THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

IN THE MATTER OF the *Public Utilities Act*, R.S.N.L. 1990, Chapter P-47, as amended, (the "Act");

AND

IN THE MATTER OF a general rate application (the "Application") by Newfoundland Power Inc. ("Newfoundland Power") to establish customer electricity rates for 2008.

PRE-FILED EVIDENCE
OF
C. DOUGLAS BOWMAN

August 6, 2007

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Evidence Outline

List of Tables and Exhibits

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My name is Doug Bowman. This document was prepared by myself, and is correct to the best of my knowledge and belief. I have been retained by the Government appointed Consumer Advocate to provide expert advice and evidence to the Consumer Advocate in response to Newfoundland Power Inc.'s ("Newfoundland Power's") application to establish customer electricity rates for 2008. In particular, this pre-filed evidence documents the results of my review of Newfoundland Power's proposed cost of service and rate design, and its actions and performance relating to distribution reliability and customer service.

A summary of my background and qualifications is provided in ***Exhibit CDB-1***. I have both a B.S. and an M.S. in Electrical Engineering from the State University of New York at Buffalo and 30 years experience in the electricity services and consulting industry. My primary expertise includes power sector restructuring, regulation and markets, and electricity services costing and pricing. I am currently an independent Energy Consultant working out of my office located in Warrenton, Virginia.

Prior to becoming an independent consultant, I was employed by KEMA Consulting, Nexant Inc., Pace Global Energy Services, International Resources Group, CSA Energy Consultants and Ontario Hydro. I have testified before this Board five times previously as an expert witness on cost of service and rate design at Newfoundland Power's 1996 *Application by Petition for Approval of Certain Revisions to its Rates, Charges and Regulations*, at Newfoundland and Labrador Hydro's 2001 *General Rate Proceeding*, at Newfoundland Power's 2003 *General Rate Application*, at Newfoundland and Labrador Hydro's 2003 *General Rate Application* and at Newfoundland and Labrador Hydro's 2006 General Rate Application. I have also appeared twice before the Nova Scotia Utility and Review Board as an expert witness on cost of service and rate design, and while at Ontario Hydro, I was involved with the regulatory process in the areas of generation and transmission planning, demand/supply integration, operations, rate design and customer service.

Section 1 of my Pre-filed Evidence summarizes my review of Newfoundland Power's evidence with regard to this Application; **Section 2** provides a review of the cost of service study; **Section 3** provides a review of Newfoundland Power's proposed rates, charges and rules and regulations; and **Section 4** provides review and comment on the need for a distribution reliability and service standard.

1. Summary of Evidence

A summary of my review of Newfoundland Power's Application follows:

a) I believe that the cost of service study has been prepared consistent with previous Board Orders and the February 26, 2004 Mediation Report from the 2003 General Rate Application. The incorporation of the 2006 Load Research Study results has improved the fairness of cost allocation among customer classes. However, the revenue to cost ratios for General Service Rate 2.2 and 2.3 customers remain high, at over 110%. Bringing the revenue to cost ratios for these classes down to 110% at this time would exacerbate the severity of the rate impacts proposed for the Domestic customers. Therefore, I recommend that the Board direct Newfoundland Power to bring the revenue to cost ratios for these classes down to 110% or less at its next general rate application.

b) With regard to proposed rates, I recommend the following:

- A reduction of about $1.00 per month in the Basic Customer Charge for the Domestic class would bring it down closer to the Canadian average and increase the energy charge to a level that more closely tracks marginal costs, thus improving the efficiency of the price signal. As I do not yet have information relating to the customer bill impacts associated with different Basic Customer Charges, I will pursue this issue further with Newfoundland Power during negotiations and file a specific recommendation with the Board prior to the hearing scheduled for October.

- Newfoundland Power is proposing that General Service Rate 2.1 customers with consumption less than 600 kWh/month, representing 60% of the class, receive a rate increase in excess of the 1.3% average rate increase proposed for this class (CA-NP 197, Attachment A, page 1 of 3). This is primarily a result of the proposed increase in the Basic Customer Charge from $17.90/month to $19.08/month which is well above the Canadian average. Because the proposed cost recovery from this class is well above costs allocated in the cost of service study (115%), and because the proposed energy charge is already well above the marginal cost of demand and energy, I recommend that the Basic Customer Charge and the energy charge change by the same percentage ultimately approved by the Board for the class as a whole. This would result in a Basic Customer Charge closer to the Canadian average while spreading rate impacts evenly among customers within the class.

- Further reductions in demand charges and 1st block energy charges, and further increases in tail-block energy charges from those proposed by Newfoundland Power would improve the efficiency of the rate designs for General Service Rates 2.2, 2.3 and 2.4. Newfoundland Power indicates such changes to the rate designs were considered but would result in unacceptable customer impacts and would lead to intra-class fairness issues. However, the designs considered by Newfoundland Power and resulting customer impacts have not been submitted in evidence. As I do not yet have this information, I will pursue this issue further

with Newfoundland Power during negotiations and file a specific recommendation with the Board prior to the hearing scheduled for October.

- Like Newfoundland Power's thermal generation, the Curtailable Service Option is available for dispatch during times of system stress. Unlike Newfoundland Power's thermal generation, Curtailable Service is also dispatched to manage Newfoundland Power's peak demand in an effort to reduce its power purchase costs from Newfoundland and Labrador Hydro. On only one occasion in the past five years has Curtailable Service been dispatched when the island interconnected system was under stress. On all other occasions, interruptions have placed an undue burden on Curtailable Service customers without providing additional value to the island interconnected system. This situation can be remedied by treating Curtailable Service in the same manner as Newfoundland Power's thermal generation – by limiting dispatch of Curtailable Service to only those occasions when Newfoundland and Labrador Hydro determines that the system is under stress, or when it can alleviate a localized problem on Newfoundland Power's system, and by providing Newfoundland Power credit for its Curtailable Service demand in Newfoundland and Labrador Hydro's cost of service study. This would maintain Newfoundland Power's incentive to continue to pursue Curtailable Service by making it financially indifferent. These issues are being considered in the *Review of Demand Billing to Newfoundland Power* as agreed among the Parties in the October 20, 2006 *Agreement on Cost of Service, Rate*

Design and Rate Stabilization Plan filed as part of Newfoundland and Labrador Hydro's 2006 General Rate Application.

- Newfoundland Power is not proposing material changes to its rate structures; nor is it proposing additional rate options in spite of the many benefits cited in its 1997 report entitled *A Study of Innovative Approaches to Rate Design Based on Marginal Costs and Time-of-Use Design Principles* (see CA-NP 422, Attachment B). The Board states in its decision following the 1996 hearing "Marginal cost and time-of-use design methods should be pursued and will direct the Applicant to pursue innovative approaches based on such methodology" (page 98). Newfoundland Power states correctly that "the high price of fuel can be expected to increase the regulatory focus on customer rate design and, in particular, the economic efficiency of customer rate design" (page 6, lines 15 – 19). Therefore, I recommend the Board direct that a study be undertaken to review Newfoundland Power's rate regime including rate options. The study would consider rates consistent with the marginal cost study (Volume 2, Tab 12) and the Conservation and Demand Management Potential Study, and include a detailed action plan for implementation of the recommendations subject to Board approval. I recommend the Board direct that Newfoundland Power, Newfoundland and Labrador Hydro and the Consumer Advocate draft a terms of reference and schedule for the study and present it to the Board for approval by year-end.

c) Reliability and cost are identified as the areas of greatest importance to consumers. Yet Newfoundland Power does not currently have a formal distribution reliability and service standard. In the absence of such a standard with attendant performance measures and benchmarks, it is not possible to determine if Newfoundland Power is meeting its obligation under the *Electrical Power Control Act, 1994* to equitably deliver power to customers in the province at the lowest possible cost consistent with reliable service (CA-NP 69, page 2 of 2, lines 14-16), and if expenditures on reliability-related projects are prudently incurred. I recommend that the Board direct that a distribution reliability and service standard be developed with reporting initiated under the standard during 2008. Because the Board ordered in P.U. 8 (2007) relating to Newfoundland and Labrador Hydro's 2006 General Rate Application that "Hydro shall include in its quarterly reports, ... , an update on the progress of the development of a comprehensive maintenance plan and associated reliability standards", I recommend that the development of the standard be a tri-party effort, led by Newfoundland Power, the primary distributor in the Province, with input and review by Newfoundland and Labrador Hydro and the Consumer Advocate. This would ensure consistency in the treatment of customers throughout the Province. The Board would have ultimate approval authority for the Standard. I recommend that the Parties cooperatively develop the scope of work and schedule and submit it to the Board for review and approval by year-end.

2. Cost of Service

I believe that the cost of service study has been prepared consistent with previous Board Orders and the February 26, 2004 Mediation Report from the 2003 General Rate Application (see response to CA-NP 188). The incorporation of the 2006 Load Research Study results has improved the fairness of cost allocation among customer classes.

I agree with the proposed changes to the cost of service study including the functional classification of PUB assets, cash working capital allowance and the amortization of the hydro equalization reserve. These changes result in improved cost tracking and a fairer allocation of costs among customer classes while maintaining acceptable customer rate impacts (see response to CA-NP 240).

Although I agree with the methodology followed in the cost of service study, I have two concerns. The first concern is that the cost of service study was based on 2005 rather than 2006 results. The response to CA-NP 187 indicates that a cost of service study based on 2006 results could not be completed in time for filing of the Application. The response goes on to state that it is Newfoundland Power's assessment that basing the cost of service on 2006 results would not provide materially different results. I tend to agree that use of 2005 results is acceptable in this case given the indicative nature of the cost of service study stemming from the broad range of target cost allocations; i.e., proposed revenue to cost ratios ranging from 94.6% to 115% (Application page 118, Table 56).

My second concern relates to the proposed revenue allocations; in particular, the proposed revenue to cost ratios for General Service Rates 2.1 and 2.2 of 115.0% and 113.3%, respectively (Application page 118, Table 56). This compares to the upper target revenue to cost ratio of 110% (Application page 117, lines 7-8). Reducing revenue to cost ratios for these classes to 110% and increasing the allocation to Domestic Rate 1.1 customers, the only class with a revenue to cost ratio less than 100%, would result in a 7.2% rate increase for the Domestic class compared to the proposed 6.4% rate increase (see Application page 4, point 15 and response to CA-NP 191).

In light of the large proposed rate increase to the Domestic class, I recommend that further increases not be imposed at this time. However, rates that are much higher than costs such as those proposed for General Service Rates 2.1 and 2.2 promote inefficient consumption, so should not be allowed to continue too far into the future. Therefore, I recommend that the Board direct Newfoundland Power to bring the revenue to cost ratios for these classes down to 110% or less at the next general rate application consistent with Newfoundland Power's proposal in CA-NP 190. This recommendation is made in an effort to improve the fairness of the rate regime over time while maintaining acceptable customer impacts.

3. Rate Design

I have identified four principal areas of concern in my review of the proposed rate designs, including:

1) The Basic Customer Charges for Domestic and General Service Rate 2.1;

2) The tail-block energy charges for General Service Rates 2.2, 2.3 and 2.4;

3) The dispatch of customer demand under the Curtailable Service Option; and

4) The need for rate options.

Each of these issues is discussed in detail below. A summary of my recommendations relating to the proposed rate designs is provided in ***Section 3.5***.

3.1 Basic Customer Charges for Domestic and General Service Rate 2.1

In Order No. P.U. 7 (1996-97), the Board ordered Newfoundland Power to review its Basic Customer Charge ("BCC") and the methodology for calculating customer costs. Mr. Brockman conducted the review on Newfoundland Power's behalf. His review is included as Exhibit LBB-3 in Newfoundland Power's 2003 General Rate Application. Some of the key findings of Mr. Brockman's review of Canadian experience with Basic Customer Charges for small customers follow (all taken from Brockman Prefiled Evidence filed in the Newfoundland Power 2003 General Rate Application):

- There seems to be almost universal agreement that the cost of metering, billing, customer information and service wire costs should be included in the customer charge (Brockman Prefiled Evidence, page 9, lines 5 to 7).
- Methods for calculating how much of the cost of the distribution system between the service wire and the distribution substation that should be included in customer related costs is controversial and there is no universally accepted way to do it (Brockman Prefiled Evidence, page 9, lines 8 to 10).

- For Domestic customers, Newfoundland Power's Basic Customer Charge is among the highest in Canada, although customer charges for other utilities have increased in recent years (Brockman Prefiled Evidence, page 9, lines 11 to 13).
- A survey of utilities in Canada shows that the customer charge generally does not recover all of the customer related costs derived from their cost of service studies (Brockman Prefiled Evidence, page 9, lines 17 to 19).
- Newfoundland Power's current method of calculating the Basic Customer Charge is within the Canadian mainstream. It recovers 100% of the cost of metering, billing, customer information and service wire costs, and about 60% of the customer related costs attributable to the distribution system (Brockman Prefiled Evidence, page 10, lines 1 to 6).

During mediation at the last rate proceeding, Newfoundland Power agreed to reduce the Basic Customer Charge for Domestic and General Service Rate 2.1 customers by $1/month. Further, Newfoundland Power agreed to cap the customer charge recovery of distribution costs allocated to customers at 50% of the allocated distribution costs for these rate classes, with the remainder to be recovered through energy charges. Distribution costs were defined as distribution network costs beyond the service drop and do not include customer specific costs such as meters, meter reading, billing and service drops (February 26, 2003 Mediation Report , Section 1, component (n)).

In this Application, Newfoundland Power proposes that the Basic Customer Charge for Domestic customers be frozen at the current level of $15.59/month, and that it be increased for General Service Rate 2.1 customers from $17.90/month to $19.08/month. In my pre-filed evidence at the last Newfoundland Power Application, I included an exhibit that showed the Basic Customer Charge for Domestic and General Service Rate 2.1 customers was substantially above the simple average of the customer charges for Canadian utilities. The $1/month reduction agreed to during negotiations brought the Basic Customer Charges more in line with the Canadian mainstream, but still well above the Canadian average. Further reductions were not pursued owing to customer impacts.

In CA-NP 259, Newfoundland Power provides current basic customer charges for utilities across Canada. The figures are repeated in ***Table 1***. As can be seen, the simple Canadian average is $14.47/month for Domestic customers and $16.51/month for small general service customers. This compares to Newfoundland Power's proposed Basic Customer Charges of $15.59/month and $19.08/month, respectively (see response to CA-NP 258). Reductions of $1.12/month for Domestic customers and $2.57/month for General Service 2.1 customers from the proposed Basic Customer Charges would:

- Recover 100% of customer specific costs including customer accounting, customer service, meters and services[1], which might be considered the floor price;

[1] Customer specific costs for the Domestic class are $13.02/month (see CA-NP 256) and for the General Service 2.1 class are $15.90/month (see CA-NP 257).

- Collect a contribution toward customer-related costs associated with distribution network costs beyond the service drop; and
- Place the level of Newfoundland Power's Basic Customer Charges for Domestic and General Service 2.1 customers at the Canadian average.

Reducing the Basic Customer Charges for Domestic and General Service Rate 2.1 customers would require that there be increases in energy charges (both rate designs are two-part with no specific demand component). This means that customer impacts would be different from those under proposed rates. More specifically, reducing the Basic Customer Charges would result in lower rate increases for low consumption customers and higher rate increases for high consumption customers. Provided customer impacts are reasonable, I view this as a positive result for the Domestic class because it brings the energy charge closer to the marginal cost of demand and energy (Volume 2, Tab 13, page 5), thus improving the efficiency of the price signal in the rate component with greatest elasticity; i.e., the rate component that customers are most able to respond.

Reducing the Basic Customer Charge for the General Service Rate 2.1 customers would further increase the proposed energy charge that is already well above the marginal cost of demand and energy (Volume 2, Tab 13, Table 6). Under the proposed rate, General Service Rate 2.1 customers with consumption less than 600 kWh/month, representing 60% of the class, would receive a rate increase in excess of the 1.3% average rate increase proposed for the class (CA-NP 197, Attachment A, page 1 of 3). This is primarily a result of the proposed increase in the Basic Customer Charge from

$17.90/month to $19.08/month. Applying the approved rate change proportionally to each of the Basic Customer and the energy components would result in a Basic Customer Charge that is closer to the Canadian average while spreading rate impacts evenly among customers within the class without significantly worsening the efficiency of the energy price signal that is already well-above marginal costs.

Table 1. July 2007 Survey of Canadian Basic Customer Charges (BCCs)

Utility	*BCC Residential*	*BCC Small General Service*
Newfoundland Power	$15.59	$17.90 (current) $19.08 (proposed)
Nova Scotia Power	$10.83	$12.65
New Brunswick	$20.99 (urban)	$20.99
Maritime Electric	$22.27 (urban)	$22.27
Hydro Quebec	$12.19 (30 days)	$12.33 (30 days)
Ontario:		
Hydro One Networks	$14.57 (urban)	$16.04 (urban)
Toronto Hydro	$12.93 (30 days)	$17.00 (30 days)
Ottawa Hydro	$9.49	$10.55
Ontario Average	$12.33	$14.53
Manitoba Hydro	$6.24 (less than 200 amps) $12.48 (more than 200 amps)	$15.60 (single phase) $21.75 (three phase)
Manitoba Average	$9.36	$18.68
Sask Power	$15.31 (urban)	$18.92 (urban)
Alberta:		
ATCO Electric	$27.81	$20.91
EPCOR (Edmonton)	$15.52	$13.99
ENMAX	$15.49 (30 days)	$23.43 (30 days)
Alberta Average	$19.61	$19.44
British Columbia:		
BC Hydro	$3.69	$4.42
Fortis BC	$10.95 (30 days)	$13.19 (30 days)
BC Average	$7.32	$8.81
Average	$14.47	$16.51

Notes:
1) Rural BCCs were excluded since Newfoundland and Labrador Hydro serves rural customers in the Province.
2) When more than one utility in a Province is quoted, an average is calculated for the province.
3) Newfoundland Power is not included in the calculation of the average.

3.2 Tail-block Energy Charges for General Service Rates 2.2, 2.3 and 2.4

The proposed tail-block energy charges for General Service Rates 2.2, 2.3 and 2.4 range from 6.5 to 6.8 cents/kWh (Schedule A). This is far below the marginal cost of energy that ranges from 9.7 to 10.0 cents/kWh for these classes (Volume 2, Tab 13, Tables 8, 11 and 14).[2] The proposed demand charges for General Service Rates 2.2, 2.3 and 2.4 range from \$7.05 to \$8.63/kW/month in the four winter months and from \$5.55 to \$7.13/kW/month in the eight non-winter months. This is far above the marginal cost of capacity ranging from \$4.7 to \$5.1/kW/month in the four winter months, and close to zero in the eight non-winter months (Volume 2, Tab 13, Tables 9, 12 and 15).

Because the proposed energy charges are much lower than marginal costs and demand charges are much higher than marginal costs, the efficiency of the rate design is far from optimum for these rate classes. Newfoundland Power considered decreasing demand charges and increasing tail-block energy charges while recovering the allocated revenue to each class. In its response to CA-NP 262, Newfoundland Power indicates that it has made significant progress in this regard while striking a reasonable balance between the various criteria for a sound rate design. Specifically, the impact on customer bills within each class influenced the tail-block increases proposed in the Application. Newfoundland

[2] The energy charges for Domestic and General Service Rate 2.1 are much closer to marginal costs because there is no specific demand component; all costs other than those collected in the Basic Customer Charge are recovered in the energy charge.

Power goes on to say that in the future[3], further reductions in demand charges may be warranted.

It is not clear to what extent Newfoundland Power considered changes to tail-block energy charges for these customer classes and their resulting customer impacts. In its response to CA-NP 262, Newfoundland Power did not actually show the impacts on customer bills resulting from changes to demand charges, and a response to CA-NP 450 requesting such information was not yet available when this evidence was filed. Newfoundland Power defends its low tail-block energy charges (relative to marginal energy costs) in its response to CA-NP 238 where it states that marginal energy costs are volatile (part a) and that setting the tail-block energy charge at a marginal supply cost of about 10 cents/kWh would require a low-priced 1st block which would raise intra-class fairness issues (part b). With regard to the first point, it is true that oil prices are volatile. However, marginal energy costs are currently high, and expected to remain high for the next several years during which these rates will be in place. Newfoundland Power has not filed evidence to the contrary.

With regard to the second point, Newfoundland Power has not filed evidence relating to the alternative rate designs that were considered, and the resulting impacts on customer bills and intra-class fairness. For example, it is not clear if Newfoundland Power considered further reductions only to the demand charges for the non-winter months and

[3] Presumably, this means the next rate Application although Newfoundland Power does not provide a specific schedule.

the resulting consumer impacts. Further analysis is necessary before I can assess the relevance and accuracy of Newfoundland Power's statement that further increases in tail-block energy charges would result in unacceptable customer impacts.

3.3 Curtailable Service Option

Under the terms and conditions of the Curtailable Service Option, customers can be curtailed, or dispatched, for up to 100 hours in total during the four winter months (Application, Schedule A). According to the response to CA-NP 424, Curtailable Service was dispatched four times for a total of 8.25 hours during the winter of 2006/07 and two times for a total of 8 hours during the winter of 2005/06. On every occasion that Curtailable Service load has been dispatched in the past five years, it has been initiated by Newfoundland Power in an effort to manage (i.e., reduce) its annual peak and resulting payments for power purchased from Newfoundland and Labrador Hydro. On only one occasion that Curtailable Service load has been dispatched in the past five years (January 23, 2006) was the island interconnected system at risk of a generation shortage (CA-NP 424, lines 13-18).[4]

It is desirable for Newfoundland Power to implement programs to reduce its peak demand, representing a substantial portion of the total demand on the island interconnected system. However, demand management programs with direct control such as Curtailable Service should be dispatched only when there is a system need (i.e., a

generation or transmission capacity deficiency), or when there are significant economic benefits to the system (i.e., during periods when it can displace high cost peaking generation). Like peaking generation, Curtailable Service has value because it is available for dispatch during system emergencies. Because Newfoundland Power's thermal generation and Curtailable Service are available for dispatch during system emergencies, Newfoundland and Labrador Hydro can include them in system simulations as a resource, thus improving the reliability of the system and reducing the need for new generation capacity in the future. In addition, because they are available for dispatch in real time, system operators can use them as operating reserve, thus improving the reliability of the system in the operating time frame. This planning and operating value exists whether or not the thermal generation and Curtailable Service are actually dispatched.

Because of the similarities, curtailable service options are often designed to mirror the operation of peaking generation facilities. In fact, like Newfoundland Power's thermal generation, Curtailable Service is dispatched when Newfoundland and Labrador Hydro determines that it can help to alleviate a system emergency. However, unlike Newfoundland Power's thermal generation, Newfoundland Power also dispatches Curtailable Service in an effort to manage its peak demand and reduce its power purchase costs. By doing so, the number of interruptions to Curtailable Service are increased (substantially over the past five years), thus placing an undue burden on these customers

[4] On this occasion, Newfoundland and Labrador Hydro requested Newfoundland Power to run its thermal generation.

without providing any additional benefit to the island interconnected system. Like Newfoundland Power's thermal generation, being available for dispatch when called upon during times of system stress represents the full value of this capacity – there is no further value gained from this capacity by also dispatching it to reduce Newfoundland Power's peak demand.

Newfoundland Power dispatches Curtailable Service to manage its demand in response to the price signal in the wholesale rate governing its purchases from Newfoundland and Labrador Hydro. The demand charge in the wholesale rate is applied to Newfoundland Power's maximum demand during the winter months, so Newfoundland Power has incentive to manage its demand whenever it believes it may establish a new winter peak. This same price signal exists for Newfoundland Power thermal generation, but Newfoundland Power has agreed to dispatch its thermal generation only when directed by Newfoundland and Labrador Hydro, or when there are localized problems on Newfoundland Power's own system. To provide Newfoundland Power incentive to maintain the availability of its thermal generation, the capacity contribution of its thermal generation is recognized in Newfoundland and Labrador Hydro's cost of service study; i.e., Newfoundland Power is compensated through a reduction in the costs it is allocated in the cost of service study. As Newfoundland Power is financially indifferent, there is no need for it to dispatch its thermal generation to manage its peak demand. The cost of service study and dispatch regime should be altered to provide similar treatment for Curtailable Service.

3.4 The Need for Rate Options

In its response to CA-NP 262, Newfoundland Power indicates that customer bill impacts are an important consideration in rate design. Likewise, in its response to CA-NP 238, Newfoundland Power notes the importance of intra-class fairness in rate design. Certainly, customer bill impacts and intra-class fairness are important rate design criteria. Whenever a change in rate designs is introduced, issues relating to both customer bill impacts and intra-class fairness will arise. In fact, intra-class fairness issues exist under the current rate regime.

For example, Newfoundland Power is proposing an average rate increase of 5.3% (Application Part A, page 3). However, owing to cost recovery fairness issues, it is proposed that Domestic customers be levied a 6.4% increase and General Service Rate 2.1 customers be levied only a 1.3% increase (Application Part A, page 4). Further, within the Domestic class, high consumption customers (consuming more than 3000 kWh/month) are expected to receive a rate increase of roughly 7%, while low consumption customers (consuming less than 200 kWh/month) are expected to receive a rate increase of less than 4%. Therefore, the issue is not "if" there will be customer impacts, but rather if there will be "unacceptable" customer impacts; i.e., relating to bill impacts and intra-class fairness. What constitutes an "unacceptable" customer impact requires judgment and a balancing of the customer impacts against other rate design criteria such as efficiency.

Inequities within a customer class arise because rates are designed on the basis of the consumption characteristics of the class as a whole. Customers within a class who do not have consumption characteristics that mirror those of the class as a whole are either paying or receiving an intra-class subsidy.[5] Consumption characteristics of customers within a class can be diverse as Newfoundland Power points out in its response to CA-NP 238 (b). Consider that Domestic customers with electric heat and hot water consume three times as much electricity as Domestic customers without electric heat or hot water (see response to CA-NP 2).

Various techniques are used to mitigate the inherent issues relating to customer bill impacts and intra-class fairness in a rate regime, including for example:

- Gradually increasing/decreasing rates for specific classes to move toward 100% revenue to cost ratios as opposed to setting all rate classes at 100% cost recovery each time a cost of service study is completed.
- Establishing maximum monthly charges to limit the size of bills for low consumption customers in a class; i.e., General Service Rates 2.2, 2.3 and 2.4 have a maximum monthly charge of 16.8 cents/kWh (plus the Basic Customer Charge).

[5] There are inter-class subsidies as well. Consider that General Service Rate 2.1 customers are currently paying 119.8% of costs while Domestic customers are paying only 93.7% of costs (see CA-NP 190).

- Increasing the number of rate classes[6]. In an ideal world without practical limitations a rate would be designed for each customer on the system.
- Offering customers rate options. As stated in Newfoundland Power's June 1997 report *A Study of Innovative Approaches to Rate Design Based on Marginal Costs and Time-of-Use Design Principles* (CA-NP 422, Attachment B, page 18), the benefits of time-of-day and seasonal rates offered on a voluntary basis give customers choices. They can also be designed so that customers who are unfairly treated by the standard rates are treated more fairly under the voluntary rate. With voluntary rates, only customers who are better off go on the rate, so negative customer impacts are avoided.

As I have testified in the past, offering customers rate options not only improves the fairness of a rate regime, but also increases customer satisfaction and improves the economic efficiency of the power system[7]. I concur with Newfoundland Power's statement (page 6, lines 15 – 19) "the high price of fuel can be expected to increase the regulatory focus on customer rate design and, in particular, the economic efficiency of customer rate design". The Board states in its decision (page 98) following the 1996 hearing "Marginal cost and time-of-use design methods should be pursued and will direct the Applicant to pursue innovative approaches based on such methodology". However, in spite of the completion of the marginal cost study, Newfoundland Power is not proposing

[6] In its response to CA-NP 447, Newfoundland Power indicates it has not conducted any recent analyses of the number of rate classifications.

material changes to rate structures; neither is it proposing additional rate options. In its response to CA-NP 23 (e), Newfoundland Power states "the Company believes a number of policy issues should be addressed before the Board before material changes to rate structures are implemented". Newfoundland Power is not proposing a specific schedule to deal with customer rate alternatives at this time (see response to CA-NP 184).

3.5 Summary of Recommendations Relating to Rate Design

My recommendations relating to Newfoundland Power's proposed rate designs follow:

a) A reduction of about $1.00 per month in the Basic Customer Charge for the Domestic class would bring it down closer to the Canadian average and increase the energy charge to a level that more closely tracks marginal costs, thus improving the efficiency of the price signal. As I do not yet have information relating to the customer bill impacts associated with different Basic Customer Charges (a response to CA-NP 449 had not yet been filed when this evidence was submitted), I will pursue this issue further with Newfoundland Power during negotiations and file a specific recommendation with the Board prior to the hearing scheduled for October.

[7] Newfoundland Power concurs on page 22 of its 1997 report.

b) Newfoundland Power is proposing that General Service Rate 2.1 customers with consumption less than 600 kWh/month, representing 60% of the class, receive a rate increase in excess of the 1.3% average rate increase proposed for this class (CA-NP 197, Attachment A, page 1 of 3). This is primarily a result of the proposed increase in the Basic Customer Charge from $17.90/month to $19.08/month which is well above the Canadian average. Because the proposed cost recovery from this class is well above costs allocated in the cost of service study (115%), and because the proposed energy charge is already well above the marginal cost of demand and energy, I recommend that the Basic Customer Charge and the energy charge change by the same percentage ultimately approved by the Board for the class as a whole. This would result in a Basic Customer Charge closer to the Canadian average while spreading rate impacts evenly among customers within the class.

c) Further reductions in demand charges and 1st block energy charges, and further increases in tail-block energy charges from those proposed by Newfoundland Power would improve the efficiency of the rate designs for General Service Rates 2.2, 2.3 and 2.4. Newfoundland Power indicates such changes to the rate designs were considered but would result in unacceptable customer impacts and would lead to intra-class fairness issues. However, the designs considered by

Newfoundland Power and resulting customer impacts have not been submitted in evidence. As I do not yet have this information, I will pursue this issue further with Newfoundland Power during negotiations and file a specific recommendation with the Board prior to the hearing scheduled for October.

d) Like Newfoundland Power's thermal generation, the Curtailable Service Option is available for dispatch during times of system stress. Unlike Newfoundland Power's thermal generation, Curtailable Service is also dispatched to manage Newfoundland Power's peak demand in an effort to reduce its power purchase costs from Newfoundland and Labrador Hydro. On only one occasion in the past five years has Curtailable Service been dispatched when the island interconnected system was under stress. On all other occasions, interruptions have placed an undue burden on Curtailable Service customers without providing additional value to the island interconnected system. This situation can be remedied by treating Curtailable Service in the same manner as Newfoundland Power's thermal generation – by limiting dispatch of Curtailable Service to only those occasions when Newfoundland and Labrador Hydro determines that the system is under stress, or when it can alleviate a localized problem on Newfoundland Power's system, and by providing Newfoundland Power credit for its Curtailable Service demand in Newfoundland and

Labrador Hydro's cost of service study. This would maintain Newfoundland Power's incentive to continue to pursue Curtailable Service by making it financially indifferent. These issues are being considered in the *Review of Demand Billing to Newfoundland Power* as agreed among the Parties in the October 20, 2006 *Agreement on Cost of Service, Rate Design and Rate Stabilization Plan* filed as part of Newfoundland and Labrador Hydro's 2006 General Rate Application.

e) Newfoundland Power is not proposing material changes to its rate structures; nor is it proposing additional rate options in spite of the many benefits cited in its 1997 report entitled *A Study of Innovative Approaches to Rate Design Based on Marginal Costs and Time-of-Use Design Principles* (see CA-NP 422, Attachment B). The Board states in its decision following the 1996 hearing "Marginal cost and time-of-use design methods should be pursued and will direct the Applicant to pursue innovative approaches based on such methodology" (page 98). Newfoundland Power states correctly that "the high price of fuel can be expected to increase the regulatory focus on customer rate design and, in particular, the economic efficiency of customer rate design" (page 6, lines 15 – 19). Therefore, I recommend the Board direct that a study be undertaken to review Newfoundland Power's rate regime including rate options. The study would consider rates consistent with

the marginal cost study (Volume 2, Tab 12) and the *Conservation and Demand Management Potential Study*, and include a detailed action plan for implementation of the recommendations subject to Board approval. I recommend the Board direct that Newfoundland Power, Newfoundland and Labrador Hydro and the Consumer Advocate draft a terms of reference and schedule for the study and present it to the Board for approval by year-end.

4. Distribution Reliability and Service Standard

4.1 The Need for a Distribution Reliability and Service Standard

Newfoundland Power states "customers expect the Company to deliver reliable electrical service at the least cost reasonable. Responsiveness to this customer expectation is central to Newfoundland Power's management of customer operations" (Application page 2, lines 3-5). In fact, Newfoundland Power's short-term incentive plan "provides for annual cash payments to Executives and Managers, with the amount of each payment determined by way of an annual assessment of both corporate and individual performance and based on a percentage of salary" (see response to CA-NP 51, page 1 of 3, lines 16-18). "Assessments of corporate performance are based on the Company's performance relative to weighted targets in respect of financial performance, system reliability, customer service and safety" (see response to CA-NP 51, page 2 of 3, lines 3-5).

In its response to CA-NP 69, Newfoundland Power states "The policy of the province as set out in the *Electric Power Control Act, 1994* (the "Act") requires, in effect, that customers should have equitable access to power and should pay the lowest possible cost consistent with reliable service" (lines 20-23). Newfoundland Power spends a significant amount of money managing system reliability through (1) capital investment, (2) maintenance practices, and (3) operational deployment" (Application, page 25, lines 2-3). Expenditures on the Distribution Reliability Initiative (DRI), the only project directly aimed at improving reliability, averaged more than $1.5 million per year over the five year period ending in 2006 (CA-NP 68, lines 10-18). In 2008, proposed expenditures on the DRI are about $1.3 million, and from 2009 to 2011, proposed expenditures are about $1.5 million annually (CA-NP 438, Table 1).

As Newfoundland Power points out customers consistently rank reliability of power as the most important attribute of service followed closely by price of electricity (Application page 22, lines 7-8). However, this does not address the question of how much customers are willing to spend for improved reliability. Neither does it address the requirement under the Act that customers should pay the lowest possible cost consistent with reliable service. When asked in CA-NP 63 to demonstrate the linkage between customer satisfaction and reliability used to assist in determining the appropriate balance between improved service and cost control, the response was "Newfoundland Power has no such studies". It is not clear how Newfoundland Power can claim that it is providing power at lowest possible cost consistent with reliable service as required under the *Electric Power Control Act, 1994* in the absence of such information.

In its response to CA-NP 14, Newfoundland Power demonstrates that its reliability has improved over the past 10 years, and that gross operating expenses have decreased while improving its customer satisfaction rating. However, this does not equate to "providing power at lowest possible cost consistent with reliable service" as required under the Act. Specifically, Newfoundland Power has not defined what constitutes reliable service. In fact, Newfoundland Power does not have a distribution reliability and service policy (see response to CA-NP 64). Without a formal policy or standard, it is not possible for stakeholders to conduct a proper audit of reliability and service expenditures, and Newfoundland Power reliability and service performance, the areas of greatest importance to consumers and Newfoundland Power's core business function. The Board and stakeholders are unable to determine in an evidence-based manner if reliability- and service-related expenditures are prudently incurred, or if customers are receiving fair and consistent treatment.

In its response to CA-NP 65, Newfoundland Power indicates that it is doing many of the things included in Delaware's *Electricity Service Reliability and Quality Standards* regulation established through Order No. 7002. Newfoundland Power states "The current practice of Newfoundland Power includes reliability assessment and reporting on a conceptually similar basis to that required by the Delaware Standard" (lines 11-13). However, Newfoundland Power goes on to say "In the absence of a perceived risk to distribution reliability in Newfoundland and Labrador, it does not appear to Newfoundland Power that adoption of a standard similar to the Delaware Standard for the

Newfoundland island interconnected grid is justified" (lines 16 – 18). I have a number of comments relating to this statement, as follows:

- In his 1998 report to the Board on *Newfoundland Light & Power Company Limited Quality of Service and Reliability of Supply*, Mr. D.G. Brown, P.Eng. concluded: "The reliability of supply to Company customers is considered to be acceptable, although lower than the average for Canadian utilities. It is important that the utility maintain and in fact seek to improve its performance in this regard" (CA-NP 65, lines 19-22). Newfoundland Power states that this report "clearly indicated to the Board and Newfoundland Power that the Company should seek to improve its reliability performance. In response to this, Newfoundland Power has undertaken a number of initiatives to improve its reliability performance and associated reporting" (CA-NP 65, lines 27 -30). This implies that there is a perceived risk to distribution reliability in Newfoundland and Labrador.

- Reliability policy and benchmarks not only guard against under-investment, they also guard against over investment. As stated in the NEB report entitled *A Compendium of Electric Reliability Frameworks Across Canada* (page 5)[8], "investments in reliability yield benefits, but, after some point, the benefits are less than the costs. This issue is recognized in the legislation and regulations in a

[8] See website:
http://www.neb.gc.ca/energy/EnergyReports/CompendiumElectricReliabilityCanada2004_e.pdf

number of provinces, which require that investments not be undertaken for reliability in the absence of other considerations such as efficiency and the prudence of incurred costs". As stated in an article from *The McKinsey Quarterly* entitled *What Power Consumers Want*,[9] "it is doubtful that residential customers who have reliable service – those in most developed markets and in some advanced emerging ones – want (or would be willing to pay for) service improvements of any type". The authors of the report go on to say "returns on reliability investments ... diminish beyond a certain threshold, which most distributors have already passed". Newfoundland Power states in its 2006 Annual Report (page 8): "our electricity system was operating successfully and delivering their ("consumers") power 99.96% of the time in 2006". If as stated in the McKinsey report that more than half of interruptions are beyond a utility's control (generation and transmission outages, excavations by gas and water utilities, etc.), how much additional money is Newfoundland Power planning to spend to improve reliability when the upper limit of improved performance is another 0.02%? Have customers indicated they are willing to pay higher bills for such a small reliability improvement?[10]

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[9] As reported in the August 4, 2003 edition of Platts *Electric Utility Week*.

[10] Newfoundland and Labrador Hydro has a generation planning criteria that the island interconnected system should have sufficient generating capacity to satisfy a loss of load hours (LOLH) expectation target of not more than 2.8 hours per year (2006 General Rate Application, Regulated Activities Evidence, page 28, lines 24-26). New generation capacity additions are considered only when the LOLH expectation exceeds this level. The basic assumption is that when LOLH expectation is below 2.8 hours per year, the cost of additional generation capacity exceeds the value customers place on the associated improvement in reliability.

- Newfoundland Power states that "Through prudent management and the use of sound engineering judgment Newfoundland Power has been able to improve system reliability in a measured way" (CA-NP 65, lines 4-6). I believe the statistics support the claim that reliability has improved in recent years. However, this raises the question: Was there a need to improve reliability, thus justifying reliability-related expenditures? If so, it implies that contrary to the statement made in CA-NP 65, there is indeed a "perceived risk to distribution reliability in Newfoundland and Labrador". Conversely, if there was no need to improve reliability (i.e., the costs exceeded the benefits of the reliability improvement), the reliability-related expenditures were imprudently incurred. A reliability policy and standard holds a utility accountable, enabling the conduct of a proper audit as required under a cost of service regulatory regime such as that currently in place in Newfoundland and Labrador.

- A reliability and service standard provides equal and consistent treatment of similar customers. For example, my home experienced 5 outages in 2006 with a total duration of 44.3 hours. This compares to annual averages of 1.46 (SAIFI) and 2.1 hours (SAIDI) for my distribution supply company over the past five years. As I live in a rural area[11], I am willing to accept lower reliability than the system average. A one-year system SAIDI that is 21 times the system average seems extreme, but in the absence of a reliability standard, it is not clear that I

have a case for lodging a formal complaint and requiring that the utility take corrective action. Newfoundland Power correctly states in CA-NP 435 "Maintenance of an acceptable level of electrical system reliability has both a local dimension (i.e. specific assets) and a broader system dimension. The Company goes on to say that the local dimension is addressed by engineered evaluation and assessment of specific asset performance and adopting the least cost means of improving that performance. The broader dimension is addressed by the implementation of broader cost effective maintenance practices for the electrical system. Newfoundland Power now believes that the broader reliability performance measured by SAIDI and SAIFI is currently acceptable, but there continues to be poorly performing assets at the local level. While this represents a reasonable approach to reliability assessment and planning, the basis for concluding that the broader reliability performance is now acceptable is not clear, and neither is the basis upon which expenditures are committed to improve local reliability performance. There are no benchmarks upon which to assess reliability performance in either case. In particular, what constitutes poor feeder performance given that broad reliability performance is based on an average of feeders with both good and poor reliability performance; i.e., is performance that is 3 times, 5 times or 22 times the average considered unacceptable?[12]

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[11] Current SAIDI benchmarks in Delaware are 295 minutes per customer for Delmarva which serves primarily urban areas and 635 minutes per customer for Delaware Electric Cooperative which serves primarily rural areas.

[12] Delaware has two indicators relating to local reliability performance including "customers experiencing long interruption durations ($CELID_8$)" representing the total number of customers that have experienced a cumulative total of more than eight hours of outages and "customers experiencing multiple interruptions ($CEMI_8$)" representing the total number of customers that have experienced more than eight interruptions in

- The Fortis Annual Report indicates that other Fortis companies have service-level agreements and performance standards. For example, FortisAlberta complies with a *Retailer Guidebook* with service level agreements[13] (see CA-NP 431), and FortisOntario is subject to performance standards[14] included in the Ontario Energy Board's *Electricity Distribution Rate Handbook* that "contains the policies, guidelines and procedures to be used for establishing unbundled distribution rates for the PBR plan". "Compliance with the Rate Handbook is a condition of license for all electricity distribution utilities in Ontario" (CA-NP 432). Service quality indicators and minimum standards in Ontario are broadly categorized into customer service performance indicators (connection of new services, underground cable locates, telephone accessibility, appointments, written responses to inquiries and emergency response) and service reliability indices (SAIDI, SAIFI, CAIDI[15] and cause of service interruption). In its 2006 Annual Report (page 30), the Company states "Newfoundland Power's strategy and vision to be a leader among North American electricity utilities in terms of customer service, reliability and efficiency remains unchanged". In the absence of a reliability and service standard, it is not clear how Newfoundland Power can determine if it is meeting this strategy and vision.

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a single year (http://depsc.delaware.gov/orders/7002.pdf). Delaware requires tracking and reporting of these indicators, but not necessarily any corrective action.

[13] According to the Fortis Inc. 2005 Annual Report (page 22), FortisAlberta was within its service level agreements 99% of the time.

[14] FortisOntario exceeded performance standards set by the Ontario Energy Board with respect to response times, service connections and telephone response statistics". (Fortis Inc. 2006 Annual report, page 22).

[15] CAIDI is an indication of the speed at which power is restored, and is calculated as SAIDI / SAIFI.

- In its response to CA-NP 40 (Table 2), Newfoundland Power identifies corporate performance measures and targets for Executives and Managers under the short-term incentive plan, including in 2006:

    - SAIDI – 3.98
    - SAIFI – 2.89
    - Customer satisfaction – 87 %
    - Injury/illness frequency rate – 1.6
    - Controllable operating cost/customer - $210
    - Earnings - $29.1 million

  Four of these six performance measures would normally be covered in a distribution reliability and service standard. It is incongruous that the compensation of Newfoundland Power Executives and Managers is based on defined performance measures and targets when the Company itself makes no such commitment to customers.

- In the Decision and Order of the Board Order No. P.U. 8 (2007) relating to Newfoundland and Labrador Hydro's 2006 General Rate Application, the Board ordered "Hydro shall include in its quarterly reports, ... , an update on the progress of the development of a comprehensive maintenance plan and associated reliability standards".

In summary, adoption of a distribution reliability and service standard for the Newfoundland island interconnected grid is indeed justified. Reporting of performance under such standards is a requirement of other Fortis distribution companies, and compensation of Newfoundland Power executives and managers is based on achievement of targets relating to such performance measures. Introduction of a reliability and service standard takes on additional importance given Newfoundland Power's penchant for regulatory mechanisms. Newfoundland Power states "The Board's use of regulatory mechanisms has complemented Newfoundland Power's cost stability and provided for transparent least cost regulation in the circumstances that presented themselves over the past decade" (Application page 5, line 23 and page 6, lines 1-2). Regulatory mechanisms do indeed reduce the costs of regulation by extending the period between General Rate Applications. As it may be quite some time before Newfoundland Power files another General Rate Application, it is important that Newfoundland Power report performance relative to standards at regular intervals to the Board. This will provide an audit trail and help to avoid performance deterioration between rate cases in areas of service that are of importance to consumers.

4.2 Recommendation

Reliability and cost are identified as the areas of greatest importance to consumers. Yet Newfoundland Power does not currently have a formal distribution reliability and service standard. In the absence of such a standard with attendant performance measures and benchmarks, it is not possible to determine if Newfoundland Power is meeting its

obligation under the *Electrical Power Control Act, 1994* to equitably deliver power to customers in the province at the lowest possible cost consistent with reliable service (CA-NP 69, page 2 of 2, lines 14-16), and if expenditures on reliability-related projects are prudently incurred. I recommend that the Board direct that a distribution reliability and service standard be developed with reporting initiated under the standard during 2008. An example of an outline of how the Standard might be organized is provided in ***Table 2***. In addition, sample performance standards and benchmarks that might be incorporated in the standard are provided in ***Table 3***.

Because the Board ordered in P.U. 8 (2007) relating to Newfoundland and Labrador Hydro's 2006 General Rate Application that "Hydro shall include in its quarterly reports, ... , an update on the progress of the development of a comprehensive maintenance plan and associated reliability standards", I recommend that the development of the standard be a tri-party effort, led by Newfoundland Power, the primary distributor in the Province, with input and review by Newfoundland and Labrador Hydro and the Consumer Advocate. This would ensure consistency in the treatment of customers throughout the Province. The Board would have ultimate approval authority for the Standard. I recommend that the Parties cooperatively develop the scope of work and schedule and submit it to the Board for review and approval by year-end.

This concludes my pre-filed evidence.

Table 2. Potential Format of Distribution Reliability and Service Standard [16]

1. General Provisions

Includes purpose of Standard – To establish performance standards and performance monitoring and reporting for electricity distribution service provided by Newfoundland Power

2. Measurement and Reporting Protocol
    a. Effective date
    b. Reporting period; i.e., annually
    c. Reporting Requirements
    d. Waivers; i.e., failures beyond utility's control
    e. Definitions

3. Performance Standards
    a. Call Center Performance; i.e., percentage of calls answered within 20 seconds, percentage of calls abandoned, outage calls not answered, percentage of blocked calls, etc.
    b. Billing Performance; i.e., percentage of bills not rendered, bills found inaccurate, payment posting complaints, etc.
    c. Meter Reading Performance; i.e., percentage of actual meter readings, etc.
    d. Work Completion Performance; i.e., percentage of customer requested work not completed on or before promised date, average number of days after missed delivery date, etc.
    e. Customer Satisfaction; i.e., transactional customer satisfaction, overall customer satisfaction, rate of complaints, etc.
    f. Worker Safety; i.e., lost time incident rate, lost time severity rate, etc.
    g. Reliability Performance; i.e., SAIDI, SAIFI, worst performing areas, major storms, etc.

4. Service Guarantees
    a. Customer Service Related
    b. Service Quality Related
    c. Administration of Guarantees

[16] The format for this Standard is based on the Green Mountain Power Corporation *Successor Service Quality and Reliability Performance, Monitoring and Reporting Plan* which can be found at http://www.gmpvt.com/atyourservice/sqrp%20plan%209-11-06.pdf .

Table 3. Sample Performance Standards and Benchmarks[17]

Performance Standard	*Benchmark*
Call Answering	
Calls not reaching a company rep within 20 seconds	≤ 25 %
Calls abandoned, normal business hours	≤ 5 %
Outage calls not answered	≤ 15 %
Blocked calls	≤ 3 %
Billing	
Bills not rendered monthly	≤ 0.1 %
Bills found inaccurate	≤ 0.1 %
Payment posting complaints	≤ 0.005 %
Meter Reading	
Meters not read	≤ 5 %
Work Completion	
Work not completed by promised date	≤ 5 %
Average delay days	≤ 5
Customer Satisfaction	
Customers satisfied or completely satisfied	≥ 80 %
Customers satisfied (company)	≥ 80 %
Complaints to Regulator	≤ 0.07 %
Worker safety	
Lost time incident	≤ 3.5
Lost time severity	≤ 37
Reliability	
SAIFI	≤ 1.7
CAIDI (hours/interruption)	≤ 2.2

[17] The definition of each benchmark is provided in Green Mountain Power Corporation *Successor Service Quality and Reliability Performance, Monitoring and Reporting Plan* which can be found at http://www.gmpvt.com/atyourservice/sqrp%20plan%209-11-06.pdf .

Exhibit CDB-1

C. Douglas Bowman Background and Qualifications

Profession	*ENERGY CONSULTANT*
Nationality	Canadian Citizen U.S. Resident
Years of Experience	30
Education	M.S./1977/Electrical Engineering/State University of New York, Buffalo, NY B.S./1975/Electrical Engineering/State University of New York, Buffalo, NY

Key Qualifications

Mr. Bowman has 30 years of experience in the power industry both domestically and internationally. His primary areas of expertise include power sector restructuring and regulation, market design and electricity service costing, pricing and contracts. Mr. Bowman has played a leading role in numerous consulting projects in Canada, Australia, Central America, China, Colombia, Dutch Antilles, Egypt, Ghana, India, Indonesia, Macao SAR, Mexico, Mongolia, Pakistan, Russia, Serbia, South Korea, Taiwan, Thailand, The Philippines, United States and Vietnam.

Expert Testimony at Newfoundland and Labrador Hydro's Rates Submission
Provided expert oral and written testimony and participated in negotiation sessions on issues related to cost of service, rate design and regulation at Hydro's 2006 General Rate Proceeding.

Expert Testimony at Newfoundland and Labrador Hydro's Rates Submission
Provided expert oral and written testimony and participated in mediation sessions on issues related to cost of service, rate design and regulation at Hydro's 2003 General Rate Proceeding.

Expert Testimony at Newfoundland Light & Power's Rates Submission
Provided expert written testimony and participated in mediation/technical sessions on issues related to cost of service and rate design at Newfoundland Light & Power's 2003 General Rate Application.

Expert Testimony at Newfoundland and Labrador Hydro's Rates Submission
Provided expert oral and written testimony related to cost of service and rate design issues at Hydro's 2001 General Rate Proceeding.

Expert Testimony at Newfoundland Light & Power's Rates Submission
Provided expert oral and written testimony related to cost of service and rate design issues at Newfoundland Light & Power's 1996 General Rate Proceeding.

Expert Testimony at Nova Scotia Power's Rates Submission
Provided expert oral and written testimony related to cost of service and rate design issues. Recommended and designed time-of-day rates for all customer classes and designed an alternative interruptible rate design for large industrial customers.

Expert Testimony at Nova Scotia Power's Rates Submission
Provided expert oral and written testimony regarding an Industrial Expansion rate design. Recommended approval of rate with modifications and submitted two alternative rate designs for approval including a real-time surplus power rate and a time-of-day expansion rate.

Cost of Service and Cost Reducing Rate Design Study
On behalf of the Nova Scotia Utility and Review Board, reviewed Nova Scotia's cost of service study, and developed rate designs consistent with Nova Scotia Power's integrated resource plan for all customer classes. Report was filed with Board, and reviewed as part of hearing on utility's subsequent rate submission.

Economic Policy Reform and Competitiveness Project – Mongolia
Developed incentive based power purchase agreement for sales of generating company capacity and energy to the transmission company. Currently developing a performance-based regulatory mechanism for electricity distribution companies and a reform plan for rationalizing wholesale and retail rates.

Competitive Electricity Market Design – Taiwan
Developed competitive market design for electricity sector in Taiwan. Drafted market governance documents including Market Rules and Grid Code. Managed market modeling component of project which simulated market operation under wide range of scenarios.

Alberta RTO Evaluation Project
The objective of the Alberta Regional Transmission Organization (RTO) Evaluation Project was to determine a business relationship with RTO West that will ensure Alberta's electricity needs are met by a competitive market. The project participants included the Alberta Department of Energy, ESBI Alberta Limited, and the Power Pool of Alberta. Developed supporting information and delivered a report to assist Alberta with formulation of a strategy relating to a preferred business relationship with RTO West.

Detailed Market Design and Market Rules Development, Western Australia
Served as project manager providing advice to the Government of Western Australia with regard to detailed market design, market rules development, and market power mitigation. Assisted with the stakeholder process, drafted position papers on various design topics, drafted market rules consistent with a bilateral contracts market, and designed a market power mitigation program.

Market Assessment of Generating Company in Korea
Provided advisory services to a client interested in submitting a bid for the purchase of a large generating company in Korea. Served as Project Manager for the market valuation component of the project. Revenues for the generating company were forecast using market simulation software both in the early years of the competitive market when it would be dominated by vesting contracts, and in later years when the market would become fully competitive with an independent system operator administering a power pool operating alongside a financial bilateral contracts market.

Expert Testimony in Kansas Civil Case Concerning IPP Development
Provided expert testimony concerning the independent power producer (IPP) programs in India and Colombia. The testimony related to the difficulties and hurdles that must be overcome in order to successfully develop an independent power project in a developing country.

Market Power Mitigation Strategy for Generating Company in Korea
Provided advisory services to a large generating company in Korea relating to a market power mitigation strategy. Served as project manager. The project included market simulation to determine if the generating company would have market power in the new competitive market, and if so, if its market power were any greater than other generating companies participating in the market.

Advisory Services on Electricity Market Design in Serbia
Developed a high-level, phased design for the internal Serbian electricity market consistent with the EU Directive. Project included three specific tasks: initial mobilization, organization of workshops, and report and presentation. The project intent was to provide institutional support to the Ministry of Mining and Energy to facilitate the phased development of the internal electricity market with competitive bilateral contracts taking into account Serbian Energy Policy, the draft Energy Law, European Union requirements and the Athens Memorandum 2002.

Development of Market Rules for Competitive Power Market in Indonesia
Project Manager responsible for leading a team of experts in the design of market rules for a competitive power market in Java-Bali, Indonesia. Under Phase 1 of the project, market rules were developed for a single-buyer market that will serve until reforms are in place to allow progression to a fully competitive, multi-buyer market structure. The market rules for the multi-buyer market structure were developed under Phase 2 of the project, and included market simulation, and development of a transition plan for moving from the single-buyer market structure to the multi-buyer market structure over time.

Expert Testimony in California Civil Case Concerning Breach of Contract
Provided expert testimony concerning the value of a company based on revenues generated less costs to manage and operate the business. Revenues were derived from a contract for energy services covering steam and electricity sales to an industrial client and its power purchase agreement covering electricity sales to a utility. Costs to manage and operate the business included administrative costs, the cost of a lease and the cost of an operation and maintenance contract with an O&M provider.

Workshop on Transmission Planning in a Competitive Power Market
Conducted workshop on transmission planning for proposed RTO West in Portland, Oregon. Workshop covered transmission planning responsibilities of Regional Transmission Organizations under FERC Order No. 2000 and experience with domestic independent system operators and international transmission organizations. Reliance on market mechanisms for transmission expansion was emphasized at workshop.

Advisory Services on Electricity Supply Industry Reform, EGAT, Thailand
Project Manager leading critical analysis of reform options and identification of those characteristics that have been implemented elsewhere and are directly applicable to Thailand, culminating in a Thailand-specific plan for power sector reform and power sector privatization.

Advice on IPP's Power Delivery Contract
Provided expert advice and written testimony on the value of an IPP's power delivery contract before the New Jersey Public Utilities Board.

Workshop on Transmission Pricing in a Competitive Power Market
Conducted workshop on transmission pricing for proposed RTO West in Portland, Oregon. Workshop covered transmission pricing in Regional Transmission Organizations under FERC Order 2000 and experience with domestic Independent System Operators and international transmission organizations. Workshop addressed transmission services such as network, connection, import, export, and point-to-point service, and cost recovery such as postage stamp, zonal and nodal pricing.

Development of Terms and Conditions for Transmission Tariff
Assisted Ontario Hydro Services Company with development of terms and conditions for its new transmission tariff. The terms and conditions were filed with the regulatory authority as part of the utility's application for approval of the new tariff. Also assisted with preparation of responses to various discovery questions related to the tariff.

International Survey of Transmission Rates and Services
Conducted a survey of transmission rates and services provided in various domestic and international jurisdictions. Survey conducted in support of submission by Ontario Hydro Services Company to Ontario Energy Board on its new transmission tariff. Survey topics included: services offered such as network, point-to-point, connection, import and export service; cost recovery such as postage stamp, zonal and nodal pricing; treatment of generation; and transmission planning.

Feasibility Study of Merchant Co-generation Project
Participated with a team of consultants on a feasibility study for development of a merchant co-generation facility to sell power into the wholesale market and steam to the industrial plant. Directed market studies including analyses of forecasts for electricity demand, new generating plant construction, generation costs, market bid strategies, fuel costs, utility avoided costs, etc.

Advice to Mid-west Cooperative Concerning Role in Deregulated Power Market
Provided advice to a mid-west cooperative on positioning itself for a deregulated power market. Advice included the cooperative's future power purchasing strategy, transmission and distribution construction and operations and maintenance strategy and how it should position itself to compete in the future deregulated power market.

Advice to Cooperatives Concerning Power Purchase Strategy and Transfer Pricing Mechanism
Advised a group of cooperatives concerning implementation of a transfer pricing methodology that would enable each member to choose the supplier of its choice while leaving the remaining members harmless. The intent was to ensure that each member paid its fair share of the costs associated with the group's power purchase commitments.

Expert Testimony at Various Rate Hearings in Ontario
Participated in annual rate cases in Ontario, Canada. Extent and content of input varied with position at Ontario Hydro at time of rate hearing.

Experience

Independent Consultant, Warrenton, VA 2005 to Present

Nexant, Inc., Washington, DC 2004
Executive Consultant

KEMA Consulting, Fairfax, VA 1999 to 2004
Executive Consultant

Pace Global Energy Services, Fairfax, VA 1998 to 1999
Director, Power Services

International Resources Group, Ltd. (IRG), Washington, DC 1995 to 1998
Senior Manager, Energy Group

CSA Energy Consultants, Arlington, VA 1994 to 1995
Vice President (1995); Senior Manager, Power Supply Analysis (1994)

Ontario Hydro, Toronto, Ontario, Canada 1977 to 1993
Industrial Service Advisor, Field Support Services Department, 1992-1993

Senior Rate Economist, Rate Structures Department, 1990-1992

Planning Engineer, Demand/Supply Integration, System Planning Division, 1988-1990

Senior Engineer, Resource Utilization, Power System Operations Division, 1987-1988

Planning Engineer, BES-Resources Planning, System Planning Division, 1981-1987

Assistant Planning Engineer, Transmission System Planning Department, 1979-1981

Engineer-in-Training, 1977-1979

Professional Affiliations

Professional Engineers of Ontario