafter, and it appears that the Heritage Pool Electricity meets the needs even near the peak in 2007. (Source: Hydro-Québec Distribution presentation).

Figure 1

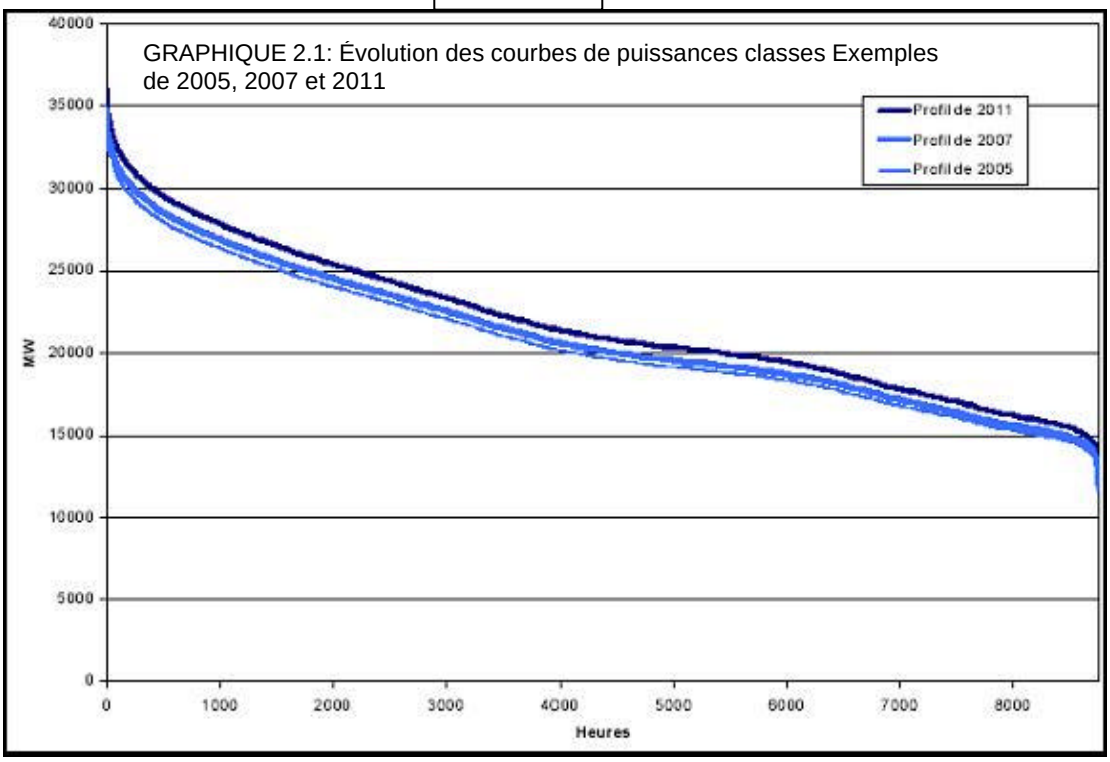
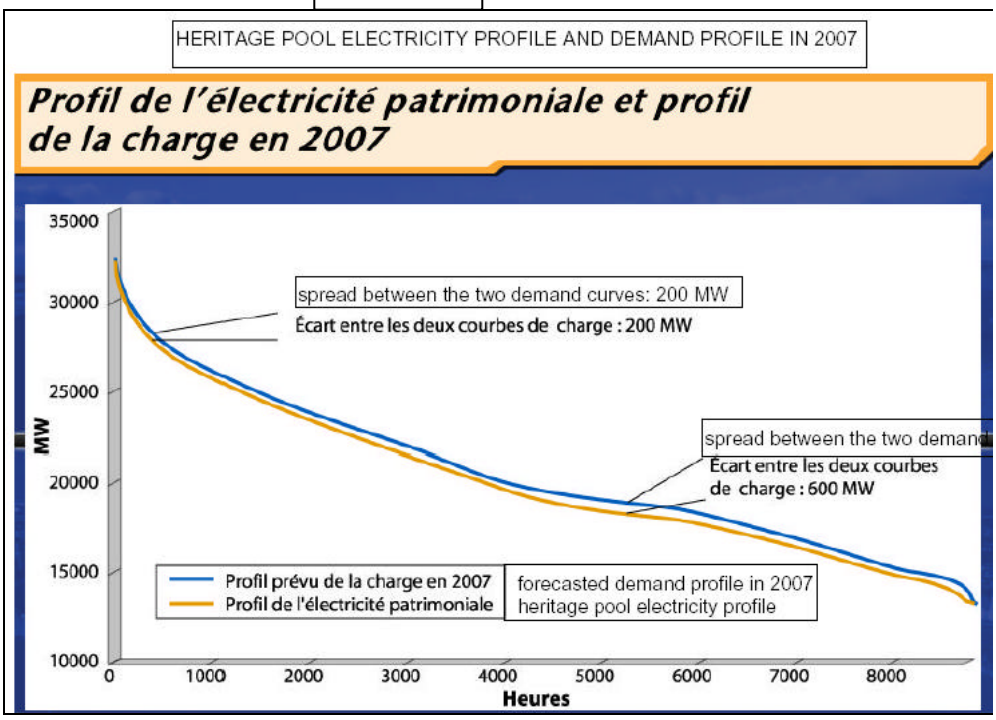


Figure 2




A15 If one just examines the top 500 hours of capacity utilization one emerges with Figure 3 below. It is safe to assume that the Hydro-Québec Distribution load duration curve for its future load will resemble the shape of the Heritage Pool Electricity, at least near the peak values.

Figure 3

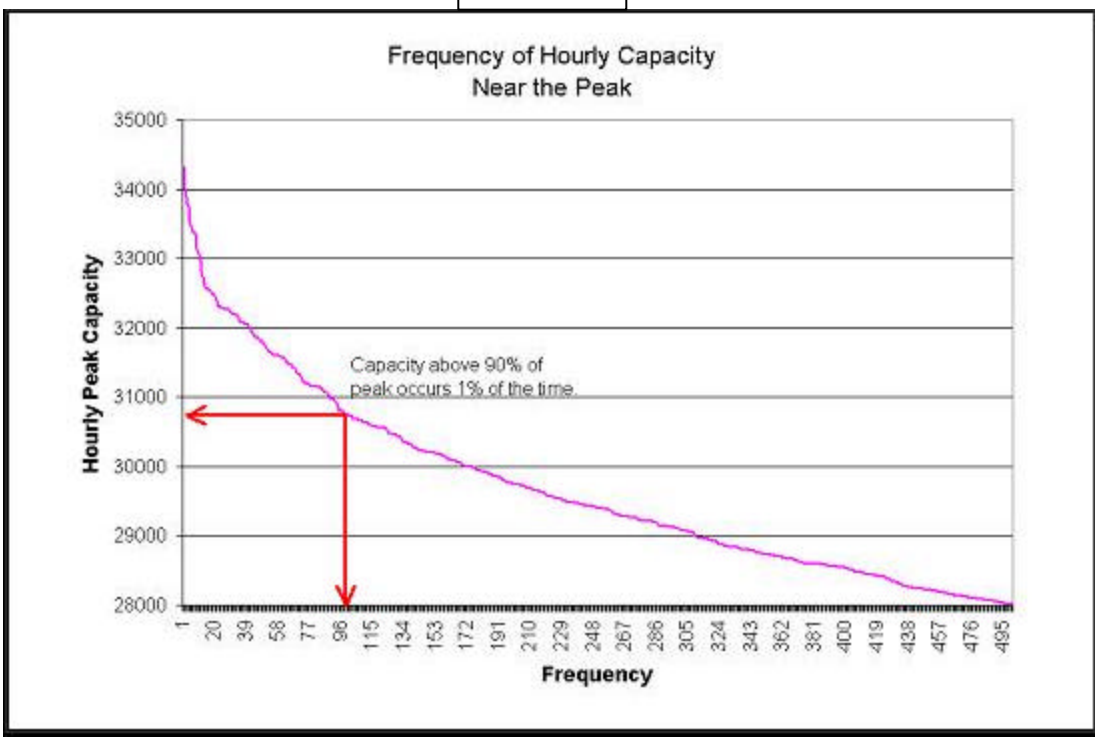
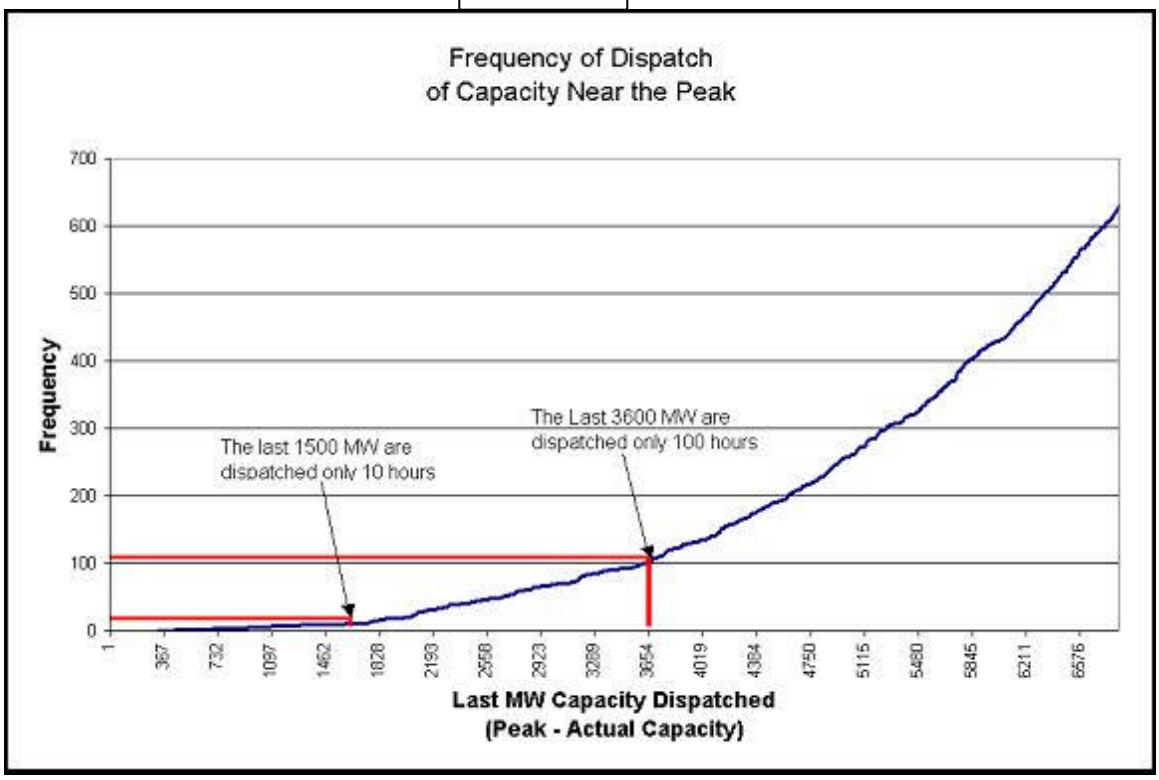



Figure 3 indicates that capacity utilization above 90% of the peak occurs only 1% of the time. The peak capacity of the duration curve is basically very “peaky”. This point is demonstrated by Figure 4 below, which displays the frequency of dispatch of the top capacity near the peak.

Figure 4




As Figure 4 indicates, the last 1500 MW of capacity are dispatched for only 10 hours of the year, and the last 3600 MW of capacity are dispatched for only 100 hours. Thus, if Hydro-Québec Distribution could sign up 1500MW of interruptible customers, it would have to interrupt them for only ten hours of the year to save that 1500MW of capacity.

Extending this analogy produces Table 1 below.

| Table 1 | | |
|---|---|---|
| Interrupting for | Saves | Percentage of time required |
| 3 hours | 500 MW of capacity | 0.015 |
| 6 hours | 1000 MW of capacity | 0.070 |
| 21 hours | 2000 MW of capacity | 0.240 |
| 67 hours | 3000 MW of capacity | 0.770 |
| 130 hours | 4000 MW of capacity | 1.500 |
| 247 hours | 5000 MW of capacity | 2.850 |
| 417 hours | 6000 MW of capacity | 4.800 |
| 648 hours | 7000 MW of capacity | 7.500 |

An interruption of less than 100 hours could generate more than 3600 MW of dispatchable capacity saving. It is interesting to note that under the medium forecast scenario Hydro-Québec Distribution is expecting an increase in capacity of 3600 MW by the year 2010 beyond the Heritage Pool Electricity capacity (Référénce:HQD-2, Document , Annexe 1, Page 4 of 4, Tableau B.2 Scénarios d'encadrement de prévision de la demande Besoins en puissance en MW)

This means that from a capacity perspective it would be economically inefficient to induce new facilities to be built to meet these very sparse capacity needs, to the extent interruptible capacity can be procured from industrial, or even large commercial customers.

Hence the nature of the flexibility inherent in the Heritage Pool Electricity (and the Hydro Québec system dominated by hydroelectric generation) suggests that Hydro-Québec Distribution should mostly be concerned with the procurement of energy either from lower cost base units or opportunistically from the market place, by capitalizing on dips in prices and off-peak energy.

**Q16 Please provide an example to demonstrate how interruptible programs could be used in conjunction with the Heritage Pool Electricity?**

A16 To demonstrate the above points the following example is provided.

At the beginning of the year in January, Hydro-Québec Distribution has access to the full spectrum of options available from the Heritage Pool Electricity. Hydro-Québec Distribution can thus choose to dispatch in the range of 11420 MW to 34 342 MW as per the Heritage Pool Electricity duration curve.

Hydro-Québec Distribution could opt to hedge against future high demand by calling on low cost interruptible voluntary programs in order to reduce its draw on the Heritage Pool Electricity. Similarly if the external market is at a reasonable price Hydro-Québec Distribution may again opt to preserve the HCAHs for future use by importing from the market.

Since Hydro-Québec Distribution still has access to most of Heritage Pool Electricity there is little risk if the industrial customers do not respond to the call for interruption or if import capabilities are not available for certain hours. This is particularly true since TransÉnergie will adjust the schedule and since the take from the Heritage Pool Electricity is calculated based on actual take and not on the day before pre-schedule.

Later in the same year, around December, Hydro-Québec Distribution will have clear idea of the remaining options within the Heritage Pool Electricity. If the Heritage Pool Electricity doesn't have many HCAHs to meet the demand of the Hydro-Québec Distribution, after factoring in all other available resources, Hydro-Québec Distribution may then call on the mandatory higher cost interruptible programs to meet forecasted demand.

Note, that since it is near the end of the year, most of the uncertainties have been removed or reduced. Note also that if the interruptible program invoked is not voluntary it will be the customer who will be incurring the cost of failing to interrupt. This is symmetrical to a dispatchable unit being unavailable or unwilling to dispatch.

If Hydro-Québec Distribution had access to a group of well-designed interruptible programs and fluency and experience in accessing external markets for opportunistic spot purchases, Hydro-Québec Distribution would be able to assess and adjust its risk exposure frequently during the year, thereby reducing its risks and managing its costs.

**Q17 Do you see any obstacles to the adoption of interruptible programs in Québec?**

A17 We do not see any real obstacles to the adoption of interruptible programs. Interruptibility programs have been used in Québec before, and we are informed that they were well received by the industrial customers. Apparently some were even oversubscribed, and it is our understanding that Hydro-Québec had to ration (pro rate) the subscription. There seems to be a reluctance on the part of Hydro-Québec Distribution to embrace these programs and they do not envisage proposing any (Référence: HQD 6, Document 1, Page 44 & 45, Question 23). This may be connected to their current interim estimation of avoided cost, which is clearly not representative of market conditions.

**Q18 What issues do you have with the interim estimate of avoided cost?**

A18 The calculation of avoided cost as outlined by Hydro-Québec Distribution is not reflective of market conditions for many of the reasons we alluded to in our information requests ((Refériénce: HQD 6,

Document 3, Page 14-16, Question 7). It is far too low, and we believe that Hydro-Québec Distribution is aware of this as they recognized that a commonly used benchmark is that of a standard Combined Cycle Gas Turbine (CCGT) which has a delivered cost of 5.5c KWh (Reférénce: HQD-6, Document-1, Page 17 &18, Question 7.1).

At the same time we recognize the difficulties facing Hydro-Québec in estimating the avoided cost, as under the previous regime costs were treated differently and were not separated as clearly. The true test of avoided cost does not lie in the interim estimate made by Hydro-Québec Distribution, but in the proposals offered to the distributor in the coming months, and Hydro-Québec Distribution appears to be aware of the shortcomings of its interim estimate. In addition, demand bids (referred to in the industry as decremental bids), as would be reflected in interruptible programs constitute a measure of avoided cost themselves, and this metric may never be known in the absence of interruptibility programs, or better still, demand bids.

**Q19 How would improperly calculated Avoided Cost affect the Procurement Plan?**

A19 Interruptible supplies of power are functionally equivalent to dispatchable power. Instead of meeting a load with resources one simply sheds that load. As the products are somewhat equivalent they are often benchmarked against one another. In particular, proposals for interruptible power are benchmarked against the avoided cost of building new resources. An unrealistic measure of avoided cost would result in the procurement of less interruptible resources than would otherwise occur, resulting in a loss of system efficiency, the procurement of more dispatchable power than necessary, and ultimately, higher costs for ratepayers. One would hope that, in the light of the responses to the Call For Tenders, Hydro-Québec Distribution would completely reassess and re-evaluate its lack of

interruptible programs. It is actually highly unusual not to have interruptibility programs.

It would be an extreme inefficiency if programs of this nature were not constituted in an environment as conducive as this one, created by the Heritage Pool Electricity.

**Q20 What do you believe is the potential for interruptible capacity in Quebec?**

A20 According to Hydro-Québec Distribution (Référénce: HQD –2, Document 1, Page 10 of 28, Lines 6-17) the large industrial sector comprises 37% of the sales in Québec, with a capacity of 7 080 MW in 2001 rising to 8 350 in 2010. This is a significant portion of total load and from our discussions with our client we believe that there is interruptible capacity up to 2000 MW (1500MW from large industrials, and 500 MW from Alouette – see below), depending on the incentives offered and the type and suitability of the programs.

There are many industries that would be interested in interruptibles. In the pulp and paper industry energy costs account for between 15-30% of total product cost. Many pulp and paper factories are able to time shift energy use by storing the pulp in tanks prior to the paper making stage. The amount of storage at a pulp and paper factory is something that affects the degree of peak shaving that an industrial user can offer. If the programs are likely to run for a lengthy period of time, then it is more likely that pulp and paper producers would invest in additional pulp storage facilities.

The Alouette smelter has indicated (Référénce: HQD-2, Document 6, Annexe 6A, En liasse) that it is willing to receive interruptible capacity (at the right price). Although aluminum smelting does not traditionally lend itself to sudden interruption, it does lend itself more long-term

planned curtailments, which could be used in severe weather years, when more of the High Capacity Hours (HCH) are needed.

**Q21 What types of interruptible programs do you think would be useful?**

A21 There are a number of different reasons to explore the use of interruptible; each of these reasons would require a different program and incentive structure. For example;

- Immediate interruption to meet critical needs: If the Distributor has run out of capacity from the Heritage Pool Electricity and other available resources and is exposed to high costs. Such a program would require a large incentive to prompt uptake from industrial users on demand and possibly on short notice. Such a program would be similar to dispatchable capacity. Subscribers must be willing to absorb any cost associated with their failure to respond to the need for interruption (replacement power); and would likely require the highest incentive.

- Curtailment: Defer use of a HCAH for use later in the year as a form of insurance and hedging. Since the need to interrupt is not imminent or critical the subscribers could be given advance notice and allowed some flexibility in their response. Such a program would require a lesser incentive to prompt uptake from industrial users. It would be similar to purchases from the export market or from dispatchable source during non-critical periods.

- Economic interruption: When Hydro-Québec Distribution has sufficient capacity, but the cost of dispatching the power is sufficiently lucrative to profit share with the industrial users. An example is replacement of power generated from gas

generation sources when gas prices are high and the cost of gas is passed on to the Distributor

- Extended interruption: To meet unseasonably extended cold periods (weather risk) or even faster than expected load growth (until new resources are found). Such a program would be similar to purchasing a block of power on term basis.

**Q22 Are there advantages to interruptible programs over procuring new resources?**

A22 There are many advantages.

- Interruptible programs do not require the extended contractual obligations as new resources; hence providing Hydro-Québec Distribution with flexibility and better risk mitigation.

- Interruptible programs can be brought on line much faster than new resources, providing Hydro-Québec Distribution with better resource procurement manageability and reduced risk exposure

- Interruptible program are peak management programs that enhance the efficient utilization of the system. The programs could result in less need for new generation and ultimately new transmission.

- Interruptible programs would be environmentally friendly.

- Interruptible programs ensures that some of the economic value of power procurement stays with the customers the Hydro-Québec Distribution serves, hence enhancing their competitiveness and welfare.

Naturally interruptible programs should be designed to provide a cost advantage over procurement of new resources. This could be achieved

by designing the programs after a representative avoided cost has been defined.

**Q23 Can you provide Experience in Other Jurisdictions**

A23 Manitoba has several interruptibility-related rate programs, including

- The Industrial Surplus Energy Rate
- The Dual Fuel Heating Rate, and
- The Surplus Energy Service for Self Generators Rate

British Columbia has a rate 1852 for customers taking power at over 60 kV. This rate allows for a modified demand agreement between the utility and the customer (source: http://eww.bchydro.bc.ca/customerservice/rates/pdf/electric_tariff.pdf).

Alberta: The Transmission Administrator of Alberta is responsible for ensuring adequate operating margins and has a number of programs to enhance transmission reliability. Programs include

1. Load Curtailment Program where loads can offer to curtail energy at a price. (Power Pool of Alberta)
2. Demand Opportunity Service tariff (Transmission Authority)
3. Supplemental Operating Reserves provided from loads (Transmission Authority)
4. Load tripping at 59.5 Hz for supplemental frequency regulation. (Transmission Authority)
5. Interruptible Load RAS as supplemental frequency regulation triggered by teleprotection on 3-pole trip of 500kV interconnection. (Transmission Authority).

The Transmission Authority has designed rates for each of these services which are approved by the regulator. [Source: Abstract: Procuring Load Curtailment for Grid Security in Alberta, Institute of Electrical and Electronics Engineers, Power Engineering Society 2001 Winter Meeting, Columbus Ohio, John H Kehler, Electricity Supply Board of Irela nd Alberta Ltd., Canada. http://www.transmission.bpa.gov/orgs/opi/Power_Stability/DirLdContAlberta.pdf]

**Q24 What is the industry experience with using industrial load to manage supply?**

A24 During the capacity shortage in Western Systems Coordinating Council in 2000/2001 curtailed industrial loads are credited for managing the supply shortage that ensued.

The Bonneville Power Administration (BPA), which is basically a hydro based utility managed to buy back 1 158MW from industrial customers (DSI rate class), through an extensive curtailment, and managed, as a result, to severely curb rate increase that would have been required without the voluntary curtailment.

In British Columbia the Cominco plant was idled for an extended period when the Californian prices were skyrocketing, freeing up in excess of 250 MW for export. Cominco owns its own power, and effectively interrupted itself. With the right incentives there should be no shortage of capacity willing to interrupt.

Powerex during a short period in early 1990 offered an industrial customer access to market priced energy. The customer subscribing to the service had to curtail itself during periods of high prices. Being exposed to the right incentive, the customer demonstrated extreme innovation in managing and curtailing its own load to capitalize on market opportunities.

**Q25 Are these examples applicable to Hydro-Québec Distribution?**

A25 The examples are provided only to demonstrate the viability of using the demand side to manage the procurement process.

It should be emphasized again that Hydro-Québec Distribution enjoys unique access to the Heritage Pool Electricity with its unique characteristics. Such uniqueness will require out-of-the-box solutions if the ratepayers are to enjoy the benefits of the Heritage Pool Electricity made available to them.

Hydro-Québec Distribution is in a position of surplus till 2005 within the Heritage Pool Electricity and likely to remain in surplus for an additional period if it procures the resources authorized by the Régie Decisions (D2002-17). Hydro-Québec Distribution should use this period to develop the interruptible programs and experiment with its customers to make the programs effective for all ratepayers by delaying, to the degree possible, the need for additional resources.

The results of the Call For Tenders process will be a useful benchmark for the Distributor, as it will indicate what it has to pay for the capacity (dispatchable energy). The price that it is willing to pay for dispatchable power should be used as a benchmark for offering interruptibile programs in a symmetrical manner to buying dispatchable capacity, with similar penalties for non-production)

Hydro-Québec Distribution is in an enviable position. Most system operators design interruptible programs around the contingency that when system stability is compromised they will be able to invoke the program. Hydro-Québec Distribution faces no such imperative. Hydro-Québec Distribution could design interruptible programs merely to bank or preserve a HCAH from Hydro-Québec Production. The lack of urgency surrounding such a system would allow Hydro-Québec

Distribution to design a system with much choice, which would, most likely, be welcomed by industry.

**Q26 How else might Hydro-Québec Distribution manage its resource cost**

A26 Hydro-Québec Distribution should exploit the export market as fully as possible to pro-actively buy power to save the high capacity allocations from the Heritage Pool Electricity, in much the same way as interruptible programs might be used. It would make sense to buy whenever they can, as if they wait until they need it the weather conditions might be widespread and affecting the entire northeast. The more Hydro-Québec Distribution can save the high capacity allocations, the more flexibility they have. It would be of particular benefit if Hydro-Québec Distribution could opportunistically buy from the short-term market whenever prices dipped below the average price of the heritage pool or the incremental cost of generation from the new resources.

Regarding transmission Hydro-Québec Distribution should have no problems securing access into Québec. It is not likely that Hydro-Québec Generation will always be filling the interconnection unless prices are really low. The position of Hydro-Québec Distribution and Hydro-Québec Production as competing for import capability appears at odds with the fact that Hydro Québec Production is, on the average, an exporting entity.

There are four neighboring systems outside of Quebec, which include New Brunswick, New England, New York and Ontario. The total import capacity of the interties from the four regions is 4,205 MW. This does not include the agreement between TransÉnergie and Hydro One (Ontario's transmission system operator) for a 1,250 MW

interconnection between Quebec and Ontario, which is scheduled for operation in 2003.

| Neighboring System | Import Mode (MW) |
|---|---|
| New Brunswick | 785 |
| New England | 1,870 |
| New York | 1,000 |
| Ontario | 550 (+1,250 in 2003) |
| Total | 4,205 (5,455) |

*Data from TransÉnergie Report of Activities 2000, p.22

The total import mode running on full capacity for one year is equivalent to 36,835,800 MWh. Although the import capacity is reduced during certain system conditions it also increases during periods when HQP or other entities are exporting to the US or Ontario. Hydro-Québec Distribution's allowance for only 5TWh of import potential, is in our judgment, extremely conservative. Hydro-Québec Production is typically an exporter.

**Q27 What is your assessment of the risks facing Hydro-Québec Distribution and its procurement strategy?**

A27 The challenge facing the Distributor, is to determine which risks need to be insured against, and when to procure that insurance. Some risks are more prudently absorbed, than insured against, meaning sometimes holding the risk may be cheaper then covering it. If Hydro-Québec Distribution wants to account for all possible risks they will increase their ratebase costs significantly. With the level of flexibility and low cost of the Heritage Pool Electricity, the ratepayers are in a very low risk situation. Even by 2011 95% of the maximum total amount of power used will still be Heritage Pool Electricity at predictable and fixed prices.

One should be careful of building resources for a high-load scenario, which might never materialize, thereby stranding resources to the detriment of ratepayers.

The high demand scenario will manifest itself over time, and if it does show up, then gas turbine technology can be built in two to three years. Even though this might not be a perfect solution, it is a less risky one.

From a risk management perspective, if the high scenario materialized, the province as a whole will be in a position to pay slightly higher costs in order to recover from any potential shortfall.

On the other hand, if Hydro-Québec Distribution procures for the high load scenario and ends up with the low scenario, then the economic cost to the province could further depress economic activity, as it would have neither the load growth, nor the economic activity, but would still have the excess capacity. The Distributor will be saddled with the additional cost of the stranded capacity. Rates will increase when the consumer is least able to handle it.

The Distributor is relying on imports to cover the high forecast scenarios, and denying itself the potential to imports during the mean, and probably most likely load scenarios. Instead Hydro Québec Distribution should emphasize imports for the mean scenario.

**Q28 What are your Recommendations to the Régie?**

A28 It is our understanding that the Régie has already approved a Call For Tenders for 600 MW and subsequently approved the Hydro Québec Distribution request for an additional 600 MW of Capacity to serve the 500 MW load of Alouette. We also understand that the Régie has given Hydro-Québec Distribution leeway to allocate the 600 MW in an optimal manner between baseload, cyclable and dispatchable.

Based on our testimony above we recommend that the Régie:

1. Does not authorize any incremental procurement, beyond that already authorized. Moreover, we believe that the Régie should instruct Hydro-Québec Distribution to favor baseload resources over Dispatchable resources to the extent that the response to the Call For Tender confirms that baseload resources would be cheaper than dispatchable when operated over extended periods.

2. Instruct Hydro-Québec Distribution to develop, in consultation with its customers, sufficient interruptible programs to provide similar characteristics and manageability to procuring dispatchable resources. These interruptible programs should be:

    - Based on avoided cost calculated after all the offers are received

    - Reflect the amount of dispatchable resources required to meet the needs to 2011, taking into consideration the Heritage Pool Electricity and the procured resources.

    - Recognize that the development of interruptible programmes requires sustained development and commitment, and continuous adjustment to meet Distributor needs as well the needs of the customers involved in the programme.

3. To facilitate future system planning and streamline the regulatory process the Régie should require Hydro-Québec Distribution to submit with the next supply plan (Demande d'approbation du plan d'approvisionnement) sufficient evidence and details of the following supply issue:

- A report detailing the Distributor's efforts to procure and manage the dispatch of interruptible power based on Hydro-Québec Distribution's negotiations with its customers, as well as a strategy to enhance access to interruptible power as load grows

- A report on how Hydro-Québec Distribution has optimized its use of the Heritage Pool Electricity in the previous period, and a clear strategy on how it intends to optimize on the Heritage Pool Electricity in the future planning horizon.

- A report on the success in using external market for the procurement of opportunistic supply, and a forecast of availability of resources from the external market in the future planning horizon.

- Previous efforts, success and evaluation of the potential for contracting future blocks of energy

The reason for the advanced notice of future reporting requirement is that it lays down the Régie's expectation of the prudency required in the procurement of future resources. This should have a stimulatory effect on management of the assets and provide prospective rather than retrospective guidance from the Regie. In addition, the use of interruptible programs and external markets need to be in place prior to their imminent need.

**Q29 Do you adopt the above as your testimony?**

A29 Zak: Yes

A29 Ken: Yes