Presentation to the Public Utilities Board in the Matter of the Muskrat Falls Reference

Ron Penney and David Vardy

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PRESENTATION TO PUB BY DAVID VARDY AND RON PENNEY, RATEPAYERS

Introduction

Thank you for giving us the opportunity to present our views on the Reference question before the Board.

We are two retired civil servants with long experience in public service, which involved providing advice to Governments on many complex public policy issues. Our only "agenda" is to ensure that this issue, which in our view is the biggest public policy issue ever to have faced the Province, gets the most through and rigorous review possible.

We have been accused of having an agenda. We do have an "agenda". Our "agenda" is to ensure the issue is subject to full public debate. We are not opposed in principle to the project. Our main concerns are with the process and whether Muskrat Falls is the best option either now or later.

We recognize that the Board is severely constrained by both the Terms of Reference and by the refusal of the Government to give the Board the time it needs to do the job it was asked to do. The bigger problem with this process, which seems to have been forgotten, is the fact that the Muskrat Falls project has been exempted from the regulatory process which applies to all regulated utilities and requires that all significant capital expenditures be approved by the Board. This is what has recently occurred with respect to an application by Newfoundland and Labrador Hydro on a transmission project which was disallowed as part of the PUB's annual review of Hydro's capital expenditures.

We note that this exemption was granted by a previous administration so there is lots of blame to be shared about this particular decision. It is important to note that the exemption order could have been lifted by the present administration but hasn't been.

Neither the previous administration nor this one has provided reasons for this exemption. How can there be any justification for distinguishing between relatively small capital projects and the largest capital project ever undertaken in our history?

On May 5th, 2011 we wrote the then Minister of Natural Resources, Shawn Skinner, asking that the exemption be lifted. In our letter we stated the following:

> *"This is one of the most important public policy issues ever to face the province and it is imperative that the choice made by Government be subject to independent review. The Muskrat falls project may well be the best policy choice but the people of Newfoundland and Labrador need to have the choice tested by the Board which is set up for this purpose. We are requesting that the Government reconsider its decision to exempt the project from the jurisdiction of the Board, in light of the magnitude of the project and the necessity to ensure that it is the best option, not only to meet our energy requirements but to mitigate the financial risk to the Province."*

On June 17th, the Government announced that the Board would be asked to conduct a review, which wasn't what we requested, but an important step nevertheless.

The Minister wrote us on June 22nd, formally responding to our letter and saying the following:

> *"As a Government, we felt it important to independently engage the PUB's expertise on this fundamental question as the Muskrat Falls development is the most significant electrical generation and transmission project undertaken by the province in 50 years. This review is just one of the elements of Government's strategy to ensure that this project is subject to input from various sources prior to sanction and will further enhance our goal to engage the people of the province and ensure confidence about the decision to move ahead and sanction this development."*

We appreciate the respectful and thoughtful way in which the former Minister, the Honourable Shawn Skinner, responded to us.

This was somewhat encouraging but, as events have unfolded and other alternatives have come to the fore, it is clear to us that the terms of reference are too narrow. By limiting the terms of reference and the time given to the Board there is a real question as to whether Government has done what it said it would do in terms of engaging the people of the province in an open public debate.

We also note that one of the casualties of the decision not to extend the deadline for the Board's report is the inability of the Board to conduct its planned technical conference, which has meant that there was no opportunity for Newfoundland Power and its parent, Fortis, to provide its perspective on the project and question the technical experts, which would have added greatly to the process. We do urge Fortis to make its own views known.

The decision to embark upon this project is a major public policy decision that will impact upon future generations. The PUB has been asked to provide their recommendation as to whether we need additional power and to choose between two alternative options. We all know that the choices which must be made are in fact more complex. There are many options to be considered, not just two. A decision to proceed with Muskrat at a later date is a realistic option but not one which is posed by Government.

We note that the "Board's review is limited to examination of these two options – the Muskrat Falls project and the isolated Island development scenario – the review will not address alternatives such as wind power, natural gas, the role of energy conservation and demand side management, or environmental concerns, or the impact on electricity rates to end users."

I am a lawyer by profession and former Deputy Minister of Justice with the Province. I bring considerable experience from my role as City Manager on the financial risk of cost-overruns on major projects. While those projects were not of the same magnitude as the multi-billion Muskrat Falls project, the City did construct large projects in an era of tremendous increases in materials and labour costs, which continues to be the case now.

I am familiar with cost estimating processes, which are designed to more accurately estimate the cost of a project as detailed designs are completed and tender documents are prepared leading to the final pre-tender estimates. The City followed those processes, utilizing outside engineering consultants, and our own internal expertise, but we found that the actual tenders and final costs did significantly increase the final costs of large projects, such as the Civic Centre and the Harbour Clean-Up project.

In a project of this magnitude there is great potential for large cost increases, particularly when this project, if sanctioned, will be undertaken at the same time as other large construction projects are underway**,** such as the Hebron oil and gas project. We note that the last major hydro project constructed by Hydro, Cat Arm, came in significantly over the estimated costs. Perhaps the Board might ask NL Hydro to provide the initial estimate and final cost of Cat Arm project.

There is one aspect of risk management, or at least the sharing of risk, which has apparently not been considered, and that is the use of the Lower Churchill Development Corporation, a joint Federal/Provincial body which was set up years ago to construct the Lower Churchill. The LCDC is owned 49% by the Government of Canada and 51% by the Government of Newfoundland and Labrador.

The Lower Churchill Development Act is still in existence. We think that serious consideration should be given to using that Corporation to construct Muskrat Falls, if it is sanctioned, rather than doing it on our own. I note that the City and the Province used a Construction Board, consisting of City and Provincial representatives, together with representatives of Destination St. John's, to manage the construction of the Civic Centre.

Reliability issues

We note that questions about reliability have been an important focus of the work of Manitoba Hydro International (MHI) at the hearings last week.

Given that the Avalon Peninsula and in particularly the North East Avalon will be very vulnerable when Holyrood is closed down, under the inter-connected option, this issue is of vital importance to this part of the Province. The Avalon Peninsula is vulnerable to disruptions anywhere along the line. Power disruptions might occur in Labrador, along the Strait of Belle Isle sub-sea crossing, on the Long Range Mountains, central Newfoundland, or on the Isthmus of Avalon. The Maritime Link does provide some added security but if the disruption occurs on the transmission lines crossing the Isthmus of Avalon then the most effective back up power has to be on the Avalon.

The interconnected option calls for Holyrood to be decommissioned as a generating plant. Having Holyrood so close to the St. John's urban region provides this area of the Province with considerable energy security. We note that the MHI report raises serious concerns about how the reliability issue has been addressed by NALCOR. We acknowledge the argument that the connection to Nova Scotia may provide us with access to power in the event of a loss of supply, depending on where the problem occurs. For example, the location of the loss of the transmission

line matters for this to work, and the capacity of Emera to supply us will be affected by where and when the loss of power occurs. If it happens during the late winter or early spring, which is our time of maximum risk, Nova Scotia would also be in a high demand situation, at the same time as they have may have lost power from Muskrat Falls.

Should the Board's report make recommendations on this matter we believe that the Board should be given the opportunity to review any further work which is done.

David Vardy's presentation

My name is David Vardy. I am by training an economist and by career a senior executive with various provincial agencies. I was chair of the Public Utilities Board from 1994 to 2001. When I served as Secretary to the Cabinet from 1978 to 1985, under Premiers Frank Moores and Brian Peckford, I was a member of the Board of Newfoundland and Labrador Hydro. In August I wrote a paper for Action Canada on the Muskrat Falls project. I am tabling a copy of this paper dated August 31, 2011, in order to place it on the record for this hearing.

I will deal with the following issues:

A. Risk mitigation
B. The MHI Report
C. 2041: The End of the Churchill Falls power contract
D. Capital Structure and cost of service
E. Water management
F. Conclusions

A. Risk mitigation

The mitigation of risk is the key issue to be addressed in this hearing. There is risk associated with all options, not just with one. Some of these risks are controllable and some are not. Some can be anticipated and known. Others may be unknown. We can never be assured that all risks have been identified and minimized. However, we must attempt to ensure that system planning takes all risk factors into account. We believe that in a project of this magnitude all available expertise and information should be mobilized.

The major risks, as we have identified them, are as follows:

- Capital cost overruns;
- Volatile oil and gas prices;
- Overestimation of load growth;
- Underestimation of load growth from emerging new industrial users of electricity;
- Volatile electricity prices in potential export markets for electricity produced in Newfoundland and Labrador;
- Changes in demography which may impact upon load growth (e.g., decline in family formation and new home construction);
- Changes in usage of electricity; and

- Physical risks, such as ice storms and iceberg scouring on the Strait of Belle Isle.

The historical advantage of hydroelectric power is that, while capital costs may be high, the operating costs are low. Once it is built the project runs itself and, if fossil-fuel energy costs are rising, then capital intensive hydro projects will stabilize the cost and, over time, the low and stable cost will be its advantage. Such was the case with the Bay D'Espoir project, which has been an enormous advantage. If energy prices behave unpredictably and start to decline then this hydroelectric megaproject might turn into an albatross. We cannot predict accurately what can happen. We must exercise prudence and then make a decision. The shale gas revolution is raising uncertainty in energy markets and we are well advised to recognize its impact, not only on gas and oil prices, but also on electricity prices throughout North America.

The isolated Island alternative contains a series of smaller projects, which allow NL Hydro to move forward to supply power and maintain system reliability and thereby provide ample time to to mitigate the risk associated with Muskrat Falls and to explore other options. The Muskrat Falls project is of such nature and scale that once the decision has been made there is no turning back. We cannot make piecemeal adjustments to our energy plan without writing off huge costs. Once we cross the Rubicon there is no turning back. The cost of Muskrat Falls is all up front and inescapable.

Our recommendation is that government take short to medium term energy decisions which will allow sufficient time for the Province to complete its due diligence on Muskrat Falls. The Joint Environmental Review Panel established by both levels of government to review the EIS for the lower Churchill had a full two years to do their job, and that Panel raised serious questions about the merits of Muskrat Falls; it concluded that Nalcor's analysis that justified Muskrat Falls was inadequate. Now, the PUB is being rushed to finalize its recommendation by the end of March. While the government filed the reference in June the submission from Nalcor was not received until November of 2011 and the MHI report was not completed for the board until the end of January. In light of this, we believe that this tight deadline is patently unfair to the board, as was the government's refusal to allow the time requested by the board. Nevertheless, we welcome this opportunity to voice our opinions.

Is the current timing right for a megaproject such as Muskrat Falls? It is the best of times and the worst of times, to quote Charles Dickens. Interest costs are low and money is available to finance a major project. Loan guarantee financing may be available from the Federal Government. Oil prices are high. The economic environment is uncertain. Signs of a buoyant economy are emerging in the United States and Eastern economies such as China and India are surging. On the other hand, unemployment has risen in Canada, and even in Newfoundland and Labrador. Europe is in turmoil, with Greece and Italy tottering toward bankruptcy.

New shale oil discoveries are dramatically changing the energy landscape. Other presenters will deal with this issue of oil and gas supply and prices.

While there are risks associated with Muskrat Falls there are also advantages, through removing our historical electrical isolation on the Island. There are inherent benefits to electrical integration, for an Island based system. Power can flow both ways so we can benefit from being electrically connected not only with Labrador, but also with the rest of North America.

The issue for us is whether we have undertaken a comprehensive assessment of the risks as well as the options available to us. The Joint Environment Panel on the Lower Churchill Generation

project identified a number of key risks which need to be mitigated. We will speak later about how much progress has been made to address these concerns. We would like formally to enter the Joint Panel report into evidence before the PUB. Please advise what we need to do to place it before the Board.

B. **Major Findings of the MHI Report**

The MHI report contains much that is useful. We would have liked to have seen more analysis with regard to the actions that could be taken to reduce peak loads such as side agreements with major industrial users or the use of on-peak pricing. This is an area in which more research is required. We also would have liked some commentary on other supply options as well as on the timing of Muskrat Falls, in light of MHI's qualified support for the project.

The MHI report concluded that the DG 2 Capital cost estimates were equivalent to an AACE Class 4 estimate, which is a feasibility estimate and has a range of accuracy of +50% to -30%. The information provided by Nalcor and reviewed by MHI was generally current as of the fall of 2010 and was used by Nalcor in making its DG2 decision. Nalcor did not generally provide information on the detailed engineering or financial work completed after DG2. The capital cost information is therefore over a year out of date, and it has the potential for cost overruns of 50%. We had expected that the cost estimates would be beyond feasibility estimates in their confidence limits at this stage of the project.

MHI's comments on the load forecast are organized around domestic customers, small general service and industrial customers. For domestic customers the load forecast has been generally reliable, presumably helped by the work of Newfoundland Power in forecasting the load of its own customers. MHI noted that, for the domestic forecast, the load is consistently under forecasted by 1% per year. They suggested that end-use modelling techniques would improve the accuracy of the forecast.

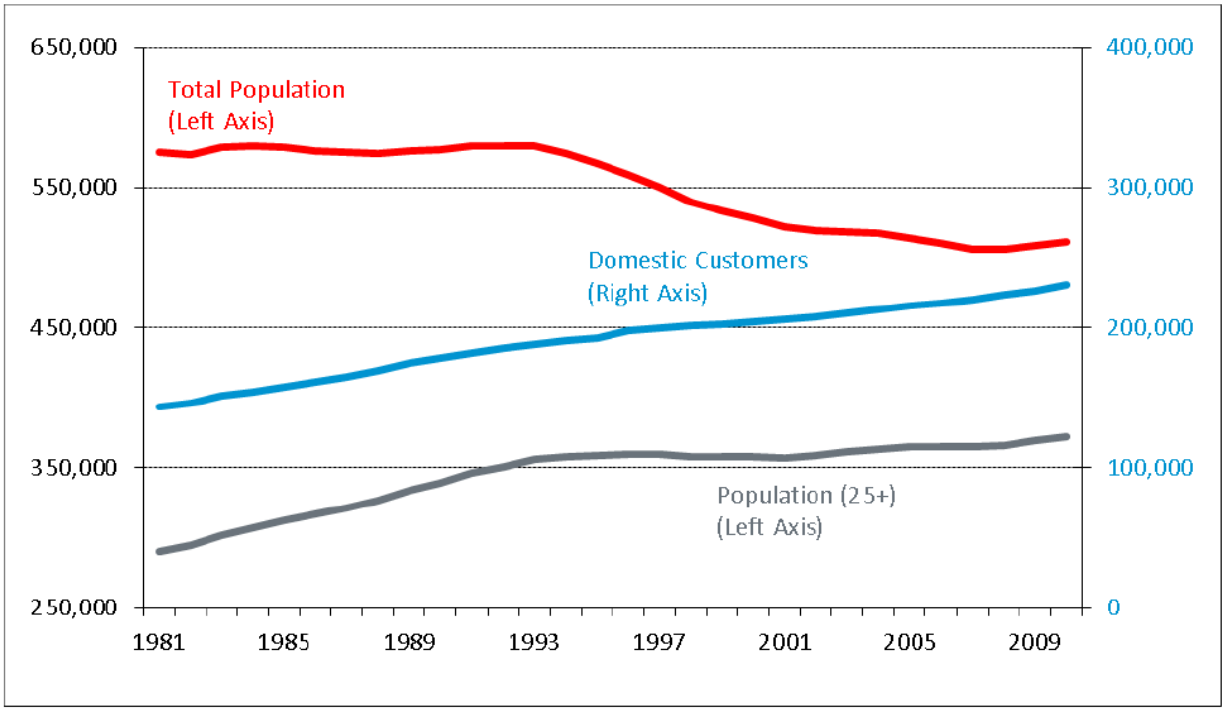
The general service forecast has been quite accurate.

The industrial load has been overestimated as a result of the closure of two pulp and paper mills (and also the remaining mill has adjusted its operation so that it purchases much less from NLH and is close to meeting its needs from its own hydro facilities). MHI points out that the addition of a large industrial customer could have a large impact on the projected load. While Nalcor's forecast into the future may appear to be conservative, Nalcor has tended in the past to overestimate its overall load growth.

Nalcor's submission to the Board of November 2011 projects a high level of new housing starts even when population is static. The submission states as follows:

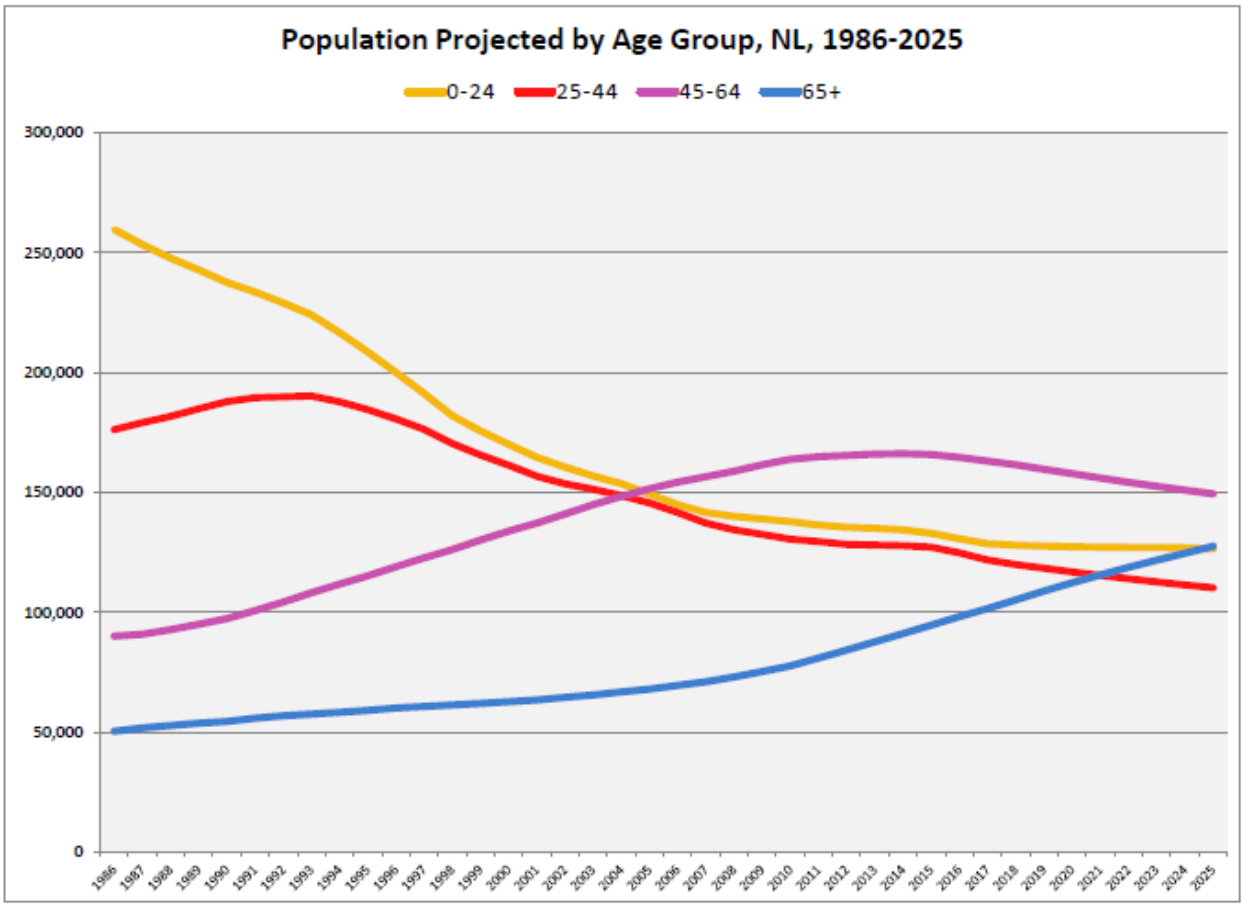
> *As depicted in Figure 4, the number of domestic customers has continued to grow despite the province's declining population. This has occurred because household and customer formation are naturally more related to the subset of population that is 25 years and older. This is the age subset which predominantly forms households and drives the demand for housing. Changes in real personal income have also been historically linked to customer growth. (p.24)*

Figure 4: Provincial Population and Island Interconnected Domestic Customers



Sources: (1) Government of Newfoundland and Labrador, Department of Finance
(2) Newfoundland Power, year-end customer data
(3) NLH, System Operations, Customer Service Group

We have three observations to make on these data on load growth. One, the continued growth of the older population subset cannot be predicted to continue indefinitely. We have to look at the numbers in the age group 24 to 45, which are responsible for new family formation and for most housing starts. This age cohort is already showing signs of slower growth, as shown in the chart below. This group of household formers peaked in the early 90s and has been declining. Second, as the population grows older, with little natural increase, it is projected that there will be more senior citizens. These senior citizens are likely to have lower incomes than the younger population and to live in smaller spaces, thereby requiring less space heating. The blue line in the chart shows the projected increase in the number of senior citizens 65 years and older, of whom I am one.



Third, we note that provincial forecasts go only to 2029, which raises the question of attempting to forecast so far into the future as 2067, for which period we do not have demographic projections. While we appreciate Nalcor's point that load growth continued in the post moratorium period, when there was an outflow of population, we have to recognize that the demographic outlook is virtually flat.

We note that MHI refers to the system reliability studies and observes that Nalcor should rely more heavily on probabilistic criteria, as do other utilities in Canada.

We note as well that integration studies will not be completed until March 2012. MHI report as follows (p. 10):

> *Good utility practice requires that these integration studies be completed as part of the project screening process (DG2). MHI considers this a major gap in Nalcor's work to date. These integration studies must be completed prior to project sanction (DG3).*

MHI suggest that the generation engineering and cost estimation is in a better state of readiness than the transmission component of the project.

MHI report as well that

Nalcor currently does not comply with North American Electric Reliability Corporation (NERC) standards. A majority of utilities in Canada have adopted the definition of "good utility practice" that incorporates adherence to NERC standards. Also, should the Maritime Link proceed, and Nalcor participates in the electricity marketplace, NERC standards will ultimately apply. MHI recommends that Nalcor complete a self-assessment and prepare for compliance to NERC standards with or without the Maritime Link.(page 10)

Nalcor has selected a 1:50-year reliability return period (basis for design loading criteria) for the HVdc transmission line, which is inconsistent with the recommended 1:500-year reliability return period outlined in the International Standard. (page 11)

Nalcor has stated that the additional capital cost increase for the 1:150-year return period for the transmission line would be $150 million. In the latter case, Nalcor should also give consideration to an even higher level reliability return period in the remote alpine regions. MHI recommends that Nalcor adhere to these criteria for the HVdc transmission line design. (MHI report,page 19)

We believe that Nalcor should include the additional capital cost for the 1;150-year reliability return period and for the even higher 1:500 standard in the higher and more remote regions. Since achieving the 1:150-year return period adds $150 million to the capital cost, we presume that the higher standard recommended by MHI would cost somewhat more. A high standard of reliability on such a distant source is crucial and this expense should be added to the reference case for the MF-LIL CPW calculation and all the sensitivity analyses performed on that reference case.

We also note that the Isolated Island option includes $582 million capital expenditure for pollution abatement but during the time since that expenditure was called for in the 2007 Energy Plan, NL Hydro has been successful in abating SOx and Particulate Emissions by using 0.7 Sulphur fuel. Also, the 2007 Plan was prior to the closure of the Grand Falls mill, which was not anticipated, but a side effect of which was to free up a large amount of hydroelectricity. With availability of that clean energy and the use of cleaner fuel, there will be much less emissions to abate and therefore the benefits of the capital expenditure will be much less than thought in 2007.

We emphasize that we support pollution abatement but are pointing out that other measures have substantially addressed the problem. Moreover, we understand that the abatement equipment, rather than reduce greenhouse gases, actually slightly increases those emissions and reduces the plant's energy efficiency. Therefore, the present value of that $582 million should be removed from the CPW calculation for the reference case, the Isolated Island option.

C. 2041: The End of the Churchill Falls power contract

The 2007 Energy Plan identifies the year 2041 as a landmark year for access to electric power from Churchill Falls. That is the year when the 1969 power contract expires and Nalcor Energy, as the majority shareholder in CFL(Co), will have access to the facility and the energy.

The energy plan, *Focusing Our Energy 2007*, states on page 22

We will maintain our focus on 2041, when the Upper Churchill contract expires and the province is in the position to receive the full benefit from this resource. Between now and 2041, we will carefully plan and make decisions to ensure Upper Churchill's success in the future, as well as organizing our current and future energy resource developments, to maximize benefits while minimizing fluctuations in our economy.

In this context it is surprising that Nalcor's planning does not rely upon Churchill Falls power in the years from 2041 to the end of the planning period in 2067. In MHI-Nalcor -3 the question is posed as follows:

Question: What consideration has been given to the excess power capacity that will become available associated with the termination of the Upper Churchill Falls Agreement in 2041?

The answer, in part, is as follows:

There is inherent uncertainty around guaranteeing the availability of supply from Churchill Falls in 2041 because it is difficult to determine the environmental and policy frameworks that will be in place 30+ years out. There are other issues surrounding the CF asset with respect to HQ, as Nalcor is not the sole shareholder of the Churchill Falls operation.

We find this response incredible. The least uncertain event for the energy future of this province is that the Churchill Falls contract expires in 2041; we even know the exact day of expiry. The Winter Availability Contract also expires in 2041 as does the Shareholders Agreement between CFLCo and Hydro-Quebec. The reservoir, dam, turbines and related facilities are in place, with no construction required. And under the Interconnected Plan, Nalcor includes Churchill Falls power starting in 2057. Yet, we are told that 2041, some 16 earlier in time, is too uncertain to consider Churchill Falls as an option.

The only uncertain element about Churchill Falls is whether the current litigation in the Quebec Court that challenges the contract might result in access to the power sooner than 2041. If this materializes then the Province might be well advised to maintain its flexibility to benefit from such an outcome by holding off on its decision to commission the Muskrat Falls project.

In the period 2041 to 2067 Nalcor's isolated Island system includes 12 thermal plants and two wind turbines, all at a cost of $5.5 Billion in current dollars. The Labrador infeed system includes six 50 MW CT units at a cost over the same period, 2041 to 2067, of just over $1 Billion. The difference in nominal or current dollars is $4.5 Billion. Does this create a bias in favour of Muskrat Falls?

Nalcor's analysis assumes that the consumption of electricity is the same in every year under both options but in the Isolated Island Option, especially in those later years, there is a substantial price difference for ratepayers. This is the essence of the Joint Panel's recommendation 4.3 to adopt integrated resource planning, which reflects the impact of rate changes upon demand and the associated revenue.

If, under the Isolated Island option, ratepayers pay higher rates then their consumption will be less. That means less need for capacity and less fuel consumption. Nalcor should be requested to adjust the CPW of the Isolated Island Option reference case to reflect this likelihood under an integrated resource planning framework, as recommended by the Joint Panel**.**

In Nalcor's submission of November 2011 they indicate they have included Churchill Falls power beginning in 2057 and reaching 500 GWh in 2067. However, there is no indication that Churchill Falls is being considered under the isolated Island option. In light of the strong commitments in the energy plan of 2007 relating to Churchill Falls it is ironic that Churchill Falls was screened out of the analysis in Decision Gate 2.

In its Recommendation 4.2 the joint federal provincial environmental review panel describes the terms of reference which should be covered by an independent analysis of alternatives to meeting domestic demand. We are citing these recommendations here in the understanding that this enquiry by the PUB constitutes the independent analysis recommended by the joint panel. They ask

> *why Nalcor's least cost alternative to meet domestic demand to 2067 does not include Churchill Falls power which would be available in large quantities from 2041 or any recall power in excess of Labrador's needs prior to that date, especially since both would be available at near zero generation cost (recognizing that there would be transmission costs involved);*[21]
> The Joint Panel recommends this question should be included in the terms of reference of the independent analysis, along with the following questions and issues:
>
> • *Whether Nalcor's assumptions regarding the price of oil till 2067 are robust and realistic?*
> • *Whether Nalcor's estimates of domestic demand growth are realistic?*
> • *Whether Nalcor has placed sufficient emphasis upon demand management programs in light of information about targets set and expenditures incurred in other jurisdictions?*
> • *Whether Nalcor should consider introducing disincentives to the inefficient use of electric space heating?*
> • *Whether conversion of the Holyrood thermal plant to natural gas as an alternative to Bunker C should be considered?*
>
> • *The panel also believes that the planning approach of defining demand requirements and seeking the lowest cost generation solution should be replaced by what is known in the public utility fraternity as integrated resource planning (IRP). IRP looks at both demand and supply options and places* ***more*** *(bolding added) weight on demand management than least cost supply planning.*

We recommend that the Board accept the advice of the joint panel to adopt the principles of integrated resource planning, which places more weight on demand side management than on least cost supply planning.

D. Capital structure, cost of service and power purchase agreement

The capital structure of public utilities is carefully calibrated in order to minimize the cost of capital. Typically the balance of debt and equity is tilted toward debt, recognizing that the opportunity cost of debt capital is deemed by regulators to be lower than that of equity capital. Regulators use the long term (30 years or longer, Government of Canada bonds) borrowing rate for bonds as the risk free proxy for the cost of debt capital. To that risk free rate is added the risk

of equity, which is less secured than is debt capital. Bondholders demand that shareholders make a significant contribution by injecting a meaningful measure of equity. The financial strength of a privately owned utility is often measured by the absolute size of shareholder equity and by its relative size, compared with debt. A typical capital structure would be 70% debt and 30% equity. A strong infusion of equity provides potential lenders with confidence that the company is financially strong. This will normally reduce the cost of debt capital. Much has been written on the subject of the optimum capital structure.

PUB chair Andy Wells raised the issue of the optimum capital structure for a Crown owned public utility at the hearing on February 15th. He asked whether a capital structure with 95% debt might be preferred to one with 75% debt, in light of the lower cost of debt capital and the fact that Nalcor is a provincially owned Crown Corporation, whose financial position is grounded in the credit standing of the provincial government.

Nalcor, an unregulated company, will be the builder and owner of Muskrat Falls. Nalcor will sell the power to Newfoundland and Labrador Hydro, a regulated subsidiary of Nalcor Energy, through a power purchase agreement. The capital structure in Decision Gate 2 has been established at 100% equity. This is unusual in at least two respects. One is the fact that it places all the risk on the Province. An equity contribution would not qualify for a Federal loan guarantee. Second is the fact that the imputed cost of capital will be higher than it would be under a balanced capital structure. The response to CA-KPL-20 states that

> *For analysis, Nalcor has assumed the Labrador-Island Transmission Link was financed on a regulated cost-of-service basis with 75% debt and a 10% return on equity. The Muskrat Falls generating facility was assumed to be financed with 100% equity with a cost-based escalating rate established to provide an 8.4% internal rate of return based on sales to the Island.*

Nalcor Energy has proposed that prices be set independently of cost when Muskrat Falls comes on stream. The standard approach to public utility rate setting is that they be based on the cost of service. The cost of service is subject to confirmation by the Public Utilities Board and normally the Board approves rate changes based on changes in the cost of service. The cost of service approach is normally applied to public utilities that are regulated entities. Nalcor Energy will be developing Muskrat Falls. Nalcor is not a regulated entity and will be selling power through a power purchase agreement between the public utility, Newfoundland and Labrador Hydro, and Nalcor. As a non-regulated entity, Nalcor is outside of the full scrutiny of the PUB.

In the present case Nalcor intends to follow a different pricing regime, modelled along the lines of Bruce Power and one which is not based on cost of service in single years. Under this model the cost of service is recovered over the life of the project. The departure from cost of service pricing has been chosen on the grounds that this would lead to excessively high prices, creating "rate shock" and imposing too high a burden on consumers in the early years. The consumption of power at that time would be about 40% of capacity and consumers would have to absorb the cost of all 100% of the power in a cost of service model.

Under the Bruce power model the shareholder, government, will subsidize the power in the early years and recover the subsidy in later years. They will forego a return in the early years and seek a higher return in later years. Effectively, the cycle of foregoing income in the early years and

receiving it later is tantamount to a subsidy at the front end, offset by a surcharge at a later time. If it does not involve inter-generational transfers one has to assume that the reduced rates in the early years are financed by taxpayer subsidies.

The bulk of expenditures under the interconnected option are being assessed outside of cost of service methodology while the isolated Island option is assessed through traditional cost of service rate-making. Is this a concern of the Board?

There has been discussion of the costs and prices of Muskrat Falls power. The pricing regime proposed is unusual and unclear to many. The result is that there is a lack of clarity on the issue which should be absolutely clear, and that is the cost of power produced from Muskrat Falls. The Board should consider asking Nalcor to prepare a document that clearly indicates (a) the cost of power and (2) the rates charged to customers, for each year. This distinction between cost and price is important.

The point we are making is that Nalcor has not been clear with regard to what is the cost of serving the energy requirements of the Island. The evidence is confusing. Compounding this is the fact that there appears to be subsidy in the early years when rates are set below cost of service. Any subsidy of this nature will have the effect of stimulating demand and will lead to a different load growth than is assumed in the Isolated Island option.

Finally, if indeed the Muskrat Falls generation is to be financed by equity then the escalating supply price should reflect that. Specifically, the supply price should be determined by a 10% internal rate of return, which Nalcor states is the cost of equity, rather than the 8.4% used by Nalcor. Doing so would result in a new price that reflects the cost of using taxpayers' money for equity financing. Nalcor should determine that price and adjust the CPW accordingly.

E. Water Management on Churchill River

Optimization of energy production at Churchill Falls depends upon integrated management of the Churchill River. The evidence on hydrology is extensive, including CRE 28 Rev. 1 but we have not found evidence relating to the Churchill Falls power contract. We understand that Hydro Quebec controls the flow of water under the 1969 contract and that they were not a party to the 2009 Churchill River Management Agreement. We refer, for example, to article 4.2.1 (ii), which reads as follows:

> *(ii) Hydro Quebec may require deliveries which have the effect of varying the amount of water to be carried in storage at any time provided that, in so doing, sufficient water is left in storage so that Minimum Capacity can always be maintained.*

We have asked Nalcor to advise how it proposes to achieve water management to optimize Muskrat Falls production in the absence of a formal agreement with Hydro Quebec. We are not comforted by the response that the management agreement in place is the panacea. Nor are we comforted by the plethora of hydrological studies which make no reference to the control exercised by Hydro Quebec through the power contract. While the pattern of production at Churchill Falls may match with the power demands for Muskrat Falls the Province requires greater certainty with respect to the management of water. We are asking the Board to probe this issue in their examination of Nalcor Energy and MHI.

F. Conclusions and Recommendations

We are confident that the Board will weigh the evidence laid before it and make appropriate recommendations to the benefit of all ratepayers and the people of Newfoundland and Labrador. In particular we commend to the Board a thorough review of the work of the joint federal provincial review panel, which made a number of recommendations which we believe continue to be valid. While the Board has to make an uncomfortable choice between only two options it is our hope that the issue of the right timing will be addressed.

We recommend that Government consider the following options:

1. That they take short to medium term energy decisions which will allow us to complete our due diligence on Muskrat Falls. This means that we should commission one or more small energy projects to allow Government to assess other options, including:
    a. Accessing Churchill Falls power in 2041 or before (which might be achieved through success of the current action in the courts);
    b. Conversion of the Holyrood plant to natural gas;
    c. Purchase of power from suppliers outside the Province;
    d. Incentives to save electricity by installing other forms of space heating (such as heat pumps) and use of time-of-day pricing;
    e. Commissioning Muskrat Falls at a later date.

2. That Government consider the Lower Churchill Development Corporation as a model for developing Muskrat Falls in the interest of risking risk to the Province.

We recommend that the Board consider the following:

3. That the Board take into evidence the report of the Joint Panel. The Joint Panel had concluded that Nalcor's analysis (page 34) is "inadequate."

4. That the Board take into evidence David Vardy's Action Canada paper of August 31, 2011, which has been tabled with the Board.

5. That the Board accept the advice of the Joint Panel to adopt the principles of integrated resource planning, which places more weight on demand side management than on least cost supply planning.

6. That the Board carefully examine the demographic profile to question the assumption with regard to continued new home construction up to 2067, given the fact that the growth in the 24-45 year old cohort will likely not continue, while senior citizens, who are becoming more numerous and whose incomes are normally reduced upon retirement, will probably be moving into smaller homes.

7. The Board should also investigate the potential load tapering that may be associated with the growth of new technologies, such as heat pumps, which are more energy efficient, along with energy-saving practices such as time of day pricing. This should be considered in the context of the high sensitivity of the CPW analysis to changes in the load growth.

8. Review the high capital cost of the Holyrood plant associated with ESP and scrubbers, in light of the higher quality fuel now being used, the availability of the former Abitibi hydro assets, and the impact of the addition of three small hydro developments and a wind project. All these will act to substantially reduce emissions.

9. The acceptance of a higher reliability standard for the transmission lines, particularly those in high elevation, remote locations.

10. Should the Board's report make recommendations on this matter of reliability we believe that the Board should be given the opportunity to review any further work which is done to improve reliability.

11. In assessing the interconnected and the isolated options the Board should recognize the higher risk exposure and the potential threat to reliable service on the Avalon, upon decommissioning of the Holyrood generation plant.

12. That the Board review the proposed capital structure, the departure from cost of service and the power purchase agreement to ensure that the options are being compared consistently and that the costs are appropriately allocated.

13. The Board should consider asking Nalcor to prepare a document that clearly indicates (a) the cost of power and (2) the rates charged to customers, for each year and for each option. This distinction between cost and price is important.

14. That the Board examine any constraints that may exist to water management on the Churchill River, arising from the Churchill Falls Power Contract.

15. Supply options based on Churchill Falls should be given serious consideration, as committed in the energy plan. These supply options should include access to Churchill Falls power in 2041 as well as other avenues to acquire power from Churchill Falls prior to that date, including purchase of power from the Province of Quebec. We remind the Board that the Energy Plan (page 14) of 2007 makes the following commitment with regard to Churchill Falls:

> We will maintain our focus on 2041, when the Upper Churchill contract expires and the province is in the position to receive the full benefit from this resource. Between now and 2041, we will carefully plan and make decisions to ensure Upper Churchill's success in the future, as well as organizing our current and future energy resource developments, to maximize benefits while minimizing fluctuations in our economy.

16. The Joint Panel recommended that other supply options be considered, such as natural gas, along with conservation and demand side management. We support this recommendation.

The Energy Plan also makes the following statement on page 28 with respect to the development of natural gas for electricity:

> Natural gas is in the early stages of development in Newfoundland and Labrador. To succeed, we need to gain a clear understanding of the strategic importance of landing gas in the province. Natural gas can be used in industrial processes such as oil refining, secondary gas processing, petrochemical manufacturing, and in the generation of electricity (underlining added). All viable options must be fully assessed for the development of our gas resources to ensure they provide an appropriate level of benefits to the province and a fair return to the investor.

On page 40 the Energy plan states:

> When natural gas is produced from our offshore it could be transported to customers, either as gas in a pipeline, as gas in a Compressed Natural Gas (CNG) tanker, or as a liquid in a Liquefied Natural Gas (LNG) tanker. Landed in the province, it could be used to make electricity, which can then be transported to domestic and external markets by transmission lines. This process is known as gas-to-wire.

17. Finally we recommend that the binary choice between the interconnected and the isolated option be qualified to allow for consideration of Muskrat Falls to proceed at a later time, allowing for full assessment of the options, including the greater and earlier access to Churchill Falls power which may accrue from successful litigation.

We wish to commend Nalcor for their professionalism and commitment throughout this process. They have supplied us and other interested parties with considerable information with courtesy and integrity.

We wish to thank the Board for the opportunity to make this presentation. We wish you well in your deliberations. We welcome your questions.