RÉGIE DE L'ÉNERGIE

HYDRO-QUÉBEC DISTRIBUTION'S APPLICATION FOR APPROVAL OF TARIFFS EFFECTIVE 2005-2006

FILE R-3541-2004

PART 1

EVIDENCE OF

WILLIAM HARPER
ECONALYSIS CONSULTING SERVICES

ON BEHALF OF:
OPTION CONSOMMATEURS

SEPTEMBER 30, 2004

TABLE OF CONTENTS

1 INTRODUCTION

On July 8th, 2002 Hydro-Québec Distribution (HQD) filed its first Application for approval of distribution tariffs with the Régie de l'énergie (the Régie). The Application arose as a result of changes in both the organizational structure of Hydro-Québec as well as changes in the legislative and regulatory framework within which it operates. The purpose of the application was to address the need for rates approved by the Régie as of May 1st, 2004, when the then existing rate freeze was scheduled to expire.

In its Application, HQD proposed that the Régie undertake its review in two phases. Phase 1 would (i) deal a number of the policies and principles applicable to electricity distribution; (ii) establish HQD's cost of service for 2002-2003; and (iii) review HQD's proposed cost allocation methodology. Phase 2 would then deal with HQD's proposals with respect to the actual rates to be approved for 2004-2005, developed in accordance with the Régie's decisions regarding Phase 1. Phase 1 took place during the fall of 2002 and the winter of 2002-2003 and the Régie issued its decision[1] on May 21st, 2003.

In July 2003, the Régie issued a procedural order[2] outlining the scope and procedures for Phase 2 of its review of HQD's 2004-2005 distribution rate case. In the same order, the Régie indicated that a Phase 3 would be added to the file, in which changes to the rate structure and a review of service charges would be dealt with. The Régie directed HQD to file the required evidence by February 16, 2004. HQD filed the requested evidence in January 2004. This evidence was subsequently withdrawn at the request of the Québec Minister of Natural Resources. In March 2004, the Régie issued a decision indicating that the issues regarding rate design and administrative service charges would be dealt with as part of HQD's 2005-2006 rate case[3].

[1] D-2003-93
[2] D-2003-138
[3] D-2004-64

On September 9th, 2003 the Régie issued a decision[4] rejecting HQD's request for a 3% interim rate increase effective October 1st, 2003. Subsequently, on September 24th HQD filed an amended Application wherein it sought the Régie's approval to increase its 2003-2004 rates by 3% 15 days following the Régie's decision with respect to its overall Application and by a further 2.98% applicable as of April 1, 2004. The Régie subsequently approved a 3% increase to be effective January 1, 2004[5]. Then, on February 26, 2004, the Régie approved a further rate increase of 1.4% to be effective April 1, 2004, subject to the provision of additional information by HQD[6]. Final approval was given for a 1.4% increase on March 16, 2004[7]. In both cases, the rate increases where applied uniformly across all customer classes and their associated rate structures.

On July 14, 2004, HQD filed a request with the Régie to initiate the regulatory process for its 2005-2006 rate case[8]. As part of its request, HQD filed evidence regarding it rate design principles[9] and possible directions for future rate design[10]. Subsequently, on August 31, 2004, the Régie issued its decision regarding HQD's 2005-2006 rate case and established a two part process for the review:

- Part 1 would address the materials filed by HQD to date and provided an opportunity for intervenors to file evidence regarding HQD's rate design principles and the future direction for rate design changes, as well as administrative charges.
- Part 2 would deal with HQD's actual rates for 2005-2006 and HQD was directed to file its detailed evidence by September 30, 2004.

[4] D-2003-168
[5] D-2003-232
[6] D-2004-46
[7] D-2004-57
[8] Demande R-3541-2004
[9] HQD-1, Document 1
[10] For example, in the case of the rate design for residential customers see HQD-1, Document 2, pages 23-28.

2 PURPOSE OF EVIDENCE

In its Application, Hydro-Québec Distribution (HQD) has set out its rate design principles and suggested[11] that application of these principles to residential rates would lead to:

- Freezing of the residential customer monthly customer charge at current levels;
- Maintaining the current 30 kWh/day first block in the residential rate structure;
- Increasing the differential between the first and second blocks in the residential rate structure; and
- Placing more emphasis on the demand charge applied to residential consumption in the third block of the current rate structure.

After reviewing HQD's Application and the Procedural Order issued by the Régie, Option Consommateurs (OC) retained Econalysis Consulting Services (ECS), a Canadian consulting firm offering regulatory services to clients in the electricity and natural gas to provide evidence that would assist the Régie in evaluating the issues associated with HQD's proposed rate design principles and the possible directions suggested for HQD's residential rate structure.

The Evidence was prepared by Bill Harper who, prior to joining ECS in July 2000, worked for 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. Mr. Harper's areas of expertise include cost allocation/rate design, the regulation of electric distribution utilities and management of utility involvement in regulatory proceedings. He has served as an expert witness in public hearings before the Manitoba Public Utilities Board, the Ontario Energy Board, the Ontario Environmental Assessment Board and a Select Committee of the Ontario Legislature on matters dealing with electricity rates and regulation. Mr. Harper has also testified before the Régie in earlier

[11] HQD-1, Document 2, page 23

proceedings dealing with HQD's 2002-2011 supply plan[12] and HQD's 2004-2005 rate application[13]. A full copy of Mr. Harper's CV is attached in Appendix A.

The Evidence starts by summarizing HQD's current residential rate structures. This is followed by a review of both the rate making principles proposed by HQD and HQD's analyses with respect to direction these principles suggest for future residential rate structures. Overall, HQD's rate design principles are generally consistent with accepted electricity industry practices. However, in applying these principles to its residential rate structures, HQD needs to undertake additional analyses in order to support the conclusions presented. Applicable comments are noted throughout the text and summarized in concluding section.

3 HQD'S CURRENT RESIDENTIAL RATES

3.1 Tariff D

Tariff D applies to separately metered residential dwelling units. It is also applicable to certain types of agricultural properties[14] which are generally considered to be "family farms".

The current two-tiered rate structure was first introduced in 1978 with a cut-off for the first block of 900 kWh/month. By 1982, both the customer charge and the first block energy rate had been converted to daily equivalents – giving rise to the 30 kWh/day for the first energy block. In 1982, a demand charge was also introduced for power usage in excess of 50 kW in the winter[15] in order to send a price signal that was more in line with marginal costs[16].

[12] File R-3470-2001
[13] File R-3492-2002
[14] HQD-1, Document 2, page 60-62
[15] Winter is defined as the months of December through March inclusive
[16] HQD-1, Document 2, page 6

The current tariff D rates as of April 1, 2004 are set out in Table 1.

Table 1
Tariff D - Effective April 1, 2004

Tariff Element	Rate
Daily Fixed Charge (per day)	$0.4064
Energy Charge (First 30 kWh/day)	$0.0495
Energy Charge (Additonal kWh)	$0.0624
Demand Charge (Winter kW's over 50 kW)	$3.21

Source: HQD-1, Document 2, page 8

3.2 Tariff DM

Tariff DM applies to multi-unit residential buildings where the dwelling units are not separately metered. The rates applied to such multi-unit residential buildings are based on Tariff D, but a multiplier is applied to both the customer charge and the kWh/day billed at the first block energy rate in order to recognize the number of dwelling units in the building. The multiplier is determined as follows:

- For multi-unit buildings with self-contained dwelling units – the multiplier is based on the number of dwelling units.
- For communal residences consisting in part or entirely of rooming facilities (as opposed to self-contained dwelling units only) – the multiplier is based on
    - The number of dwelling units, plus
    - One for the first 9 rooms or less, plus
    - One for each additional room.

The demand rate for power use in the winter in excess of 50 kW is set at $0.81/kW – roughly one-quarter the demand charge for Tariff D. The lower demand charge is meant to maintain a degree of parity between the costs that will be attributed to (i) multi-residential buildings with separate metering and billed using Tariff D and (ii) multi-residential buildings without separate metering and where Tariff DM will apply[17].

The current tariff is set out in Table 2.

Table 2
Tariff DM - Effective April 1, 2004

Tariff Element	Rate
Daily Fixed Charge (per day)	$0.4064 x Multiplier
Energy Charge (First 30 kWh/day x Mulitplier)	$0.0495
Energy Charge (Additonal kWh)	$0.0624
Demand Charge (Winter kW's over 50 kW)	$0.81

Source: HQD-1, Document 2, page 9

[17] HQD-1, Document 2, pages 9-10

3.3 Tariff DT

Tariff DT is an option rate open to Tariff D customers with a dual energy system for home heating or home and water heating. For a customer to be eligible for the rate both energy systems (i.e., the electric system and its alternative) must be capable of meeting the customer's full heating needs and must not be capable of operating simultaneously.

The peak and off-peak prices vary by temperature and are set such that:

- The same revenues are collected as under the Tariff D if the alternate system is not operated;
- The off-peak electricity rate provides a competitive advantage to electricity relative to the cost of diesel oil; and
- The peak electricity rate is greater than the equivalent cost of diesel oil.

The current rates for Tariff DT are set out in Table 3. There are currently (2002-2003) 119,000 customers on the rate.

Table 3
Tariff DT - Effective April 1, 2004

Tariff Element	Rate
Daily Fixed Charge (per day)	$0.4064
Energy (per kWh)	
Peak Energy Charge (applicable for temperatures < -12 C or -15 C depending on zone)	$0.1624
Off-Peak Energy Charge (applicable for temperatures > -12 C or -15 C depending on zone)	$0.0362

Source: HQD-1, Document 2, page 65

3.4 Tariff DH

Tariff DH is an experimental time of use rate introduced in the early 1990s. To be eligible for the rate customers must have been on Tariff D for a year with a capacity requirement of 200 amps or more. Furthermore, consumption during the winter period was to have represented at least 50% of annual consumption and be at minimum 80 kWh/day. During the period in which the reference data for HQD-1, Document 2 were collected (2002-2003), there were 194 customers on the tariff and it is currently closed to new subscribers.

The rate structure itself consists of:

- A customer charge equivalent to that for Tariff D
- An off-peak energy rate which is applicable for all hours in the summer and in the winter for the following times:
  - Weekends, December 25th and January 1st
  - Weekdays from 22 h to 6 h and 11 h to 15 h

- A peak energy rate with is applicable for the winter weekdays (excluding Christmas and New Years) from 6 h to 11 h and from 15 h to 22 h.

There is no demand for power use in excess of 50 kW associated with the Tariff DH.

The rates are design to recover the same revenue from the customers concerned as the Tariff D would – assuming there is no customer response to the peak/off peak price differential.

The current tariff schedule is set out in Table 4.

Table 4
Tariff DH - Effective April 1, 2004

Tariff Element	Rate
Daily Fixed Charge (per day)	$0.4064
Peak Energy Charge (per kWh)	$0.1354
Off-Peak Energy Charge (per kWh)	$0.0367

Source: HQD-1, Document 2, page 69

4 RATE MAKING PRINCIPLES

4.1 HQD'S Proposed Principles

In its July 2004 Evidence, HQD sets out[18] three principles that it proposes should be used in guiding decisions regarding rate design:

- Reflect the cost of service structure;

[18] HQD-1, Document 1, pages 6-7

- Provide a signal to encourage energy efficiency; and
- Promote simplicity, equity, continuity and stability.

Each of these principles is described and discussed below.

4.2 Reflect Cost of Service

HQD indicates that, based on this principle, rates would be designed to reflect the results of its cost allocation studies[19]. In particular, the fixed and variable components of a customer class' rate structure would be based on the customer-related costs versus demand and energy-related costs as identified by the Company's cost allocation studies. However, HQD also points out that, given the cross-subsidies built into the rates for the various customer classes, the required revenues by customer class determined by its cost allocation studies do not represent the revenue that each class must generate through its rates. This means that the cost allocation study results can not be used directly in setting the levels for the various components of the rate structure and instead should be used to "calibrate" the various components of the required rate structure[20].

Comments

As noted in the ECS Evidence prepared for R-3492-2002[21], one of the principle purposes of a cost allocation study is to provide guidance in the designing of rate structures for each individual customer class. One of the key criteria[22] in designing rates is that they should be "fair". This is generally interpreted as requiring that customers pay for the utility services they use and pay what the

[19] Note: The term "cost of service" has varying interpretations in different jurisdictions. In some, "cost of service study" refers to the utility's revenue requirement; whereas, in other jurisdictions, the term cost of service study refers to cost allocation, i.e. the allocation of the utility's revenue requirement to customer classes. To avoid confusion, the term cost allocation studies will be used throughout the Evidence in referring to the latter.
[20] HQD-1, Document 1, page 11
[21] January 8, 2003 Evidence of William Harper – pages 4-5 and October 16, 2003 Evidence of William Harper – page 3
[22] Phillips Jr., Charles F. The Regulation of Public Utilities, page 410.

services cost. Designing rates to reflect the results of a utility's cost allocation studies is the way utilities seek to achieve this objective. As a result, requiring that rate structures reflect costs (as defined by a cost allocation study) is an accepted and widely applied principle for rate design.

4.3 Provide a Price Signal to Encourage Energy Efficiency

HQD indicates that, to guarantee the optimal use of resources, economic theory suggests that the price of electricity should be set based on long-run marginal costs[23]. However, HQD also notes that since the revenue requirement overall is based on average (historical accounting) costs, rates can not be set at marginal cost levels for all elements of rate structure. As a result, HQD suggests that marginal costs should be applied to those elements of the rate structure that will have more of an effect on the behaviour of customers.

Comments

It is widely accepted that utility rates should inform customers as to the implications of their consumption decisions in terms of the costs of the resources that will be required (or saved) as result of changes in electricity usage. Such a principle is consistent both with competitive market pricing (for which economic regulation is meant to be substitute) and the objective of encouraging energy efficiency. Furthermore, in applying this principle, utilities commonly look to their own marginal cost/opportunity cost of supply as the appropriate price signal – as indicated in the references provided by HQD.

[23] HQD-1, Document 1, page 7

4.4 Promote Simplicity, Equity, Continuity and Stability

HQD indicates that simplicity in rate design implies both designing rates that are easy to understand and apply, as well as avoiding the creation of too many rate classes.

In terms of equity, HQD suggests that this principle requires that customers using similar services, with similar consumption characteristics and similar supply arrangements should pay similar costs in total. Equity also requires that, when changes are required to rate structures, the resulting bill increases be considered when determining the period of time required to achieve the desired changes.

With respect to continuity, HQD states that this criterion requires continuity between rate classes such that customers naturally select the rate class that corresponds to their level of consumption.

Finally, with respect to stability, HQD indicates that this requires that changes to rate structures should be made in a gradual manner.

Comments

Simplicity is a commonly used rate principle for a number of reasons. If rates are not sufficiently simple, such that customers can understand them, then both the fairness and efficiency principles could be compromised. For example, customers can not be expected to respond to a price if they can not determine what the price is. Similarly, if customers don't understand the basis on which their bill is prepared, then questions about the fairness and equity of the rates are bound to arise. Simplicity is particularly important for those customer classes consisting of residential and small commercial/industrial customers where the customers are likely to invest less time in trying to understand their bills.

Equity in terms of similar costs for similar services is consistent with the principle that rates should reflect the cost allocation study results. The requirement for managed changes in bills is frequently captured under a principle of "public acceptability". For some utilities, this requirement is expressed in terms of the maximum annual bill impacts – either in over all terms or relative to the customer class average rate change[24].

Continuity is particularly important for commercial/industrial customers who, as their consumption increases, are likely to be transferred from one rate class to another. Continuity of rate structures ensures that customers do not see significant changes in their bill as they move from one rate class to another. It also ensures that customers do not try to manipulate their consumption simply to qualify for one rate class versus another.

Finally, with respect to rate stability, it is understood that rates and rate structures will change over time. What this principle requires is that rates and rate structures change on a regular and predictable basis. Frequently utilities use the principle of "gradualism" if substantial changes are required – rather than making large shifts in either inter- or intra-class revenue recovery in a single rate case.

4.5 Conclusion

As indicated in the commentary for the previous sections, the rate design principles proposed by HQD are generally consistent with industry practice and regulatory literature.

[24] An example of such considerations is the case of Manitoba Hydro where bill impact guidelines require that no residential customer experiences a bill increase which exceeds the greater of $3.00 or three percentage points above the class average.

5 RESIDENTIAL RATE DESIGN

5.1 HQD's Residential Rate Design Analyses

As indicated in Section 3, HQD's standard residential rate as of April 1, 2004 (Tariff D) consists of:

- A customer charge of 40.64 cents per day;
- An energy charge of 4.95 cents/kWh for the first 30 kWh used in each day of the billing period;
- An energy charge of 6.24 cents/kWh for any additional kWhs used in the billing period; and
- A demand charge of $3.21/kW for all kW's in excess of 50 kW's recorded during the winter months.

In assessing the appropriateness of the current rate structure, HQD looked at:

- The 30 kWh/day definition for the first usage block;
- The differential that would be required between the first and second block energy rates in order to reflect the cost allocation study results;
- The level of current fixed customer charge relative to the cost allocation study results and fixed charges elsewhere; and
- The demand charge that would be required for rates to fully reflect marginal cost.

HQD also looked at the implication of the implications of introducing a third energy use block for consumption and reducing the customer charge below current levels.

Based on these analyses, HQD has concluded that:

- The customer charge should be frozen at its current level;
- The 30 kWh/day consumption level for the first block should be maintained;
- A third consumption block is not warranted and inconsistent with the proposed rate making principles;

- The price difference between the first and second consumption blocks should be based on the relative difference in the costs of serving the blocks of usage as determined by the cost allocation studies; and
- The demand charge for usage in excess of 50 kW should be increased.

In terms of implementation, HQD suggests that the required changes could be phased in over four years such that, even in conjunction with annual overall average rate increases of 2% per annum, the bill impacts would be acceptable.

Each of the above conclusions, the implementation plan and the alternatives considered are discussed in more detail below.

5.2 First Block Definition of 30 kWh/Day

HQD explains[25] that the first block of consumption is meant to cover uses of electricity for which there is not an alternative energy source, such as for lighting and electric appliances, as well as water heating. The rationale given is that the ability of consumers to change the electricity use associated with these basic uses is limited given the absence of substitutes and the nature of the uses.

To support the 30 kWh/day figure, HQD notes that based on its billing data the average daily use for Tariff D and DM customers without electric space heating[26] is 28 kWh per day and that the average summer use for Tariff D customers is 30 kWh per day[27]. HQD also notes that the data derived from its PEPC (Permanent Metering Program) also supports the 30 kWh/day value.

HQD further observes that the load profile associated with usage in the first block is relatively stable over the year; whereas usage in the second block (i.e., over 30

[25] HQD-1, Document 2, page 20
[26] Also excluded are customers using more than 50 kW.
[27] HQD-1, Document 2, page 21

kWh/day) is much more variable and increases in the critical hours of the year[28]. This fact is borne out by the load factors that can be ascribed to the two blocks of energy use from the data presented in HQD's Evidence[29] and summarized below.

Table 5
Load Factors for First and Second Residential Blocks (Tariff D&DM)

Block	2002 Average Use (kWh)	Peak Demand (kW)	Load Factor(1)
First Block (30 kWh/Day)	8,536	1.49	65.40%
Second Block (Balance of Use)	7,392	2.32	36.37%
Total	15,928	3.81	47.72%

Source: HQD-1, Document 2, page 16

Notes: 1) Calculated based on the Average Use and Peak Demand

Comments

The determination of the consumption level attributable to the first usage block should be consistent with HQD's rate making principles. The cost allocation study allocates costs to the residential customers classes based on both demand and energy usage. However, with the exception of usage over 50 kW, residential customer consumption is billed entirely on a kWh basis. As a result load factor is a critical determinant in the cost per kWh hour attributed to the residential class through the cost allocation study. In order to be consistent with the principle that the rate structure "reflect cost of service", the breakpoint for the daily usage blocks should reflect usage levels at which the load factor for a residential customer typically changes.

[28] HQD-1, Document 2, page 14
[29] HQD-1, Document 2, page 16

As can be seen from Table 5, there is a significant difference (65.4% vs. 36.4%) in the load factors associated with the first and second blocks as proposed by HQD. However, HQD has not demonstrated that the 30 kWh/day is the optimal breakpoint for the first usage block. In order to do so, HQD should provide analysis[30] of the data available from its load research program (i.e., PEPC) as to how the load factor changes as daily usage increases. Such analysis would indicate whether there is more natural breakpoint for the first usage block than 30 kWh.

In order to satisfy the principle of encouraging energy efficiency, the block structure should be selected such that:

- The higher priced block(s) captures the incremental usage for significant portion of the customers; and
- Usage in the higher priced block is considered to be "elastic" (i.e., there are alternatives and consumers can readily respond to the price signal).

HQD indicates that only 19% of customers were billed only in the first usage block[31]. This type of bill frequency information is much more useful for assessing the implication of rate structure changes than the distribution of the annual consumption of Tariff D customers set out in Figure 5 of the Application[32]. In order to assist the Régie and other parties to fully understand the implication of using different energy blocks, analysis should be presented that looks at the distribution of the consumption[33] associated with the bills actually sent to customers over a recent 12 month period.

[30] One way of doing this would be to construct a schedule similar to Table 5 (HQD-1, Document 2, page 16) but where the usage, peak demand and resulting load factor is set out for each progressive 10 kWh block starting from 20 kWh up.
[31] HQD'1, Document 2, page 10
[32] HQD-1, Document 2, page 30
[33] This would involve developing a bill frequency distribution that identified the number of bills issued for different blocks of daily usage.

HQD indicates[34] that the purpose the 30 kWh/day block is to allow for basic electricity uses for which there are generally no substitutes such that the second block will capture space heating usage which is considered to be more elastic (i.e., more substitutes readily available). To support this point, HQD notes that the typical level of usage for non-electric space heating customers is 28 kWh/day and the average summer usage for Tariff D customers is 30 kWh/day. However, utilizing the data provided by HQD in its Application, the average daily usage for non-electric space heating customers appears to be between 32[35] to 34[36] kWh per day. As result, there is some question as to whether the 30 kWh/day block is sufficient to cover basic uses. To address this question in more detail would require the type of bill distribution analyses discussed above – except this time focusing on non-space heating customers.

5.3 First/Second Energy Block Cost Differential

HQD utilizes the results of its cost allocations studies and, in particular, the costs that are allocated to the residential class on volumetric basis to establish the costs attributable to usage in the first and second energy block. The results are presented in HQD's Evidence in Table 5 (assuming a constant 3.23 cents/kWh cost of supply) and Table 6 (assuming a cost of supply that varies by load factor)[37]. In Table 5, the difference in costs per kWh for Transmission and Distribution by energy block arise because, in both cases, costs are allocated to the residential class based on demand (coincident and non-coincident) and the load factor used to translate the costs into a per kWh value differ by energy block. Similarly, in Table 6, the electricity supply costs are allocated between energy blocks based on the same formula that is used to allocate

[34] HQD-1, Document 2,pages 6 & 20-21
[35] Based on Table 3, HQD-1, Document 2, which shows an annual consumption of 10,839 GWh for a total of 929,005 non-space heating customers below 50 kW.
[36] Based on Table 4, HQD-1, Document 2, which shows an average annual use for non-space heating customers of 12,500 kWh.
[37] HQD-1, Document 2, pages 16 & 17

supply costs to customer classes. Since this formula utilizes load factor the results costs vary by energy block and increase when the load factor is lower.

Overall, HQD's analyses indicate that the relative cost differential between the first and second energy blocks is 34% (assuming a constant value for electricity supply) and increases to 50% is the cost of electricity supply is also varied by energy block[38]. Using these results, HQD concludes that the differential between the first and second energy blocks could be set at a minimum of 34% and a maximum of 50%.

Comments

The approach taken by HQD to identify the cost differential between consumption blocks is reasonable and consistent with that seen employed elsewhere[39].

It is not immediately clear from the Application what the source of the cost data used in the analyses was (i.e., what cost allocation study results were used?). The most recent publicly available cost allocation study is the one filed by HQD as part of its August 14, 2002 Phase 2 Application to R-3492-2002. Table 6 (below) sets out the cost per kWh for Tariff D and DM customers based on the results of that cost allocation study.

[38] HQD-1, Document 2, page 17

[39] The question of inverted rates has arisen at recent Manitoba Hydro proceedings before the Manitoba Public Utilities Board. Parties seeking to demonstrate the rationale for a cost differential have used analyses similar to that presented by HQD.

Table 6
R-3492-2002 Cost Allocation Results

	Electricity Supply	Transmission	Distribution [3]
Results Per R-3492-2002			
Allocated Costs to D and DM [1] ($ M)	1,700.60	1134.4	340.4
Energy Use [2] (GWh)	52,651	52,651	52,651
Cost/kWh	$0.0323	$0.0215	$0.0065

Sources:
1. R-3492-2002-Phase 2, HQD-8, Document 4, Table 7
2. R-3492-2002-Phase 2, HQD-8, Document 4, Table 11
3. Excludes customer service costs, metering costs, connection costs and minimum system costs consistent with the definition used in the current Application (HQD-1, Document 2, Table 6)

A comparison of the total costs presented in the current Application[40] and those filed as part of R-3492-2002 Phase 2 indicates that the electricity commodity and transmission values are virtually equivalent. However, the costs attributable to distribution are substantially different. The cost allocation methodology presented by HQD in R-3492-2002 has undergone further refinements the results of which have yet to be filed with the Régie. Clarification as to the basis for the distribution cost data is required and likely forthcoming as part of HQD's September 30th, 2004 filings.

5.4 Fixed Customer Charge

HQD explains that the daily customer charge should recover the fixed customer service costs, as these costs do not vary by the level of customer consumption[41]. Utilizing 2004

[40] HQD-1, Document 2, Table 5
[41] HQD-1, Document 2, page 17

cost allocation study results, HQD demonstrates that these costs are currently in the order of 35 cents per day.

In the Application, HQD also compares its fixed customer charge with that of other utilities as of May 1st, 2003. The comparison demonstrates that while the HQD customer charge was marginally lower than the Canadian average; it was higher than the average for the American utilities surveyed[42]. HQD also notes that its customer charge represents a higher proportion of the total residential monthly bill for a 1,000 kWh customer than do the customer charges for virtually all other utilities in the survey.

Finally, HQD identifies the conflicting objectives involved in setting the level of customer charges. While some US utilities have increased the charges in order to provide greater revenue stability, this move reduces the emphasis on the volumetric charge and lessens the customers' incentive to manage electricity use wisely.

Overall, HQD concludes that a freeze in the current fixed charge may be appropriate[43].

Comments

HQD's uses customer service and metering-related costs as a benchmark for the appropriate level of customer service charge. In contrast, in its cost allocation studies, HQD also includes as customer-related costs the costs of connection facilities and a minimum system component of its overall distribution system[44]. However, as suggested by the level of customer charges levied by the various North American utilities HQD survey, virtually no utility recovers all of its customer-related costs through a fixed charge. This is particularly the case when the customer-related costs also include a portion of the distribution system as is it does with HQD. In such cases, utilities will look at the costs more directly related

[42] HQD-1, Document 2, page 19
[43] HQD-1, Document 2, page 20
[44] R-3492-2002, HQD-8, Document 4, page 13

with providing service to customers when testing the reasonableness of their customer charges.

It is not immediately clear what is the source of the customer service and metering costs presented in the Application and used to calculate the 35.02 cents/kWh benchmark. The 2004 total costs for customer service and metering allocated to residential customers are identified in the Application as $397.2 M[45]. In contrast, the total customer service and metering costs attributed to residential customers in the cost allocation study filed for R-3492-2002 are $361.5 M[46]. Again, clarification as to the source of the relevant data may be forthcoming in HQD's September 30th filing.

Also, it is debatable as to whether the benchmark shouldn't also include the cost of connection facilities – which HQD appears to have excluded. Using the results of the cost allocation study HQD filed as part of its R-3492-2002 Application, the inclusion of the connection costs and sales and marketing costs attributable to residential customer would increase the total costs recovered through the fixed customer charge to $398.5 M. Based on the customer counts presented in the same study this would translate into a daily fixed charge of $0.353.

Based on the cost allocation study results currently available, HQD's conclusion that the customer charge should be frozen is reasonable. Indeed an argument could be made for a modest decrease. However, the updated cost allocation study results will have to be considered before any definitive conclusions can be reached.

[45] HQD-1, Document 2, page 18
[46] R-3492-2002, HQD-8, Document 4, page 13. Note: The total quoted includes marketing and sales costs as well as a credit for other revenues. Based strictly on the cost categories identified by HQD the equivalent value derived from R-3492-2002 data would be $360.3 M.

5.5 Demand Charge for Excess Power Usage

The Tariff D currently includes a demand charge in the winter months[47] of $3.21 / kW for load taken in excess of 50 kW. The purpose behind this excess demand charge is to send a pricing signal to larger customers that is more in line with the marginal cost of supply during the winter months.

HQD asserts that customers using 130,000 kWh or more (i.e., more than 50 kW at a 30% load factor) should pay one cent per kWh more for their incremental consumption which translates into a demand charge of $10.20 / kW per winter month[48].

Comments

While the rationale for the excess demand charge is consistent with the principle of encouraging energy efficiency by setting rates for incremental use close to marginal costs, doing so by adopting the suggested demand charge for loads in excess of 50 kW raises a number of questions.

First, it presumes that the energy prices set for the last energy block will be less than the marginal cost of energy and that, furthermore, the differential will be one cent per kWh. These presumptions can only be tested after the decisions have been made regarding the basic residential rate design and, in particular, regarding the cost differential to used between the various energy blocks. This issue will be explored further in section 5.6.

Second, an annual load factor of 47% is required to translate one cent per kWh into a demand charge of $10.20 / kW for four months of the year. HQD has indicated that at demand levels of 50 kW the customer's overall load factor is

[47] Winter is considered to be December through March inclusive
[48] HQD-1, Document 2, pages 22 & 23

30%[49]. Assuming a higher load factor for basic use, the load factor for usage in excess of 50 kW is probably less than 30%. As a result, the derivation of the $10.20 / kW requires further clarification.

Finally, the question arises as to why it is necessary to wait until consumption reaches 130,000 kWh per year (or 356 kWh/day) before a third block is effectively introduced and rates increased to be comparable to long run marginal costs. The issue of a third energy block is discussed in more detail later in section 5.8.1.

5.6 HQD's Reference Rate Structure

Based on its analyses, HQD concluded that:

- The customer charge should be frozen at its current level;
- The 30 kWh / day consumption level for the first block should be maintained;
- A third consumption block is not warranted and inconsistent with the proposed rate making principles;
- The price difference between the first and second consumption blocks should be based on the relative difference in the costs of serving the blocks of usage as determined by the cost allocation studies; and
- The demand charge for usage in excess of 50 kW should be increased.

Using the cost differentials for the first and second energy blocks as derived from the cost allocation results and an excess winter demand charge of $10.20 / kW, HQD derived two sets of reference rates for Tariffs D and DM where each would recover the same revenue as the existing April 1st, 2004 rates. The first set of reference rates is based on the 34% energy block price differential; while the second incorporates the 50% differential that arises when supply costs are also differentiated by energy block. The results are set out in Table 7.

[49] HQD-1, Document 2, page 22, Footnote #15

Table 7
Reference Tariffs for D and DM

Tariff Element	Current Tariff	Reference Tariffs 34% Differential	Reference Tariffs 50% Differential
Customer Charge (cents/day)	40.64	40.64	40.64
Energy Charges			
First 30 kWh/Day (cents/kWh)	4.95	4.78	4.47
Remaining kWh (cents/kWh)	6.24	6.40	6.71
Excesss Demand ($/kW > 50 kW)			
Tariff D	3.21	10.20	10.20
Tariff DM	0.81	2.49	2.49

Source: HQD-1, Document 2, page 24

Comments

The rationale for the excess demand charge was that an extra cent per kWh was required in order to bring the rates, for higher levels of usage, up to marginal costs. In the Application, HQD indicates that the marginal cost for residential heating is 6.6 cents / kWh in 2006[50]. Given that the price of energy associated with the second energy block is 6.4 or 6.7 cents per kWh (depending upon the cost differential employed), additional charges of one cent/kWh are not required in order to bring the tariffs in line with marginal costs for usage over 50 kW.

However, HQD has recently updated its marginal cost calculations in accordance with the Régie Decision D-2004-96. In HQD's August 2004 avoided cost update

[50] HQD-1, Document 2, page 22

the 2006 value for heating applications is 7.74 cents per kWh[51]. Based on this level of avoided costs, an excess demand charge equivalent to one cent per kWh would serve to bring the tariffs more in line with the marginal cost of supply.

5.7 HQD's Illustrative Implementation Plan

Implementation of the tariff structure changes will impact individual customers bills even if the changes are revenue neutral overall. Table 8 illustrates the impacts of implementing the reference tariff structures discussed in the previous section. Furthermore, the impacts would be incremental to any impacts arising as result of requests for general rate increases or changes in the cost allocation methodology.

Table 8
Reference Tariff Monthly Bill Impacts

Monthly Use {kWh}	Bill @ Current Rates	Bill @ Reference Rates {34% Differential}	Impact {%}	Bill @ Reference Rates {50% Differential}	Impact {%}
200	22.092	21.752	-1.54%	21.132	-4.35%
500	36.942	36.092	-2.30%	34.542	-6.50%
1000	62.982	61.612	-2.18%	59.132	-6.11%
2000	125.382	125.612	0.18%	126.232	0.68%
3000	187.782	189.612	0.97%	193.332	2.96%
4000	250.182	253.612	1.37%	260.432	4.10%
5000	312.582	317.612	1.61%	327.532	4.78%

Source: Calculated based on the stated monthly consumption values and the rates per HQD-1, Document 2, page 24

In order to ameliorate the bill impacts, HQD has illustrated how the changes to a rate structure based on a 34% differential between the first and the second blocks could be phased in over 4 years[52]. When combined with general rate increases of 2% per

[51] HQD, "Mise à jour des coûts évités", août 2004, p. 10, document distributed during the September 8, 2004 working group session on l'étude du potentiel technico-économique d'énergie, R-3519-2003, Phase II (available on the Régie website).
[52] HQD-1, Document 2, page 27. Note: The illustrative plan does not fully implement the excess demand charge over the four year period.

annum, the resulting bill impacts are less than 3% for virtually all customers[53]. For very large customers (i.e., annual consumption of over 400,000 kWh and a demand of 100 kW) the annual impact would be roughly 3.3% in total[54].

Comments

Overall, the range of bill impacts associated with a four year phase-in is quite concentrated around the assumed 2% general rate increase. Indeed, the fairly tight dispersion would suggest that a shorter phase-in period could well be acceptable. However, before adopting a shorter period it would be necessary to update the bill impact analyses using HQD's proposed rate increase for 2005-2006 and to look more closely at the range of bill impacts in excess of 3%.

HQD has not presented an implementation plan for the reference tariffs based on a 50% differential between the first and second energy blocks. There are merits to the 50% differential reference tariff in terms of HQD's rate making principles. The resulting cost differentials more fully capture the implications of customers' load profiles on the cost of service allocation and the resulting energy rates for the second energy block more closely approximate HQD's marginal costs. Implementation of the 34% differential could be considered as a first step in the rate restructuring process.

[53] HQD-1, Document 2, page 28
[54] HQD-1, Document 2, page 29

5.8 Alternatives Considered

In its Application HQD outlines a number of modifications to the reference Tariff that it analyzed and found inadequate for the reasons described below.

5.8.1 Introduction of a Third Energy Block

In response to queries from stakeholders[55], HQD also looked at introducing a third energy block. HQD indicates that in order to justify a third energy block there should be a cost change as result of a given load profile or customer consumption pattern. HQD goes on to note that the current 30 kWh breakpoint reflects consumption for basic uses versus space heating and that there is no "use" that would allow one to define a third energy block. As a result, HQD arbitrarily established a third energy block at 60 kWh/day - noting that this cut the above 30 kWh/day consumption roughly in half[56].

HQD then went through a costing process similar to what was done for the two energy block case and derived the unit costs associated with each of the three energy blocks assuming no differentiation in electricity supply costs by block. The results are summarized in Table 9 below.

[55] HQD-1, Document 2, page 29
[56] HQD-1, Document 2, page 31.

Table 9
Cost and Load Profiles for Three Energy Block Case

Energy Block	Average Energy Use {kWh}	Peak Demand {kW}	Load Factor	Total Cost {cents/kWh}
First (<30 kWh/day)	8536	1.49	65.4%	5.58
Second (30->60 KWh/day)	3662	0.94	44.5%	6.69
Third (> 60 kWh/day)	3730	1.38	30.9%	8.22
Total	15928	3.81	47.7%	6.45

Source: HQD-1, Document 2, page 32

HQD raises a number concerns regarding the results of introducing a third energy block:

- Even with a four year phase-in the dispersion of bill impacts is much greater than with the two block reference tariff. Larger customers (i.e., 100 kW customers) would see impacts in the order of 5.5%, inclusive of the 2% assumed annual rate adjustment.
- Price increases for the first block of energy use will be less than the general rate increase and rates for the second energy block will remain virtually unchanged over the implementation period. This means that for 75% of the consumption and 44% of the customers will see lower than average or no increase in prices.
- Given the absence of a change in prices for the second block, some uses such as air conditioning will be charged at lower rates than under the reference tariff case.

Comments

HQD claims that there is no basis for the selection of a third energy block. However, the load profile data presented in Table 9 above suggests that consumption profile of customers is not constant for all usage in excess of 30

kWh/day – as demonstrated by the change in load factor for usage between 30 and 60 kWh/day as opposed to usage over 60 kWh/day. In order to determine the most appropriate breakpoint it would be necessary to undertake analyses of HQD's load research data similar to that described in section 5.2 above for determining the most appropriate breakpoint for the first energy block. This would allow a reference tariff structure with a third energy block to be developed that better reflected HQD's "cost of service" rate making principle.

In all likelihood, any three block tariff structure will still yield a pricing signal for the second block that is less than the rate derived for consumption above 30 kWh/day in the current two block reference tariff (e.g., 6.4 cents / kWh[57] with the 34% differential)[58]. Given that the most recent estimates of HQD's marginal costs suggest a value of 7.74 cents per kWh for 2006, this means that the introduction of a third energy block is likely to result in greater disparity between the rates for the second energy block and marginal costs while moving the rates for the third energy block closer to (and perhaps even above) marginal costs. The overall effect, from an energy efficiency perspective is that some customers will see an improvement in the price signal (i.e., those billed in the third block), while others will see a dilution of the price signal (i.e., those billed in the second block).

In order to fully understand the extent of the trade-off involved, it would be useful to have more detailed information regarding the frequency distribution of HQD's residential bills by level of use (e.g., how many bills were issued in the last full year with daily consumption of 10-20 kWh, 20-30 kWh, 30-40 kWh, etc). Such information, particularly if broken down between electric space heating and non-space heating customer would provide invaluable insight into the extent to which the introduction of a third energy block (based on cost of service principles)

[57] HQD-1, Document 2, page 24
[58] The only way this is not likely to be the result is if the size of the 30 kWh first block was also reduced.

compromised the energy efficiency principle and allow for the appropriate trade-offs to be made in establishing the future direction for rate restructuring.

5.8.2 Level of Customer Charge

HQD also looked at the implications of reducing the current fixed customer charge by 10% or 25% and in its Evidence has illustrated how such reductions could be phased in over 4 years[59] along with the rate changes structure based on a 34% differential between the first and the second blocks

When combined with general rate increases of 2% per annum, the resulting bill impacts for the 10% customer charge reduction are roughly the same as those previous presented for just the reference tariff phase-in and are less than 3% for virtually all customers[60].

In the case of a 25% reduction in the customer charge, the customer impacts have a larger dispersion and almost 15% of the customers see a bill decrease even while the general rate level is increasing at 2% per annum.

Commenting on the results, HQD notes that:

- In the case of a 10% reduction, the 34% cost differential is not achieved by the 4th year;
- The intent of the customer charge is to recover the costs of customer service and metering and transferring such costs to the energy component of the tariff structure would be inconsistent with the price signal (presumably from a cost allocation study perspective); and

[59] HQD-1, Document 2, pages 36 & 38. Note: Again, the illustrative plan does not fully implement the excess demand charge over the four year period.
[60] HQD-1, Document 2, page 37

- Lowering the customer charge would unduly favour customers who do not consume electricity regularly throughout the year[61].

Comments

With respect to the rate making principle of cost tracking, a 25% reduction in the customer charge is likely to reduce the value to the point where the charge does not recover the customer service and metering costs attributed to residential customers by the cost allocation study. However, it is not clear that this is the case with a 10% reduction. Indeed, a 10% reduction may serve to bring the customer charge more in line with these costs. As discussed in Section 5.4, there is a need to clarify and/or update the cost allocation study results before a definitive conclusion can be reached on the matter.

HQD notes that in the case of the 10% reduction, the differential in rates between the first and second energy blocks only reaches 29% by the end of the four year phase-in as opposed to the 34% target. However, the reason for this result is that HQD, in developing the illustrative implementation plan for the customer charge reduction, appears to have set the first energy block increase at 2% per annum[62] – equivalent to the assumed annual general rate increase. No such requirement was used in the original implementation plans developed for the reference tariffs and, indeed, in the case of the 34% differential, the rate for the first energy block only increases at 1.4% per annum[63].

With respect to the rate making principle of "energy efficiency", while the rates for the second energy block resulting from a reduction in the customer charge increase in both cases (i.e., for the 10% and 25% reduction) the resulting energy rates are still below HQD's updated values for its marginal cost of supplying residential customers.

[61] HQD-1, Document 2, page 40
[62] HQD-1, Document 2, pages 36 & 38 – Tables 18 & 21
[63] HQD-1, Document 2, page 27, Table 10

Overall, a reduction in the customer charge could have merit and needs to be evaluated once updated cost allocation study results are available.

6 CONCLUSIONS

A summary of key comments and conclusions is set out below.

6.1 HQD's Rate Making Principles

- The rate design principles proposed by HQD[64] are:
  - Reflect cost of service;
  - Encourage energy efficiency; and
  - Promote simplicity, equity, continuity and stability.
- These principles are consistent with both industry practice and regulatory literature and are appropriate criteria for guiding HQD's rate restructuring analyses.

6.2 HQD's General Analytical Approach

- The analytical approach that HQD has followed in the Application to establish its reference tariff structure and assess alternatives generally consisted of the following seven steps:
  1. Identify the appropriate energy blocks by segmenting residential energy consumption based on usage characteristics;
  2. Use the results of the cost allocation studies and load profiles to determine the costs associated with each energy block;
  3. Similarly, use the results of the cost allocation studies to determine an appropriate level for the fixed monthly customer charge;

[64] HQD-1, Document 1

4. Develop a reference tariff structure that captures these cost characteristics;
5. Look at the marginal cost of supply to establish the rates for winter demand charges for excess power usage;
6. Test the appropriateness of the overall structure in terms of pricing signals by looking at energy rates that customers will face for marginal consumption as well as the year over year trends; and
7. Establish an implementation plan that phases in the reference tariff in a manner that produces acceptable bill impacts on an annual basis.

- The overall general analytical approach is reasonable in that it captures the need to reflect cost of service (in the first four steps) and considerations with respect to encouraging energy efficiency (in next two steps) as well as issues of simplicity, equity, etc. (in steps 6 and 7).

- The only shortcoming may be the fact that (with the exception of the excess demand charge) the analyses do not formally consider the degree to which the resulting rates for incremental consumption reflect HQD's marginal cost of supply residential customers. Rather, energy efficiency considerations tend to focus on the changes in the energy rates for the blocks that will capture incremental consumption.

6.3 HQD's Reference Tariff

- HQD's reference tariff represents an improvement over the current tariff structure when assessed against the rate making principles
- However, there is a need to both update and clarify the cost allocation study results used in establishing the relative cost of the energy blocks and the benchmark for the fixed customer charge. Based on the current results, a decrease in the fixed customer charge would appear to be warranted.

- Furthermore, more analyses should be done to:
    - Confirm that 30 kWh/day is the appropriate breakpoint between the first and second energy block, and
    - Determine an appropriate breakpoint for a potential third energy block.
- Finally, it would be useful if more details regarding HQD's billing statistics (e.g., frequency distribution by usage level) were provided so as to provide greater insight into what portion of the customers would face the marginal prices in each of the energy blocks (for both the reference and any alternative cases examined).

APPENDIX A

CV FOR ECS CONSULTANT

William O. Harper

Mr. Harper has over 20 year experience in the design of rates and the regulation of electricity utilities. He has testified as an expert witness on rates before the Ontario Energy Board from 1988 to 1995, and before the Ontario Environmental Assessment Board. He was responsible for the regulatory policy framework for Ontario municipal electric utilities and for the regulatory review of utility submissions from1989 to 1995. Mr. Harper 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. He has 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. Since joining ECS, Mr. Harper has provided consulting support for client interventions on energy and telecommunications issues before the Ontario Energy Board, Manitoba Public Utilities Board, Québec's Régie de l'énergie, British Columbia Utilities Commission, and CRTC. He has also appeared before the Manitoba's Public Utilities Board, the Manitoba Clean Environment Commission and Quebec's Régie de l'énergie. Bill is currently a member of the Ontario Independent Electricity Market Operator's Technical Panel.

EXPERIENCE

Econalysis Consulting Services- Senior Consultant
2000 to present

- Responsible for supporting client interventions in regulatory proceedings, including issues analyses & strategic direction, preparation of interrogatories, participation in settlement conferences, preparation of evidence and appearance as expert witness.

- Electricity
  - IMO 2000 Fees (OEB)
  - Hydro One Remote Communities Rate Application 2002-2004
  - OEB - Transmission System Code Review (2003)
  - OEB - Distribution Service Area Amendments (2003)
  - BC Hydro IPP By-Pass Rates
  - WKP Generation Asset Sale
  - BC Hydro Heritage Contract Proposals
  - BC Hydro's 2004/05 and 2005/06 Revenue Requirement Application
  - Hydro Québec-Distribution's 2002-2011 Supply Plan
  - Hydro Quebec-Distribution's 2002-2003 Cost of Service and Cost Allocation Methodology
  - Hydro Québec-Distribution's 2004-2005 Tariffs
  - Manitoba Hydro's Status Update Re: Acquisition of Centra Gas Manitoba Inc.
  - Manitoba Hydro's Diesel 2003/04 Rate Application
  - Manitoba Hydro's 2004/05 and 2005/06 Rate Application

- Manitoba Hydro/NCN NFAAT Submission re: Wuskwatim

- Natural Gas Distribution
  - Enbridge Consumers Gas 2001 Rates
  - BC Centra Gas Rate Design and Proposed 2003-2005 Revenue Requirement
  - Rate of Return on Common Equity (BCUC)

- Telecommunications Sector
  - Access to In-Building Wire (CRTC)
  - Extended Area Service (CRTC)
  - Regulatory Framework for Small Telecos (CRTC)

- Other
  - Acted as Case Manager in the preparation of Hydro One Networks' 2001-2003
  - Distribution Rate Applications
    - Supported the preparation of Distribution Rate Applications for various Ontario municipal electric utilities.
  - Supported the implementation of OPG's Transition Rate Option program prior to Open Access in Ontario
  - Prepared Client Studies on various issues including:
    - The implications of the 2000/2001 natural gas price changes on natural gas use forecasting methodologies.
    - The separation of electricity transmission and distribution businesses in Ontario.
    - The business requirements for Ontario transmission owners/operators.

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 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.
- 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 (APR. 1995 TO APR. 1999)

- Supervised professional and admin staff responsible 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.

Manager – Rates, Energy Services and Environment (June 1993 to Apr. 95)
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.

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.

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.

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