RÉGIE DE L'ÉNERGIE

HYDRO QUÉBEC APPLICATION
FOR APPROVAL OF THE
PROPOSED 2002-2011 SUPPLY PLAN

FILE R-3470-2001

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Appendix A – CV for William Harper

1.0 Background

On October 25th, 2001, Hydro-Québec Distribution (HQD) filed an Application with the Régie de l'énergie requesting approval for its 2002-2011 electricity supply plan and permission to launch a "call for tenders" process in January 2002 for 1,000 MW of supply (4.1 TWh) for delivery commencing in 2006-2007.

This Application arises out of recent changes in both the organizational structure of Hydro-Québec as well as the legislative and regulatory framework in which it operates. In response to regulatory and reciprocal open access requirements, vertically integrated electric utilities across North America have been restructuring their activities and separating their generation, transmission and distribution businesses. Consistent with this trend Hydro-Québec recently created four business divisions (Hydro-Québec Distribution, TransÉnergie, Hydro-Québec Production, and Hydro-Québec Ingenierie, approvisionnement et construction). Furthermore, recent amendments to the Act respecting the Régie de l'énergie have removed the generation-side of Hydro-Québec's business from regulatory oversight by the Régie and require the regulated functions (i.e. transmission and distribution) to operate within a framework that facilitates wholesale access and competition. On the transmission side, this means having in place the requisite tariffs, terms and conditions to allow parties besides Hydro-Québec Production to supply distributors in the province. On the distribution side, it means establishing a process for acquiring generation supplies that allows for the participation of all interested suppliers and leads to a choice of supply options that best meet the needs and objectives of Hydro-Québec's Distribution function and its customers.

In order to achieve this, the Legislation and associated Regulations establish a Heritage Pool giving HQD customers access to a maximum of 165 TWh of Hydro-Québec Production's output at an average commodity price of 2.79 cents/kWh and, then, requires that any additional supply needs over and above this quantity be obtained through a tendering process[1]. To this end, the Act also requires that the distributor submit to the Régie for approval a supply plan describing the characteristics of the contracts it intends to enter into to meet the needs of Quebec consumers. Finally, the Act requires that the distributor submit for approval by the Régie a tender solicitation and contracting award process and a tender solicitation code of ethics applicable to electricity supply contracts that would allow all interested parties to tender and grants equal treatment to all sources of supply[2]. In keeping with these latter requirements, HQD obtained Régie approval[3] earlier this year for a "Call for Tenders and Contract Award Procedure" and a "Code of Ethics Conducting Calls for Tenders". In accordance with these documents, bids are evaluated on the basis of established criteria such as price, experience, financial capacity and the maturity of the technology concerned.

The Supply Plan prepared by HQD forecasts that, under an average load growth scenario, its electricity requirements will exceed the 165 TWh guaranteed through the Heritage Pool starting in 2005 by some 0.5 TWh and that the additional requirements will grow to 4.1 TWh by 2007 and to 10.8 TWh by 2011. HQD is proposing to use the short-term markets (e.g. imports) to meet its incremental needs for 2005 and to initiate a call for tenders (for supply options) involving some 1,000 MW to meet the needs for 2006-2007. The needs beyond this period will be addressed through future tendering processes.

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[1] HQD-2, Document 2, p. 1 and HQD-1, Document 2, p. 8.
[2] Section74.1, Amended *Loi Sur la Régie de l'énergie* (*la Loi*)
[3] Decision D-2001-191.

2.0 Purpose of Comments

In its Application, Hydro-Québec Distribution is requesting that the Régie:

1. Approve its overall supply plan for the period 2002-2011 as filed, and
2. Authorize it to launch a call for tenders in January 2002 for 1000 MW of base and dispatchable[4] capacity for delivery commencing in 2006/2007.

On November 2, 2001, the Régie issued an Order (D-2001-254 in re R-3470-2001) initiating an accelerated review process for those matters related directly to the proposed call for tenders:

> Dans ce contexte, la Régie utilisera un processus accéléré tout en permettant aux différents intéressés de faire valoir pleinement leur point de vue. Elle étudiera les éléments du dossier qui touchent directement au lancement du premier appel d'offres et, plus précisément, la prévision de la demande jusqu'en 2007, les approvisionnements additionnels requis pour 2006-2007 et la stratégie proposée, les risques découlant du choix des sources d'approvisionnement et les critères de sélection des offres.[5]

The Régie also indicated that it would be undertaking a formal review of the overall supply plan at a future date.

After reviewing HQD's Application and the Procedural Order issued by the Régie, Option Consommateurs (OC) retained me to provide comments that would assist the Régie in evaluating the issues associated with the call for tenders proposal.

I am a consultant with Econalysis Consulting Services (ECS), a Canadian consulting firm offering regulatory services to clients in the electricity, natural gas and telecommunications sectors. Prior to joining ECS in July 2001, I worked for

[4] The term "dispatchable" is generally used throughout the Comments to refer to both supply options where the amounts to delivered can be readily varied on either a daily, weekly or seasonal basis to meet expected changes in load requirements as well as supply options used to meet reserve requirements.
[5] D-2001-254 R-3470-2001, p. 2

over 25 years in the energy sector in Ontario, first with the Ontario Ministry of Energy and then, with Ontario Hydro and its successor company Hydro One. My areas of expertise and experience include cost allocation/rate design, the regulation of electric distribution utilities and management of utility involvement in regulatory proceedings. I have served as an expert witness in public hearings before the Ontario Energy Board, the Ontario Environmental Assessment Board and a Select Committee of the Ontario Legislature on matters dealing with rates, regulation and demand/supply planning. A full copy of my CV is attached in Appendix A.

The Comments start by discussing the supply planning process for electric utilities, identifying the key elements involved and their applicability to Hydro-Québec. This is followed by a more detailed critique of the supply planning process utilized by HQD in developing its proposed call for tenders requirements. It should be noted that while the Comments focus on the Application as it pertains to the development of the proposed call for tenders, some of the conclusions lead to recommendations dealing with the longer term and the overall proposed supply plan.

3.0 The Supply Planning Process

3.1 General Overview

Like other electric utilities, one of the prime objectives of Hydro-Québec (in particular, Hydro-Québec Distribution) is to provide continuing reliable electricity service to customers[6]. As a result the supply planning process serves as a bridge between the utility's goal/objectives on the one hand and its specific action plans on the other for acquiring/maintaining sources of supply.

[6] Hydro Québec's Strategic Plan 2002-2006 Summary, p. 7 (English Translation).

The electricity supply planning process is complicated by a number of factors including:

- The long lead times required to bring new facilities into service, which typically exist whether the utility is constructing its own supply facilities or seeking to obtain supply from others.
- The uncertainty associated with future customer requirements. Changes in demographics, economic performance, technology and relative fuel prices can impact on trends in customer usage over the long term; while weather conditions can lead to significant variations in electricity requirements on an annual basis.
- The need to follow daily (and seasonal) variations in customers' overall electricity requirements.

Finally, the supply planning process is both complicated (and facilitated) by the fact that there are typically a wide range of resource options available to utilities and therefore choices that have to be made.

In the past, integrated electric utilities have typically approached the issue of supply planning[7] by:

1. Clearly articulating the goals and objectives that will be used in making the choices required throughout the planning process and, ultimately, in implementing the resulting action plans. These objectives have usually focused on reliability and cost, but have also included consideration of environmental impacts, customer values, resource preferences and economic impacts.
2. Forecasting future electricity requirements and understanding the uncertainty associated with the forecast. To this end, it must be clear how demand side management, arising as a result of price, technological

[7] Examples of this approach can be found in the Integrated Resource Planning Guidelines published by the British Columbia Utilities Commission, February 1993 and the Report of the Electricity Planning Technical Advisory Panel to the Ontario Minister of Energy, July 1988.

change or utility sponsored programs, is captured in the forecast in order to ensure that it is properly accounted for and does not become a source of increased uncertainty.

3. Translating the forecasts for future customer electricity requirements into capacity requirements based on clearly articulated reserve criteria.
4. Identifying and analyzing the available resource alternatives. These alternatives included upgrading/refurbishing existing facilities, construction of new supply facilities (where again there were typically a number of options available), adoption of demand side management initiatives, and purchasing supply from other producers. The analyses included considerations of cost, reliability, lead times, flexibility, and dispatchability.
5. Combining the resource options into prospective “plans” and assessing the results in terms of their ability to meet the established goals/objectives. A critical aspect of this assessment has also been the ability of the prospective plans to respond to uncertainties regarding the future.
6. Selecting a proposed plan and identifying the short terms actions necessary to implement the plan.

Recent changes in the electricity industry, in terms of increased open access between jurisdictions and corporate restructuring have introduced new planning challenges for those utilities (utility segments) responsible for ensuring the reliable supply of electricity to consumers. The introduction of open access and the formal establishment of “competitive wholesale electricity markets” are increasing both the near term and longer term supply options available to utilities. At the same time, industry restructuring is separating the generation, transmission and distribution functions and requiring that the distribution segment (typically the segment retaining responsibility for customer supply) treat potential supplies from its formerly associated production function as “purchases”. Furthermore, in those jurisdictions introducing retail competition, distributors have to not only address the traditional issues associated with load forecasting, but also forecast what portion of their customer base will opt to be supplied by a competitive "retailer" as opposed to the utility itself.

Also, as a result of industry restructuring, changes are required with respect to the goals and objectives used in the supply planning process. The focus must now be solely from the perspective of the distribution segment and its customers. Economic opportunities/risks associated with the operation of the production or transmission segments are relevant supply planning considerations for an integrated utility since they will ultimately impact on customers (e.g. the opportunity for increased export revenues that may arise in the event of overcapacity or the implications of construction cost over-runs). However, in a restructured environment, such opportunities/risks are only relevant to the extent they impact on the costs payable by the distributor for the supply option (which will be a function of the contractual arrangement) or impact on the risk of non-performance on the part of the supplier (again an issue to be managed through the contractual arrangements).

3.2 Supply Planning for Hydro-Québec Distribution

In the case of HQD, the governing legislation dictates a number of aspects of the supply planning process:

- The Heritage Pool effectively represents an ongoing contract for 165 TWh of electricity;
- There is a statutory requirement[8] that the utility prepare and file for approval by the Régie "a supply plan describing the characteristics of the contracts the holder intends to enter into to meet the needs of Quebec markets following the implementation of efficiency measures";

[8] Section 72, Amended *Loi Sur la Régie de l'énergie* (*la Loi*) - official translation.

- The utility is required[9] to follow a call for tenders procedure in obtaining any additional “supply” resources required over and above the Heritage Pool.

However, none of these requirements are inconsistent with the supply planning process outlined above. In fact, the content dictated by the Québec Government Bylaw regarding the Supply Plan[10] envisages a very similar process in that the Company is expected to provide:

- Demand and supply data for the next ten years that describes forecast electricity requirements (accounting for DSM programs) and sensitivity analyses, along with details regarding existing supply contracts and the resulting incremental needs;
- The utility’s objectives as well as its strategy over the next 3 years with respect to incremental supply and the characteristics of the contracts it intends to sign. Also required is an identification of the risks pertaining to the choices of supply sources, the risk mitigation measures planned and measures to assure sufficient transmission capacity.
- All technical data, a description of the assumptions made/methodologies applied, and justification of the choices made.

Similarly, the legislation requires[11] that the call for tender procedures must:

- Allow for the participation of all interested suppliers;
- Grant equal treatment to all sources of supply, unless otherwise provided for by regulation of the Government; and
- Favour the awarding of supply contracts on the basis of lowest price for the conditions and amount of power required.

Again, these requirements are also consistent with the supply planning process elements previously outlined.

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[9] Sections 52.2, 72, 74.1 and 74.2, *la Loi*.
[10] *Règlement sur la teneur et la périodicité du plan d’approvisionnement*, (2001) 133 G.O. II, 6038.
[11] Section 74.1, *la Loi*.

Conclusion:

While the supply planning process must be adapted, in Hydro-Québec Distribution's circumstances, to provide for a "call for tenders" process to identify and select the supply side options, the development of the call for tenders requirements must be done within the context of an overall supply plan if the utility is to meet its legislative obligations. Furthermore, unless the amount (and types) of incremental capacity to be acquired through the call for tenders process are determined as part of an overall supply plan the results could lead to higher costs and lower reliability of supply for consumers.

As a result, the fundamentals of the supply planning process, as previously utilized by integrated electric utilities, are still applicable to Hydro Québec:

- A clear set of planning goals/objectives to guide the process. This starts with an overall set of "corporate" objectives that provide a consistent basis for establishing reliability criteria/reserve margins, evaluation criteria for assessing alternatives and selection criteria for evaluating alternative supply "bids" ultimately received in response to the Company's call for tenders.
- A credible load forecast that provides insight into the uncertainty attributable to future electricity demand and transparently captures the implications of various demand side management initiatives. (Note: In the alternative, new DSM initiatives can be treated simply as another supply option. But then, there must be clear understanding of what is captured in the "basic load forecast").
- A transparent reserve margin target. Both the basis for the reserve margin target and the "risks" it is meant to address should be clearly articulated.

- A comprehensive identification and assessment of all alternatives. All potential options for meeting future load requirements need to be identified, investigated and fairly evaluated. If viable options are omitted or screened out prematurely, the outcome will be erroneous and not necessarily result in the best plan. Similarly, there needs to be a standard set of economic criteria that are applied to each alternative.
- An explicit assessment of the risks associated with any proposed plan.
- The recognition that planning is not a linear process and certain iterations/feedbacks may be necessary. For example, if the evaluation of alternative supply options suggests that the price of electricity will have to increase this would need to be factored back into the load forecast.

The requirement for a call for tenders process to select the needed supply options means that the planning process must be carried out in two stages. Stage One would entail:

1. The delineation of the goals and objectives to be used in the overall planning process.
2. The development of a forecast of future requirements based on price forecasts that incorporate preliminary expectations as to the cost of incremental supplies and a delineation of the uncertainties associated with the forecast.
3. The identification of that portion of future electricity requirements that could be met by the Heritage Pool and by demand side management programs (based again on preliminary estimates as to the future price of electricity and the costs of new supply options) and, as result, the portion that must be met by new supply options (including the uncertainty associated with the estimate).

4. A determination of the delivery characteristics of the supply options required (e.g. will the supply options be base loaded, required to follow daily load patterns, required primarily for reserve purposes, etc.) in order to determine supply option “product categories”. At this point, the flexibility in the delivery characteristics needed to address the uncertainty associated with the total requirement for new supply options would also be established.
5. Develop a “call for tenders” for new supply based on the preceding results and evaluation criteria that reflect the objectives of the overall planning process.

Stage Two would then take place after the responses to the call for tenders have been received and include:

1. Identification of preferred bids by product category based on the evaluation criteria.
2. The development and evaluation of alternative “supply plans” based on combinations of preferred bids. At this step, the anticipated cost of the new supply options would be estimated and used to fine-tune (if necessary) the overall cost future supplies used at the start of the process to forecast future electricity requirements and estimate the contribution from demand side management initiatives.
3. The selection of the preferred combination of new supply options and approval/execution of the necessary supply contracts.
4. Development/initiation of any programs required in conjunction with the demand side management initiatives coming out of the planning process.

4.0 Specific Comments re: Hydro-Québec-Distribution's Proposed "Call for Tenders"

4.1 Hydro-Québec Distribution's Goals and Objectives

As indicated earlier, the purpose of the supply planning process is to translate a utility's goals and objectives into an action plan for the acquisition of specific supply options. As a result, it is important that the intended goals/objectives be clearly articulated at the start of the process and incorporated into the various planning and evaluation criteria used throughout the process.

There are references[12] throughout the Application to cost minimization and reliability as objectives of HQD's supply planning process. Also, in response to OC Interrogatory 4.8, HQD confirmed that while cost minimization and reliability of supply were the most important objectives in the development of the Supply Plan and the call for tenders proposal, facilitating the development of competition in electricity supply in Quebec was also an important consideration[13].

However, it is not fully transparent as to how these goals are measured and therefore, applied throughout the supply planning process and determination of the supply side option requirements for the call for tenders proposal.

4.1.1 Reliability

In terms of "reliability of supply", references are made throughout the Application to a number of different reliability measures and considerations:

[12] See for example HQD-2, Document 3, page 11, lines 9-19 and Document 4, page 11, lines 9-14.
[13] HQD-4, Document 6, p. 22.

- There are references[14] to the NPCC requirements and the associated 15% reserve requirement. However, it is clear both from the quantum of the planned supply option reserves (i.e., 400 MW) and HQD's response to OC Interrogatory 4.12[15] that the NPCC requirements are not the determining factor in establishing either the total reserve requirements or the amount of reserves required to be provided by new supply side options. Rather, the major driver in establishing the need for reserve requirements[16] to maintain reliability is that fact that HQD must supply all of the load in excess of the Heritage Pool's 165 TWH and therefore must address (through the provision of new supply) all of the upside uncertainty associated with the load forecast.
- The implications of weather variances on future electricity requirements are discussed and various scenarios are presented combining different weather and economic conditions. However, the determination of the reserves required to meet variations in load arising due to weather and the decisions as to how they will be provided appear to have been separated out and performed independently, rather than as part of a comprehensive supply plan[17].
- Similarly, while the Application looks at various load growth scenarios arising from different economic and demographic assumptions and their associated requirements for incremental supply, there is no indication (and HQD indicates that it is not available) as to the likelihood of such loads materializing and therefore the risks faced by customers (or in other words – the level of risk HQD believes it should be mitigating)[18].
- The 400 MW of planned reserve is rationalized, in part, on the basis that it represents only 2 years worth of load growth and therefore not a

[14] HQD-2, Document 3, p. 20 and Annexe 3D.
[15] HQD-4, Document 6, p. 27.
[16] HQD-4, Document 6, p. 28, Response 4.14
[17] HQD-2, Document 3, p. 33 and HQD-4, Document 6, p. 28, Response to 4.14.
[18] HQD-2, Document 3, p. 21 and HQD-4, Document 6, p. 21, Response to 4.5.

significant "premium"[19]. However, there is no indication as to why "two years" is the appropriate measure.

Conclusion:

The presentation of reliability-related issues and requirements is piece-meal and in no one place is there a comprehensive discussion of reliability criterion that HQD is planning for (e.g., risk of future outage/non-supply) or an indication of the total reserve requirements (from all sources) that HQD considers necessary for 2006/2007.

HQD should clearly articulate its reliability targets, the resulting reserve margin requirements it anticipates needing over the planning period and the basis on which they were developed. Furthermore, HQD should clearly indicate how these reliability requirements impact on the incremental supply requirements.

To the extent that scenarios are used to test the robustness of the proposed supply plan and associated call for tenders proposal, there should be a clear understanding of the risks/uncertainties involved. Supply planning requires tradeoffs be made between reliability and costs. However, without clear understanding of the risks involved customers and regulators will not be able to assess whether the proposed costs are reasonable.

4.1.2 Cost Minimization

Similarly, in the case of "cost minimization", there are a number of places in the Application where cost considerations are addressed. However, again, there

[19]HQD-2, Document 3, p. 20.

appear to be inconsistencies and a lack of clarity in terms of how costs are to be measured and assessed:

- The avoided costs used for purposes of evaluating energy efficiency initiatives are based on the "average" cost[20] of Heritage Pool and new supplies as would be reflected in consumers final rates, even though HQD acknowledges that after 2005 energy efficiency programs will impact only the requirements from new supplies[21].
- In contrast, when determining the avoided costs for transmission, rather than using the applicable transmission rates, HQD takes into account the current excess capacity available on the TransÉnergie network[22].
- When asked which of the economic tests referenced in the Strategic Plan were used to assess the economic potential of energy efficiency measures, HQD indicated that none of them were used and, instead, it used an avoided cost test [23].

Conclusion:

HQD should clearly articulate the cost criteria that will be used in its supply planning process. Contrary to HQD's response to OC Interrogatory 4.17 b)[24] it is a well established fact that using a Ratepayer Impact test[25] (where the objective is minimizing the rates paid by customers) will frequently yield different results when evaluating energy efficiency initiatives than a Resource Cost test which looks at the total costs paid by the utility. HQD's response[26] to OC interrogatory 4.17 a) would suggest that the utility is using a Resource Cost test. However, the approach used

[20] HQD-2, Document 1, Annexe 1A, p. 5 and HQD-4, Document 1, page 13-14.
[21] HQD-4, Document 6, p. 15, Response to 2.8 b).
[22] HQD-2, Document 1, Annexe 1A, p. 5
[23] HQD-4, Document 6, pages 14-15, Response to 2.8 a).
[24] HQD-4, Document 6, p. 29.
[25] Also referred to as the Rate Impact Measure or RIM test.
[26] HQD-4, Document 6, p. 29.

to determine avoided commodity costs is more akin to a Ratepayer Impact test.

Furthermore, given the functional separation between transmission and distribution it is important that HQD clarify how/why it is approaching the determination of avoided transmission costs. It appears that HQD is factoring into its decision making processes the implications of its resourcing decisions on TransÉnergie's overall resource utilization and costs. Under normal circumstances this would not be appropriate as true functional separation requires that HQD operate at "arm's length" from TransÉnergie. However, there is an economic rationale for HQD to take this approach as long as it is TransÉnergie's predominant customer and therefore, through the regulated rate setting process, ultimately responsible for most of TransÉnergie's costs.

4.1.3 Competition

The code of ethics and call for tenders procedures approved by the Régie earlier this year will help ensure a "level playing field" for all suppliers vying to obtain contracts with HQD to meet its incremental capacity needs. However, also critical for suppliers is assurances that the actual processes to be used in the dispatch of facilities under contract are clear and provide for equal treatment of all parties. In this regard, the responses to interrogatories posed by OC[27] as to how the market will operate in "real time" do not clearly explain how the amount of capacity that will be dispatched from the "incremental suppliers" will be determined. For example, the response indicates that HQD will, on a day-ahead basis, determine the dispatch of suppliers for the following day. In order to do so, HQD will need to determine the supplies it will receive from the Heritage Pool. However, the Heritage Pool supply is represented by a 8,760 hour load duration

[27] HQD-4, Document 6, pages 15-16, Responses to 3.1 and 3.2.

curve and it is not clear how, in real time, HQD will be able to determine which 24 of the 8,760 hours it should be contracting for the following day. Then, in real time, as the loads do not turn out as expected, adjustments will have to be made. The response[28] to OC Interrogatory 3.1 suggests that TransÉnergie will be responsible for real time dispatch for system security purposes. However, It is not clear how it will determine which suppliers will be affected by the process.

Conclusion:

These are important issues and need to be clarified so that new suppliers are assured of fair treatment and know how they will be dispatched. In fact, unless there is a clear understanding as to when and how they will be dispatched, suppliers may have difficulty responding to HQD's call for tenders and pricing their proposals.

4.2 Load Forecast

4.2.1 Methodology

The persuasiveness of a utility's supply plan depends to a large extent on the transparency and the objectivity of its load forecasting activity.

A load forecast combines future expectations regarding population growth and demographics, economic activity, relative energy prices and consumer response as well as future changes in the efficiencies associated with the use of electricity. Transparency requires that the methodology used for considering these factors be clear and comprehensive at the same time. Objectivity requires that the various assumptions incorporated in the load forecast regarding these factors be

[28] HQD-4, Document 6, page 16.

tested/benchmarked against forecasts of similar variables prepared by knowledgeable third parties.

The initial Application filed by Hydro-Québec Distribution contained virtually no details as to the forecasting methodology used. Subsequent interrogatory responses[29] referred to material filed during the recent proceeding into TransÉnergie's proposed tariffs. However, upon review, these materials do not provide the details required to understand how the forecasting methodology captures changes in electricity prices, changes in the demographic/economic outlook or changes in energy efficiency and therefore create confidence in the load forecast presented.

Another means by which stakeholders can gauge the reasonableness of a utility's load forecast is by looking at the performance of past forecasts versus actuals. HQD's response to Régie Staff Interrogatory 5.3[30] provides historical data on the performance of the Company's load forecast. Given that the proposed call for tenders covers the period 2006-2007, the most relevant point of comparison is the five-year performance. The response shows that the average error for the 5 year horizon over the 11 observations was 4.3% (i.e. the forecast was 4.3% too high). Upon closer inspection it can be seen that the forecast has consistently been too high for each of the last 8 years, that the error has been 6% or more for each of the last 7 years and that the largest error is more than 12% higher than the actual (in 1998). One can expect forecasts to be wrong. However, the variances should be both positive and negative over time. When asked about this apparent tendency of the methodology to over-forecast, HQD pointed to the short-term performance of a couple of its more recent forecasts (which show both pluses and minuses) but did not address the inherent bias that seems to exist in its longer-term forecasts[31]. Also, it should be noted that even

[29] HQD-4, Document 6, p. 4, Response to 2.3 a).
[30] HQD-4, Document 1, pages 12-13.
[31] HQD-4, Document 6, pages 10-11, Response to 2.3 d).

the successful performance of past forecasts cannot demonstrate whether the methodologies used to adjust the load forecast for factors such as improved codes/standards or the expected impact of energy efficiency programs are appropriate.

Finally, the accuracy of load forecasts is also dependent upon the credibility of the economic and demographic assumptions used. In this regard, HQD's demographic assumptions seem to compare reasonably well with those prepared by other agencies. Although HQD's short-term economic outlook is somewhat more pessimistic than that of most other agencies, this is most likely a function of the fact that the other forecasts were generally prepared in the first half of 2001.

Conclusion:

HQD should improve the credibility of its load forecasting by:

a. Providing the Régie and stakeholders with further information regarding the forecasting methodologies used and indicating specifically how the forecasting methodologies incorporate changes in energy prices, economic/demographic assumptions and the impact of energy efficiency initiatives.
b. Undertaking to examine the apparent bias in its long term forecasting results.

4.2.2 Treatment of Uncertainty

Given the number of assumptions that go into the development of a load forecast and the long planning horizons involved (up to 10 years in HQD's case), considerable uncertainty exists about future load growth. As a result, planning must also focus on risk mitigation and management. To this end, it is important to understand the range of uncertainty associated with the load forecasts used for planning purposes.

HQD has developed alternative forecasts reflecting stronger/weaker economic growth scenarios as well as variations in weather conditions. But, as noted above, HQD has been unable to indicate the uncertainty represented by the range in load forecasts presented. Although HQD did provide some insight into the uncertainty generally associated with its load forecasts.[32]

Conclusion:

A better understanding of the risks and uncertainty associated with the various load growth scenarios would provide stakeholders (and the Régie) with the information required to judge the reasonableness of HQD's reliability objectives, its overall supply plan and the reserves (i.e. the 400 MW) built into its call for tenders proposal.

4.2.3 Demand Side Management Initiatives

In order to ensure that customers' electricity needs are met at the lowest feasible cost, it is important that every potential resource alternative be identified, investigated and fairly evaluated.

The Legislation specifically provides for this in the case of new supply options by requiring that HQD obtain such supplies through an open call for tenders process. However, there are other alternatives available to HQD to address future electricity requirements that need to be considered and incorporated into the overall planning process. These include energy efficiency initiatives and pricing options (such as interruptible power) that encourage customers (or allow

[32] HQD-4, Document 1, p. 21, Response to 10.1.

utilities) to manage loads. The most effective way to do this consistent with a call for tenders process for new supply options is to:

a. Evaluate the ability for such sources to meet future electricity requirements based on the same economic assumptions used for load forecasting purposes (including the projected costs of new electricity supply);
b. Incorporate the expected contributions from these sources into the load forecast used to establish the requirements for new supply options used to develop call for tenders proposal;
c. Update, once the call for tenders process is complete and better estimates are available as to the expected costs of new supply options, both the evaluation of the potential contribution from demand management initiatives and the overall load forecast and refine the total requirements for new supply side options; and then
d. Select the appropriate supply side bids based on these redefined requirements.

In its Application HQD has acknowledged the potential role that energy efficiency and pricing options could play in meeting future electricity requirements but, as discussed below, they have not all been included or evaluated on a consistent basis.

4.2.3.1 Energy Efficiency

HQD has included in its planning load forecast allowances for the adoption of energy efficiency improvements as a result of structural changes (e.g. codes and standards), existing energy efficiency programs and new programs that will be introduced over the planning period. The total impact of all three factors is a reduction in electricity demand of 4.1 TWh in 2007 (of which 0.4 TWh is the result of new programs)[33]. However, the basis for these numbers is open to question.

There is an assumed 0.2-0.3 TWh per annum increase in energy efficiency due to structural changes. However, no rationale or explanation is provided as to the basis for this value.

The determination of potential savings achievable starts with a value for energy efficiency potential (27.6 TWh) established almost 10 years ago and then proceeds to discount it in order to account for past increases in energy efficiency standards, program achievements to-date, better estimates of cross-usage impacts and lower avoided costs to derive an updated technical/economic potential of only 6 TWh. Concerns or shortcomings with this particular approach include:

- The 27.6 TWh figure was estimated in 1992 and it appears that no adjustments were made to account for increases in load growth over the past 10 years[34],
- The initial potential of 27.6 TWH has not been updated to account for new/recent energy efficiency technologies or options.
- The avoided cost estimates are deemed to be lower, in part, because the avoided cost of generation is determined at the weighted average cost of purchases – where the bulk of the supply is still coming from the Heritage Pool at 2.79 cents per kWh. However, after 2005, energy efficiency programs will be impacting directly on the amount of "new supply" needed by HQD. Therefore from an avoided costs perspective the appropriate value to use for "generation" would be the avoided cost of new supply of 5.5 cents/kWh[35]. As discussed earlier, the approach used by HQD is more consistent with an objective of rate (as opposed to cost)

[33] HQD-2, Document 1, p. 18.
[34] HQD-4, Document 1. pages 16-17, Response to 7.2.
[35] The avoided cost of new generation was reported as 5.5 cents/kWh in HQD-1, Document 1, pages 39-41, R-3466-2001.

minimization and relates directly to the need for a clear statement as to the "cost-related" goals and objectives of the planning process.

- The avoided costs have also been reduced in view of excess capacity that currently exists on the HQ's transmission system[36]. This requires looking beyond simply the current rate for transmission, taking into account the implications of HQD's actions on usage of the transmission system and the resulting impacts on transmission rates.

HQD has indicated that it will be developing a comprehensive Energy Efficiency Plan for submission to the Régie in 2002[37].

Conclusion:

It is critical that both the development and the results of HQD's Energy Efficiency Plan be integrated with the "call for tenders" process for new supply by ensuring that:

- The avoided costs used in the analysis of energy efficiency options reflect the results of the call for tenders process; and
- The MW of new supply required to be contracted for through the call for tenders process are updated to reflect the results of the Energy Efficiency Plan prior to the actual selection of the successful bidders.

Otherwise, stakeholders and the Régie have no assurance that the implementation of the call for tenders process will be based on the optimum contract quantities and yield the lowest cost of supply overall.

[36] HQD-2, Document 1, Annexe 1A, p. 5.
[37] HQD-2, Document 1, Annexe 1A, p. 10.

4.2.3.2 Pricing Options

The Application makes references to a number of different pricing options including the residential dual-fuel program, the existing interruptible power and a new real-time interruptible rates program. However, none of the programs appear to have been fully factored into the supply planning process.

In the case of the residential dual-energy program, the reduction in peak winter requirements attributable to the program is a constant 880 MW for the years 2002-2011 inclusive; even though the contribution to peak load attributable to domestic and farm heating loads is expected to increase by over 7% during the same period[38]. HQD has simply assumed that there will be no additional customers on the dual-fuel option[39].

In the case of the existing interruptible program, it is acknowledged that there are currently 1024 MW of coincident load under contract and that there is the potential for more interruptible contracts[40]. The Plan also acknowledges that interruptible power can be relied on to meet peak requirements for a limited number of hours each year[41]. While existing contracts are at the disposition of Hydro-Québec Production to assist it in meeting its Heritage Pool obligations, HQD has the option of developing new interruptible programs to help offset the need for incremental supply requirements[42]. Furthermore, HQD has indicated that it will be developing a new real time interruptible program and bringing it forward to the Régie for approval in the future[43]. However, HQD has made no allowance for new interruptible programs in developing its call for tenders requirements and, in fact, takes the position that consideration of these programs

[38] HQD-2, Document 1, p. 15: 7% = (11,110-10,370) / 10,370.
[39] HQD-4, Document 2, p. 28, Response to ACÉÉ-SÉ-GS-31.
[40] HQD-4, Document 6, Response to 3.3 b) and HQD-2, Document 2, p. 5.
[41] HQD-2, Document 3, p. 14.
[42] HQD-4, Document 6, page 16-17, Response to 3.3 a).
[43] HQD-2, Document 3, p. 31.

is outside of the scope of the proceeding as it pertains to the review of its call for tenders proposal[44].

Conclusion:

Clearly interruptible power offers the opportunity of providing a cost-effective alternative to new supply-side capacity options and an estimate of its potential needs to be established and factored into any decision regarding the supplies to be contracted for. To do otherwise could lead to over-contracting for higher cost supply-side options and result in higher customer rates. As a result, the potential for new interruptible programs is relevant to this proceeding and the determination of both the quantum and the mix of new supply that should be contracted for through the call for tenders process.

It is critical that both the development and potential contribution for any new interruptible rate program be integrated with the call for tenders process for new supply by ensuring that:

- The avoided costs used in the development of the new interruptible rates reflect the responses to the call for tenders process; and
- The MW of new supply required to be contracted for through the call for tenders process are updated to reflect the anticipated uptake of the new interruptible pricing program prior to the actual selection of the successful bidders.

Otherwise, stakeholders and the Régie will have no assurance that the call for tenders process will yield the lowest cost supply overall.

[44] HQD-4, Document 6, pages 17-18, Responses to 3.3 f) and g) and page 21-11, Response to 4.7.

4.3 Determination of Additional Supply Option Requirements

HQD establishes its additional supply requirements by identifying the load forecast requirements in excess of what will be supplied by the Heritage Pool and then adding a "reserve margin" to address uncertainties associated with weather, economic conditions and delivery of contracted supply. Section 3.1 identifies issues associated with the determination of the reserve margin and 3.2 discusses issues associated with how HQD has captured other alternatives, besides supply options, in its overall supply planning process. The discussion in this section focuses on the Heritage Pool and the determination of incremental load requirements.

Hydro-Québec Distribution is eligible to receive, from the Heritage Pool, a total of 165 TWh of energy per year (plus losses). The hourly load profile associated with this annual requirement has been set by Regulation and ranges from a maximum of 34,342 MW in the "peak" hour to 11,420 MW in the lowest load hour of the year[45]. A comparison of the load profile associated with the overall load forecast and that of the Heritage Pool indicates a maximum difference of 420 MW in 2006 and 600 MW in 2007[46]. However, these "maximum" differences do not occur at the time of the system peak – when the incremental needs are somewhat less (e.g. 160 MW for the 2006/2007[47]). While this discrepancy tends to disappear over the planning period, clearly the assumptions as to the hourly load profile of the overall load forecast and how these requirements will be matched up with power available from the Heritage Pool are critical in defining the needs for 2006/2007. However, while the Application provides some indication as to how the "peak" demand associated with the TWh forecasted for each year was determined, there is virtually no indication as to how the hourly

[45] HQD-2, Document 2, Annexe 2A.
[46] HQD-2, Document 3, p. 9.
[47] HQD-2, Annexe 3D, p. 3.

profile associated with the overall load forecast was established[48]. In fact, responses to Régie Staff interrogatories[49] indicate that HQD does not have weather normalized load duration curves for the years 1996-2000, which raises the question as to how the forecast load duration curves were determined.

Conclusion:

The derivation of the 420 and 600 MW values is by no means transparent. Furthermore, given the number of steps that have to be gone through to establish the values, there is likely to be a higher degree of uncertainty associated with these values than with the forecast for either incremental energy or incremental system peak load requirements.

Under the terms of the Heritage Pool, Hydro-Québec Production must provide the planning reserve requirements for generation associated with the Heritage Pool loads[50]. But as part of its Supply contracting process, HQD must provide the reserves to support any load requirements in excess of the Heritage Pool along with the associated ancillary services. To this end, HQD's call for tenders will include an additional 400 MW of supply. HQD rationalizes the need for this 400 MW as follows:

Ce premier bloc de 400 MW couvre les situations les plus probables de gestion des aléas. En plus, cette capacité additionnelle permet, lorsqu'elle n'est pas requise pour faire face aux aléas conjoncturels de la demande, de parer à d'autres besoins tels:
- jouer un rôle de soutien de production lors des mises hors service des équipements de production reliés aux autres contrats d'approvisionnement ;
- jouer un rôle de soutien de production en cas de défaut d'un

[48] In its response to OC interrogatory 4.3 (HQD-4, Document 6, p. 20), HQD states that the incremental loads are greater in summer than in winter for the years 2005-2009 and that in 2010-2011 the incremental loads will be greater in winter than in summer. In Régie Staff Interrogatory 12.1 (HQD-4, Document 1, pages 22-23), HQD explains that the first years' incremental loads are greater in summer because it made some changes to the Heritage Pool classified loads curve. However, no indication is provided as to what these changes were or why.
[49] HQD-4, Document 1, p. 23, Response to 12.2.
[50] HQD-4, Document 6, p. 18, Response to 3.4 a).

> fournisseur d'énergie rencontrer le critère de fiabilité en puissance.
>
> Finalement, la stratégie visant à ajouter 400 MW aux approvisionnements additionnels requis selon le scénario moyen est réversible. Si, au fil des années, le marché de court terme offre davantage d'opportunités à un coût raisonnable, cette capacité additionnelle peut facilement être utilisée à d'autres fins. Une quantité de 400 MW représente la croissance normale des besoins du Distributeur dans un intervalle d'environ 24 mois. Cette marge peut donc rapidement être absorbée par la croissance des besoins des marchés québécois. Le Distributeur doit donc avoir l'option d'utiliser cette capacité en service de base de façon permanente[51].

However, upon closer scrutiny there are some inconsistencies in the rationale put forward by HQD to support the 400 MW:

- As acknowledged by HQD, the NPCC requirement associated with the additional loads in excess of those to be served by the Heritage Pool in the year 2006/2007 amounts to only 20 MW[52]. Furthermore, even applying the NPCC requirements to the maximum incremental load requirements identified for 2007 yields a reserve requirement of only 90 MW (i.e., 15% of 600 MW).The NPCC requirements[53] are specifically meant to address reliability issues arising from equipment outages. Indeed, HQD acknowledges this in its discussion as to why the reserve requirements have been increased to 15% (from previous levels of 11-13%)[54]. As a result, meeting the NPCC requirements should also address concerns regarding equipment outages and non-delivery of supply (two of the other arguments used in support of the 400 MW).The NPCC requirements also allow utilities to rely on "assistance over interconnections with neighbouring areas and regions, and capacity and/or load relief from available operating procedures" in planning their reserves[55]. Elsewhere in the filed materials[56] HQD has indicated that it

[51] HQD-2, Document 3, page 19-20.
[52] HQD-2, Document 3, Annexe 3D, p. 3.
[53] HQD-2, Document 3, Annexe 3D, p. 1 - Footnote.
[54] HQD-2, Document 3, Annexe 3D, p. 2.
[55] HQD-2, Document 3, Annexe 3D, p. 1 - Footnote.
[56] HQD-4, Document 6, pages 30-31, Response to 4.18 e).

expects to be able to rely on 1410 MW of short term purchases and a "yet to be determined" quantity of interruptible power if load requirements (due to either economic or weather conditions) turn out higher than expected. However, HQD has made no reference to these potential options in its discussion of the 400 MW requirement.

As a result of the foregoing observations, it would appear that the justification for most, if not all, of the 400 MW of reserve supply options proposed for 2007 lies in the need to address load forecast uncertainty, the final factor identified by HQD in its rationale for establishing the level of reserve requirements. This conclusion is confirmed by HQD's response to OC Interrogatory 4.12:

> Il n'y a aucune relation entre la marge de manœuvre de 400 MW et la réserve en puissance identifiée à la page 3 de l'Annexe 3D. La marge de manœuvre de 400 MW est une capacité de production énergétique pour faire face à des scénarios de croissance de la demande plus élevés que le scénario moyen en conjonction avec les marchés de court terme. Cette marge de manœuvre permet cependant, entre autres, de couvrir à l'horizon du Plan la réserve en puissance identifiée à l'Annexe 3D. Aucun critère du NPCC ne traite du type de contrainte associée à l'électricité patrimoniale[57].

However, given that HQD is responsible for meeting <u>all</u> load requirements in excess of the Heritage Pool quantities, the need to address load forecast uncertainty is, in itself, a significant factor in the determination of reserve requirements. While the incremental loads expected to occur may be relatively small over the initial planning horizon (i.e. 600 MW by 2007), load forecast uncertainty is the result of potential variances around the utility's total load requirements which amount to some 34,500 MW in 2006/2007[58]. Small variations around this expected number could add significantly to the overall requirements for additional capacity relative to the base 600 MW requirement.

[57] HQD-4, Document 6, p. 27.
[58] HQD-2, Document 3, Annexe 3D, p. 3.

HQD has presented a number of load forecast scenarios to indicate the uncertainty associated with future load requirements. While the Company was not able to provide the probabilities associated with its various scenarios[59], based on the information available from HQD as to the uncertainty associated with its load forecasts, there appears to be a very low probability that either the mi-forte and forte growth scenarios will materialize[60]. This is probably just as well, since HQD's response to OC Interrogatory 4.18 e) indicates that the maximum resources available under the utility's plan in 2007 (16.2 TWh / 2410 MW) would be unable to meet the loads associated with the forte scenario based on its currently proposed 1000 MW call for tenders and available short term purchases. It is useful to note, that the Company would appear to have more than sufficient resources to meet the mi-forte scenario (i.e., 16.2 TWh/2410 MW to cover an incremental load of 11.5 TWh/1670 MW) and also enough to cover the same economic scenario under adverse (plus one standard deviation) weather conditions (where incremental load requirements are in the order of 13.4 TWh and approximately 2000 MW)[61].

Conclusion:

Based on HQD's planning assumptions, the proposed 1,000 MW call for tenders for 2006/2007 supply appears to be sufficient to cover (along with short term purchases of up to 8-9 TWh) all but the most improbable load forecast requirements.

4.4 Supply-Side Options Considered

[59] HQD-4, Document 6, p. 21, Response to 4.5.

[60] Response to Régie Staff Interrogatory 10.1 (HQD-4, Document 6, pages 19-20) shows that using a horizon of 3 years a forecast variation of 2.3 TWh (the difference in 2004 between the average and mi-forte scenarios) is less than 1% and that a variation of 8 TWh (the 2004 difference between the average and forte scenarios) is infinitesimal.

[61] HQD-2, Document 3, pages 8-9.

Potential supply-side options include contracting with:

- Developers of small distributed generation facilities (less than 100 kW) within Quebec (excluded from the supply plan[62]),
- Developers of larger generation facilities (most likely hydraulic or gas-fired) within Quebec, and
- Suppliers outside of Quebec (either owners of generation facilities or wholesale marketers).

In its initial Application, HQD proposed to limit the “call for tenders” to suppliers inside Quebec[63]. However, in response to Régie Staff Interrogatory 24.1, HQD indicated[64] that it would be willing to accept proposals from production sources outside Quebec as long as the deliveries did not utilize existing interconnection ties. Supplies along existing inter-ties were excluded on the grounds that the available supplies from this source were only in the order of 5 TWh per annum and needed to be reserved for short term purchases to cover load increases as a result of variations in the weather[65]. Eligibility for participation in the call for tenders process was also limited to parties who could commence delivery within the 2006-2007 timeframe.

4.4.1 Inter-ties

In response to Interrogatory 17.1 from the Régie Staff, HQD explains[66] that, after allowances for “market constraints”, imports over the inter-ties that are expected to be in place for 2006/2007 are limited to 20 TWh. The Company then indicates[67] that based on the existing generation capacity available on the other side of the inter ties and the coincidence of the various systems’ requirements only 10 TWh can be reasonably relied upon and that this capability must be

[62] HQD-1, Document 2, p. 2.
[63] HQD-1, Document 1, p. 3.
[64] HQD-4, Document 1, p. 39.
[65] HQD-2, Document 3, pages 16-17 and p.33.
[66] HQD-4, Document 1, p. 28.
[67] HQD-2, Document 3, p. 16.

shared with Hydro-Québec Production who also relies on the inter-ties to support the Heritage Pool. The net result, HQD argues, is that there are only 5 TWh annually that can be relied upon by HQD over the existing inter-ties. The Company has also indicated[68] that strengthening the inter-ties would not significantly increase this value as the neighbouring system on the other side of the inter-ties would also need to be significantly upgraded.

However, upon review, this logic would also suggest that there is 10 TWh of capacity available on the existing inter-ties that could be used to import power from new plants constructed in neighbouring jurisdictions as a result of contracts with HQD or neighbouring utilities who chose to contract to supply HQD out of their existing resources and meet their own needs through other means (e.g. perhaps through interconnects/contracts with utilities even further south). The point is that, unless the call for tenders process is opened up to allow for such parties to participate, HQD will never know for sure if such options are viable. Furthermore, through its Call for Tenders and Contract Award Procedure, HQD has the ability to “weed out” any such proposals that are not truly considered feasible.

HQD appears to have also arbitrarily determined that this 5 TWh should be reserved for short-term purchases to address uncertainties in load[69] and not used to source supplies as part of the call for tenders process. As discussed above, a preferable approach would have been to start by identifying overall reserve requirements and then, after matching them against the characteristics of the various supply options available, determine how many MW should be included in the proposed call for tenders and what the required product mix should be. As it is, the decisions appear to have been made on a piece-meal basis, such that there is no assurance that the overall result produces the appropriate level of reliability and does not lead to higher customer costs.

[68] HQD-4, Document 4, p. 10, Response to 7.2.
[69] HQD-2, Document 3, p. 17.

Conclusion:

HQD should permit suppliers from outside Quebec to participate in the call for tenders process and judge the merits of their proposals as part of the selection process.

4.4.2 Longer-Term Options

Participation in the call for tenders process will be limited to suppliers who can meet the 2006/2007 delivery timeframe. Furthermore, indications are that HQD plans to use a rolling 5-6 year window for any future call for tenders[70]. As a result, options that would require more than 5-6 years to develop will be shut out of any consideration as to how future load requirements will be met, even though the Supply Plan is supposed to consider a 10-year time horizon[71].

Conclusion:

In the interests of ensuring customers' costs are minimized over the long run, HQD should determine if there are cost-effective supply options that may require longer than 66 months to develop and, if so, determine how to provide for their inclusion in the supply planning and call for tenders processes.

4.5 Definition of Products Required

HQD's Application proposes issuing a call for tenders in January 2002 for 1,000 MW of capacity with delivery staged over the 2006/2007 period. Using the

[70] HQD-2, Document 3, p. 30.
[71] The Supply Plan Bylaw, Article 1, August 30, 2001 and HQD-4, Document 6, p. 29, Response to 4.16.

anticipated incremental load duration curve for 2007, the need for 300 MW of base load capacity has been identified along with 200 MW of cyclable capacity, 100 MW of cyclable/baseload capacity and 400 MW of fully dispatchable capacity[72].

In the event of higher than expected loads, it is my understanding that the cyclable and dispatchable capacity would be expected to run on a more continuous basis. Should lower than anticipated loads emerge, HQD anticipates that it would let the supplier sell the generating capacity on the short term markets, either with or without HQD being given a share of the profits. HQD also anticipates entering into contracts with suppliers that provide some flexibility in the timing of the initial delivery date[73].

Conclusion:

Based on the identified load requirements, HQD's proposed product mix appears reasonable.

4.6 Risks and Selection Criteria

The selection criteria (and the weightings) proposed by HQD for purposes of evaluating the eventual responses to its call for tenders proposal include:

- The cost of electricity: 60 %
- Financial soundness: 10%
- Experience: 10%
- Project feasibility: 10%
- Project flexibility: 10%

[72] HQD-1, Document 1, pages 3-4.
[73] HQD-2, Document 3, pages 19 and 26 and HQD-4, Document 1, pages 48-53.

Furthermore there will be minimum criteria for some areas (e.g. financial soundness and experience) and proposals that do not meet the required standards will be automatically excluded.

Given the uncertainties associated with when deliveries could be required and the mode (e.g. baseload vs. cyclable vs. fully dispatchable) in which the successful proposals may be required to operate and the weighting assigned to "cost" – it is critical that cost not be gauged simply on the "expected" operating mode but that its sensitivity to alternative modes of operation be included in any assessment of "cost performance". To do otherwise, could lead to a situation where the Company, as a result of accepting the options with the highest score, has contracted with a supplier who is lowest cost but whose limited flexibility in terms of operating mode could significantly increase customers' costs if loads do not turn out as forecast. While HQD's response to OC Interrogatory 5.2[74] suggests this will be considered; the response to Régie Staff Interrogatory 36.1[75] seems to suggest that the cost criteria will be judged based on the offer and the expected mode of operation.

Another concern is that the evaluation criteria do not give any weight to diversity of supply sources when evaluating a combination of supply alternatives. Such considerations are important if overall supply risks are to be minimized.

[74] HQD-4, Document 6, p. 32.
[75] HQD-4, Document 1, p. 62.

5.0 Overall Conclusions

In the preceding sections, a number of issues and concerns have been raised about the manner in which the 1,000 MW requirement for HQD's call for tenders proposal has been developed and the options that will be considered eligible determined. The following general conclusions provide a framework within which these specific concerns can be addressed and HQD's planning timelines still respected:

1. There is a need to clarify the relationship between the HQD's Supply Plan and its call for tenders process. In particular, the Régie de l'énergie should confirm that the call for tenders process is part of the overall supply planning process and that, as a result, the needs to be met by the call for tenders process must be integrated with planned capacity needs that will be met from other alternatives (e.g. energy efficiency initiatives, interruptible options) on a least cost basis consistent with clearly established reliability requirements.
2. It is reasonable based on the information provided to date and in view of the timelines required to develop new supply to "authorize" HQD to initiate its call for tenders process. The Régie de l'énergie should also direct HQD to open the process to suppliers from outside Quebec, including both those with proposals that involve new inter-ties as well as those that would involve the use of existing inter-ties.
3. It is not reasonable, based on the information provided to date, to conclude that HQD should enter into contracts with suppliers for a 1,000 MW of capacity for delivery over the 2006/2007 period. The Régie de l'énegie should direct HQD to update its overall Supply Plan for the period 2002-2011 and submit the results, prior to requesting approval of any specific supply contract. This updated Plan should:
    i. Include a clear definition of the reliability and costing criteria used in the planning process;

ii. Provide a transparent understanding of how the load forecast was developed;

iii. Present an revised load forecast that reflects energy efficiency savings and new interruptible rate programs based on avoided costs that are consistent with the Company's costing criteria and the cost of new supplies, as ascertained through the RFP process;

iv. Address the full reserve requirements of the utility in a comprehensive manner; and

v. Identify the resulting MW of capacity (and product mix) required to be contracted for over the 2006/2007 period after allowing for short-term purchases.

This updated Plan would then provide the context within which HQD would propose the approval of specific supply contracts.

WILLIAM O. HARPER

PROFILE

- Over 20 year experience in the design of rates and the regulation of electric utilities.
- Testified as an expert witness on rates before the Ontario Energy Board, 1988 to 1995 inclusive, and before the Ontario Environmental Assessment Board.
- Responsible for the regulatory policy framework for Ontario municipal electric utilities and for the regulatory review of individual utility submissions, 1989 to 1995 inclusive.
- Coordinated the participation of Ontario Hydro (and its successor company Ontario Hydro Services Company) in major public reviews involving Committees of the Ontario Legislature, the Ontario Energy Board and the Macdonald Committee.
- Provided consulting support for client interventions on energy and telecommunications issues before the Ontario Energy Board, the British Columbia Utilities Commission, and the CRTC.
- Served as a speaker on rate and regulatory issues for seminars sponsored by the APPA, MEA, EPRI, CEA, AMPCO and the Society of Management Accountants of Ontario.

EXPERIENCE

ECONALYSIS CONSULTING SERVICES

Consultant
July 2000 To Present

- Acted as Case Manager in the preparation of Hydro One Networks' 2001-2003 Distribution Rate Application.
- Responsible for supporting client interventions in regulatory proceedings, including issues analyses & strategic direction, preparation of interrogatories, and participation in settlement conferences. Specific proceedings include:
    - IMO 2000 Fees (OEB RP-1999-0040)
    - Enbridge Consumers Gas 2001 Rates (OEB RP-2000-0040)
    - BC Hydro IPP By-Pass Rates (BCUC G-26-01)
    - WKP Generation Asset Sale (BCUC G-33-01)
    - Rate of Return on Common Equity (BCUC G-62-01)
    - Access to In-Building Wire (PN CRTC 2000-124)
    - Extended Area Service (PN CRTC 2001-47)
    - Regulatory Framework for Small Telecos (PN CRTC 2001-61)
- Supported the preparation of Distribution Rate Applications for various municipal electric utilities
- Prepared Client Study regarding the implications of the 2000/2001 natural gas price changes on natural gas use forecasting methodologies.

HYDRO ONE NETWORKS

Manager - Regulatory Integration, Regulatory and Stakeholder Affairs
April 1999 to June 2000

- Supervised professional and administrative staff with responsibility for:
  - providing regulatory research and advice in support of regulatory applications and business initiatives;
  - monitoring and intervening, as required, in other regulatory proceedings;
  - ensuring regulatory requirements and strategies are integrated into business planning and other Corporate processes;
  - providing case management services in support of specific regulatory applications.
- Also Acting Manager, Distribution Regulation since September 1999 with responsibility for:
  - coordinating the preparation of applications for OEB approval of changes to existing rate orders; sales of assets and the acquisition of other distribution utilities;
  - providing input to the Ontario Energy Board's emerging proposals with respect to the licences, codes and rate setting practices setting the regulatory framework for Ontario's electricity distribution utilities;
  - acting as liaison with Board staff on regulatory issues and provide regulatory input on business decisions affecting Hydro One Networks' distribution business.
- Supported the preparation and review before the OEB of Hydro One Networks' Application for 1999-2000 transmission and distribution rates.

ONTARIO HYDRO

Team Leader, Public Hearings, Executive Services
April 1995 to April 1999

- Supervised professional and administrative staff with responsibility for managing Ontario Hydro's participation in specific public hearings and review processes.
- Directly involved in the coordination of Ontario Hydro's rate submissions to the Ontario Energy Board in 1995 and 1996, as well as Ontario Hydro's input to the Macdonald Committee on Electric Industry Restructuring and the Corporation's appearance before Committees of the Ontario Legislature dealing with Industry Restructuring and Nuclear Performance.

ONTARIO HYDRO

Manager – Rates, Energy Services and Environment
June 1993 to April 1995
Manager – Rate Structures Department, Programs and Support Division
February 1989 to June 1993

- Supervised a professional staff with responsibility for:
  - developing Corporate rate setting policies;
  - designing rates structures for application by retail customers of Ontario Hydro and the municipal utilities;
  - developing rates for distributors and for the sale of power to Hydro's direct

industrial customers and supporting their review before the Ontario Energy Board;
  - maintaining a policy framework for the execution of Hydro's regulation of municipal electric utilities;
  - reviewing and recommending for approval, as appropriate, municipal electric utility submissions regarding rates and other financial matters;
  - collecting and reporting on the annual financial and operating results of municipal electric utilities.
- Responsible for the development and implementation of Surplus Power, Real Time Pricing, and Back Up Power pricing options for large industrial customers.
- Appeared as an expert witness on rates before the Ontario Energy Board and other regulatory tribunals.
- Participated in a tariff study for the Ghana Power Sector, which involved the development of long run marginal cost-based tariffs, together with an implementation plan.

ONTARIO HYDRO

Section Head – Rate Structures, Rates Department
November 1987 to February 1989

- With a professional staff of eight responsibilities included:
  - developing rate setting policies and designing rate structures for application to retail customers of municipal electric utilities and Ontario Hydro;
  - designing rates for municipal utilities and direct industrial customers and supporting their review before the Ontario Energy Board.
- Participated in the implementation of time of use rates, including the development of retail rate setting guidelines for utilities; training sessions for Hydro staff and customers presentations.
- Testified before the OEB on rate-related matters.

ONTARIO HYDRO

Superintendent – Rate Economics, Rates and Strategic Conservation Department
February 1986 to November 1987

- Supervised a Section of professional staff with responsibility for:
  - developing rate concepts for application to Ontario Hydro's customers, including incentive and time of use rates;
  - maintaining the Branch's Net Revenue analysis capability then used for screening marketing initiatives;
  - providing support and guidance in the application of Hydro's existing rate structures and supporting Hydro's annual rate hearing.

ONTARIO HYDRO

Power Costing/Senior Power Costing Analyst, Financial Policy Department
April 1980 to February 1986

- Duties included:
  - conducting studies on various cost allocation issues and preparing recommendations on revisions to cost of power policies and procedures;
  - providing advice and guidance to Ontario Hydro personnel and external groups on the interpretation and application of cost of power policies;
  - preparing reports for senior management and presentation to the Ontario Energy Board.
- Participated in the development of a new costing and pricing system for Ontario Hydro. Main area of work included policies for the time differentiation of rates.

ONTARIO MINISTRY OF ENERGY

Economist, Strategic Planning and Analysis Group
April 1975 to April 1980

- Participated in the development of energy demand forecasting models for the province of Ontario, particularly industrial energy demand and Ontario Hydro's demand for primary fuels.
- Assisted in the preparation of Ministry publications and presentations on Ontario's energy supply/demand outlook.
- Acted as an economic and financial advisor in support of Ministry programs, particularly those concerning Ontario Hydro.

EDUCATION

MASTER OF APPLIED SCIENCE – MANAGEMENT SCIENCE

- University of Waterloo, 1975
- Major in Applied Economics with a minor in Operations Research
- Ontario Graduate Scholarship, 1974

HONOURS BACHELOR OF SCIENCE

- University of Toronto, 1973
- Major in Mathematics and Economics
- Alumni Scholarship in Economics, 1972