rev. November 15, 2013

Conformity of the Maritime Link Compliance Filing with UARB Condition Concerning Market-Priced Energy

submitted to the
Nova Scotia UARB

In the Matter of the Maritime Link Act
Matter #M05419

on behalf of the

Low Power Rates Alliance

by

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1. Mandate

The Helios Centre was engaged by the Low Power Rates Alliance to analyze the conformity of the NSPML Compliance Filing with the Condition concerning market-priced energy imposed by the NSUARB in its decision dated July 22, 2013 (the "Decision").

2. Introduction

In the Decision, the Board approved the Maritime Link project, subject to several conditions. The most significant of these conditions is described in para. 226 to 228 of the decision, as follows (the "Condition"):

> [226] The Board will impose a condition relative to the availability of Market-priced Energy over the 35 year term. In the Board's opinion, such a condition should not create any practical difficulty because it would simply codify what NSPML asserts is the effect of the arrangement in any case. It would also confirm what NSPML already states is Nalcor's view of their future relationship.
>
> [227] This is a simple remedy to the fundamental risk underlying NSPML's Application for approval of the ML Project. If no such condition was imposed, the Board would fail in its regulatory oversight by approving an application that could potentially be commercially disadvantageous to NS ratepayers.
>
> [228] Accordingly, the Board directs as a condition to its approval of the ML Project that NSPML obtain from Nalcor the right to access Nalcor Market-priced Energy (consistent with the assumptions in the Application as noted in NSUARB IR-37 and Figure 4-4) when needed to economically serve NSPI and its ratepayers; or provide some other arrangement to ensure access to Market-priced Energy.

In its Oct. 21 Compliance Filing NSPML states that it "agrees and accepts this condition" (page 6). It concludes that "the Energy Access Agreement attached as Appendix A is compliant with the UARB Market-priced Energy condition" (p. 16). In this testimony, I will examine the validity of that statement.

In section 3, I will describe the UARB Market-Priced Energy condition. In section 4, I will examine the Compliance Filing in light of the Condition. In section 5, I will summarize my findings and conclusions.

3. The NSUARB Condition

The NSUARB condition incorporates by reference Fig. 4-4 (page 92 of NSPML's Application) and NSPML's response to NSUARB IR-37 ("IR-37"). This response is a nine-page spreadsheet in which Fig. 4-4 is an embedded chart, and hence contains the assumptions underlying this Figure. In this section, I will review these assumptions.

The pages of the IR-37 spreadsheet are labeled as follows:

- Figure 4-4
- ML Base Load Surplus Energy
- Surplus Energy by Month
- ESAI – Q3 – Low Case
- ESAI – Q3 – Base Case
- ESAI – Q3 – High Case
- Purchases from Market – Low
- Purchases from Market – Base
- Purchases from Market – High

The last six of these pages are used to estimate the market price for surplus energy in Fig. 4-4. However, the Board has indicated in para. 225 that it, in its opinion, "the price of future Market-priced Energy is not the real concern … rather the concern is that the advantageous opportunity to purchase cannot take place, if there is no Market-priced Energy to buy." Consequently, I will not address the issue of price and will limit myself in this testimony to the question of available volumes of Market-Priced Energy ("MPE") and the implications thereof.

I shall begin by tracing the assumptions in IR-37 with respect to volumes of MPE, which are found in the first three pages of the spreadsheet.

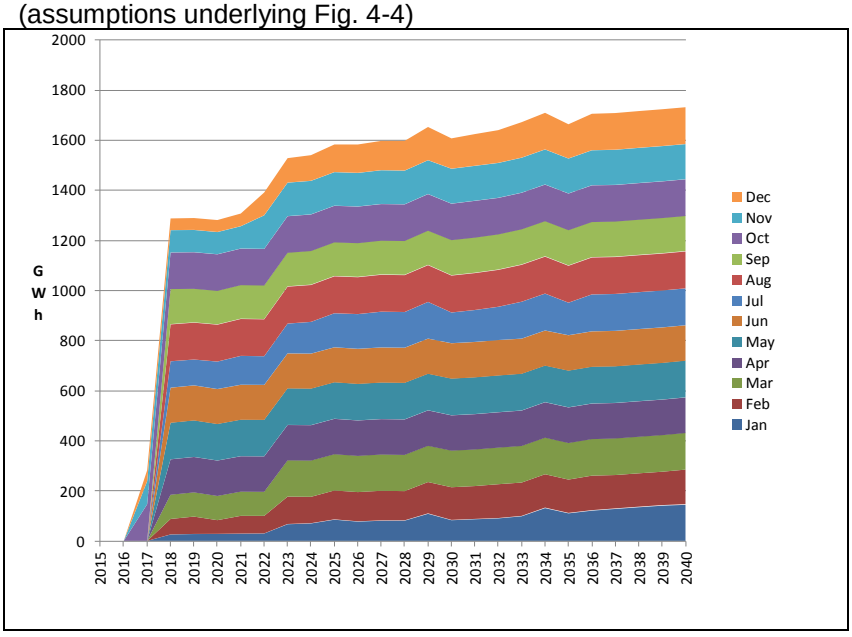
The blended rate shown in the middle line of Fig. 4-4 is found in cells D42:D46 of the first sheet ("Figure 4-4"), which are transposed from row 17. This blended rate is based on the total energy supply revenue requirement (row 15), divided by total energy volume (row 16), which includes the Nova Scotia block as well as MPE imported both via NL and via NB.

The MPE component in row 16 is carried over from row 11, but this is still a blend of NL and NB MPE. It is carried over in turn from row 35 of the "Surplus Energy by Month" page, and we need to look there to separate out the assumptions regarding MPE from NL and NB.

NL Surplus Energy is set out, on a monthly basis, in rows 21-32 of this sheet, and the annual totals are found in row 33. (The same annual figures are also given in cells D4:D27 of the sheet "ML Base Load Surplus Energy".) These figures therefore constitute the assumptions regarding MPE from NL that underlie the Blended Rate in Figure 4-4.

These monthly and annual amounts were shown in Fig. 2 of my April 17 testimony (M-48), as follows:

Figure 1: Market-Priced Energy Purchases over the Maritime Link (assumptions underlying Fig. 4-4)



The annual volume of surplus (market-priced) energy forecast to be purchased over the Maritime Link thus rises from 1288 GWh in 2018 to 1528 GWh in 2023, and then increases gradually to 1732 GWh in 2040. As Fig. 1 indicates, the volumes are quite stable from month to month.

In the following section, I will review the extent to which the Energy Access Agreement reflects these assumptions.

4. The Compliance Filing

According to NSPML's Compliance Filing, the Energy Access Agreement ("EAA") "is compliant with the UARB Market-priced Energy condition" (p. 16 of 20).

In this section, I will review several aspects of the EAA, in light of the Condition. In particular, I will focus on the following aspects:

- Commitment volume
- Variability of Available Energy
- The "energy only" nature of the EAA
- Foregivable Events
- Term of commitment
- The "variable energy" explanation

4.1. Commitment volume

As we have seen above, IR-37 is very explicit regarding the monthly and annual volumes of MPE assumed to be procured over the Maritime Link. For the years 2018-2040 (inclusive), the

average volume is 1571.7 GWh/yr.[1] The cumulative volume of MPE from NL during the full period is 36.2 TWh.

The EAA, however, entitles NSPI to an average of only 1.2 TWh/yr (p. 10-11), with considerable variability. Annual amounts can vary between 0 and 1800 GWh.[2] (The implications of this variability will be addressed in the next section.) Assuming that full power commences on Jan. 1, 2018, this commitment would provide a cumulative total of just 27.6 TWh, almost 25% less than the volumes assumed in IR-37 and Fig. 4-4. **Thus, on the face of it, the EAA is not compliant with the Condition with respect to the volumes of MPE.**

NSPML seeks to explain this divergence by stating that:

> The Energy Access Agreement provides NS Power with the opportunity to contract for energy in volumes that are consistent with Figure 4-4 from the Application, under Low Load planning assumptions. (p. 11 of 20) (underlining added)

This statement is internally inconsistent. Fig. 4-4 was based on the Base Load forecast, not the Low Load forecast. A similar document based on the Low Load forecast was also produced by NSPML, in response to a request by the Consumer Advocate (Undertaking U-3). However, the Condition explicitly references IR-37, not Undertaking U-3.

The Board did indeed conclude (as I and others urged it to) that the Base Load scenario is in fact a high scenario. The compliance filing quotes the first two sentences of para. 106 of the Decision (on page 11), suggesting that the Board intended to replace the Base Load forecast by the Low Load forecast. However, the remainder of that paragraph, not quoted in the Compliance Filing, makes it clear that the Board also considered the Base Load scenario to be plausible and important:

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[1] ML Baseload Surplus Energy, cells D5:D27. This average ignores the partial year delivery of 282.2 GWh in 2017.

[2] Nalcor's Forecast shall distinguish peak and off-peak volumes by month, but there are no constraints on these volumes.

> [106] On balance, the Board believes that NSPML's "Low Load" forecast, which most closely aligns with NSPI's current load forecast, is a more realistic scenario than NSPML's "Base Load" forecast. The Board accepts the evidence of Synapse, Levitan and Resource Insight that NSPML's "Base Load" forecast is more in the nature of a high load forecast. However, as was pointed out, a number of factors could impact load in a way which could cause it to be higher. It is prudent for NSPI to have flexibility in their load forecasts. (underlining added)

Furthermore, the following paragraphs make abundantly clear that the Board would not support an analysis based only on the Low Load scenario:

> [109] What is known is that today's load forecast will not be correct in 10 or 20 years' time as unknown events will intervene. The Board needs to be satisfied that the ML Project was tested over a reasonable range of load assumptions. The evidence of both NSPML and Synapse provide us that information.

The Compliance Filing implicitly replaces NSPML's evidence "tested over a reasonable range of load assumptions" with an analysis based on a single load forecast scenario (presented by NSPML as the Low Load scenario). This is not justified. To eliminate the Base Load scenario (seen by the Board as a high load scenario) from NSPML's analysis at this stage would fundamentally alter the evidence on which the Board reached its Decision.

In the Compliance Filing, NSPML attempts to gloss over this difference as follows:

> This amount of average Nalcor surplus energy is consistent with the amounts modelled to be taken by NS Power as demonstrated in the scenario of Figure 4-4 (Undertaking U-3) accepted by the Board as the more realistic forecast. Therefore, the Energy Access Agreement complies with the UARB Market priced Energy condition because NSPML has obtained from Nalcor, "the right to access Nalcor Market-priced Energy (consistent with the assumptions in the Application as noted in NSUARB IR-37 and Figure 4-4) when needed to economically serve NSPI and its ratepayers". (pp. 15-16) (underlining added)

By this somewhat tortuous reasoning, NSPML attempts to read the Condition down to "the scenario of Figure 4-4 (Undertaking U-3) accepted by the Board as the more realistic forecast". However, the expression "Figure 4-4 (Undertaking U-3)" is contradictory, as these are two distinct documents based on two different sets of assumptions.

Despite para. 106, the Board chose to formulate the Condition in terms of NSUARB IR-37, rather than in terms of Undertaking U-3, a choice that must be taken as intentional. **Because it is based on Undertaking U-3 rather than NSUARB IR-37, the Compliance Filing is not compliant with the Condition.**

4.2. Variability of available energy

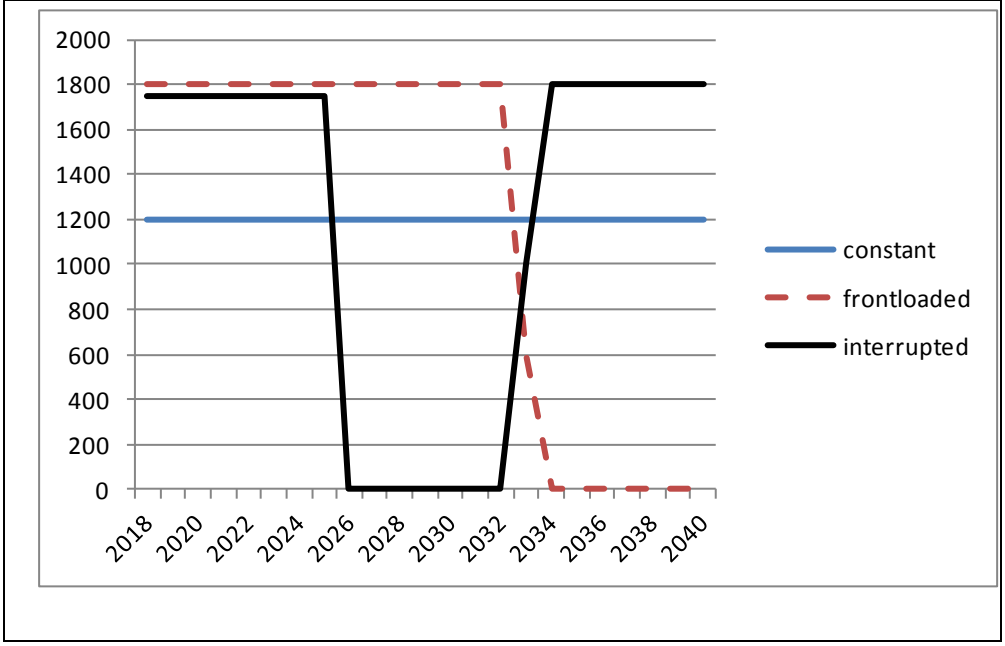
IR-37 set out a fixed schedule of MPE deliveries, via both the NL and NB pathways. To the best of my knowledge, no sensitivity analyses were carried out, in Strategist or elsewhere, with respect to variances in the availability of MPE.

The EAA, in contrast, incorporates a great deal of year-to-year and month-to-month flexibility in terms of the volumes of MPE to be made available over the ML. The commitment is simply to deliver an average of 1.2 TWh/year of MPE. In any given year, Nalcor's forecast of Available Energy can range anywhere from 0 to 1800 GWh. Forecast Energy which exceeds the NSPI Sollicitation in any given year is counted toward the average (i.e. cumulative) commitment.

The following chart indicates a number of patterns that could result from the EAA. Each of these time series meets the Commitment, without creating Variances.

The blue line (steady deliveries of 1.2 TWh/yr) reflect the assumptions of Undertaking U-3. Each of the other lines also represents a possible, if extreme, sequence of forecasts (offerings) that would also be compliant with the EAA.

Fig. 2



The dashed red line describes a "front-loaded" scenario, in which Nalcor's available energy forecast is at the maximum (1800 GWh/yr) for every year starting with commissioning, until 2033. If Nalcor maintains that level of availability through 2033, its Commitment under s. 6 of the EAA will be met, even if its Forecast of Available Energy is zero from then on.[3]

The black line shows an "interrupted" scenario, in which Nalcor's Available Energy is 1800 GWh/year through 2025, drops to zero for seven years, and then returns to 1800 GWh/year. Both of these scenarios are consistent with the EAA and result in Nalcor meeting its Commitment to provide 1.2 TWh of Available Energy, on average.

This latter type of scenario is not implausible. Nalcor will have ample surplus energy upon commissioning of Muskrat Falls. However, based on Nalcor's forecasts of Native Load growth

[3] Under this scenario, it is uncertain whether NSPI would take more MPE than the levels specified in IR-37 during the first years of the contract, given that the 5-year Supplemental Energy is also supplied during this period.

in Newfoundland and Labrador, as described in my initial testimony (M-48) and that of MPA (M-46), this surplus is expected to diminish rapidly in the 2020s. In these scenarios, Nalcor's Available Energy would decline as well, and would only recover when new generating resources are in service.

Fig. 4: Available market-priced energy according to recent Nalcor load forecast

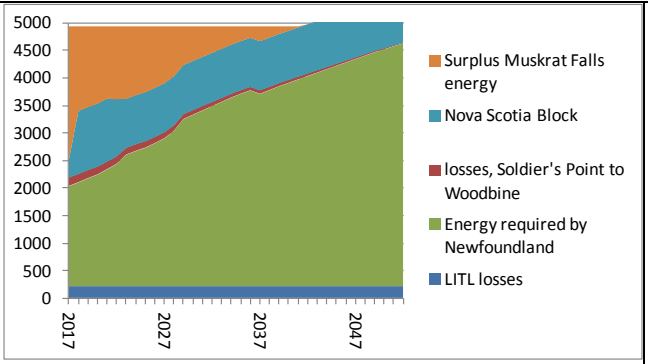


Fig. 4a: from M-48, p. 25

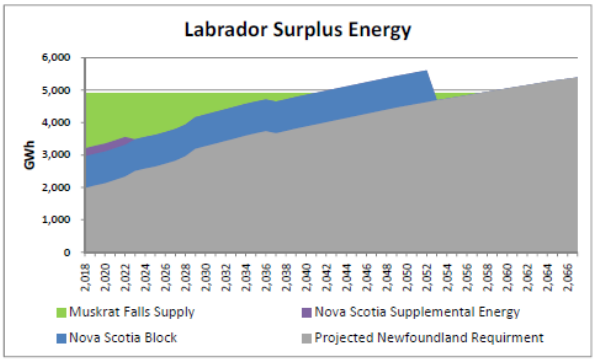


Fig. 4b: From M-46, p. 31.

The Compliance Filing presents no quantitative analysis of the implications of these or other scenarios consistent with the EAA. We thus have no idea what the implications of one or another of the delivery schedules shown above in Fig. 2 (all of which are acceptable under the EAA) would be on the NPV.

The Board found the ML Project to have lower NPV costs that the alternatives, "but not on an overwhelming basis" (para. 171).

> [171] While the Board finds that the ML Project is the lowest long-term cost alternative, it is not on an overwhelming basis. Based on the evidence presented by Synapse, which the Board accepts, there are various scenarios, within a range of reasonable assumptions, that perform almost on an equivalent basis, or even better in a few cases, than the ML Project. ...

Thus, there is no basis to presume that the NPV impact resulting from replacing the MPE volumes described in Fig. 1 with one of those described in Fig. 2 would be insignificant.

In the absence of quantitative analyses taking into account this new dimension of uncertainty, the Board's conclusion that the ML Project is the least-cost alternative is cast into doubt.

4.3. Variances

The analysis presented in the previous section is based on the assumption that Nalcor will meet its Commitment under EAA to make available to NSPI an average of 1.2 TWh/yr of MPE, or a total of 27.6 TWh from 2018 through 2040. However, NSPML has acknowledged that there exists a possibility that Nalcor will be unable to meet this Commitment.

In response to my question about this issue at the Technical Conference, Mr. Gallant responded:[5]

> In the second piece, which I think is helpful, is that the contract itself commits Emera and Nalcor to ensure energy is available, even in the face of that evidence that you describe. But you know, I need to be intellectually honest with you that the answer to your question is, yes, if there is no energy, then there'll be no energy forecast and no energy bid. That's quite true. But that's not the scenario that is -- we're confident that's not the scenario we're going to experience.

In the hearing, the Board heard many expressions of confidence that Nalcor would have ample supply in the future. It found those assurances to be inadequate, and called instead for an "enforceable covenant about the availability of market-priced energy" (para. 223). If the EAA also depends on "confidence" with respect to the supply of MPE, we are no farther advanced.

Section 7 of the EAA describes the mechanism for dealing with such an eventuality. Section 7a sets out the modalities for annual progress reports to verify Nalcor's capacity to meet the Commitment, and for resolving disputes in this regard. The remainder of s. 7 sets out the mechanism for establishing and responding to such "Variances".

[5] Transcript, Technical Conference, October 28, 2013, pp. 125-126.

Let us look at how this would play out in the "interrupted" scenario described in the previous section (the black line in Fig. 2). If Energy Availability remained low in 2034, it would then become impossible for Nalcor to meet its Commitment, which would trigger a Variance. The Variance Trigger Date, following the Dispute Resolution Mechanism (s. 6.1), might be in 2035. Emera's and Nalcor's obligations under the Variance provisions would thus only last for 5 years.

Would Emera actually be able to obtain sufficient transmission via New Brunswick to bring its Variance obligation of 300 GWh/yr into Nova Scotia, without compromising NSPI's ability to make the other purchases of economy energy via NB that it was also planning to rely on (as per Fig. 4-4)? No demonstration has been made that this will be possible.

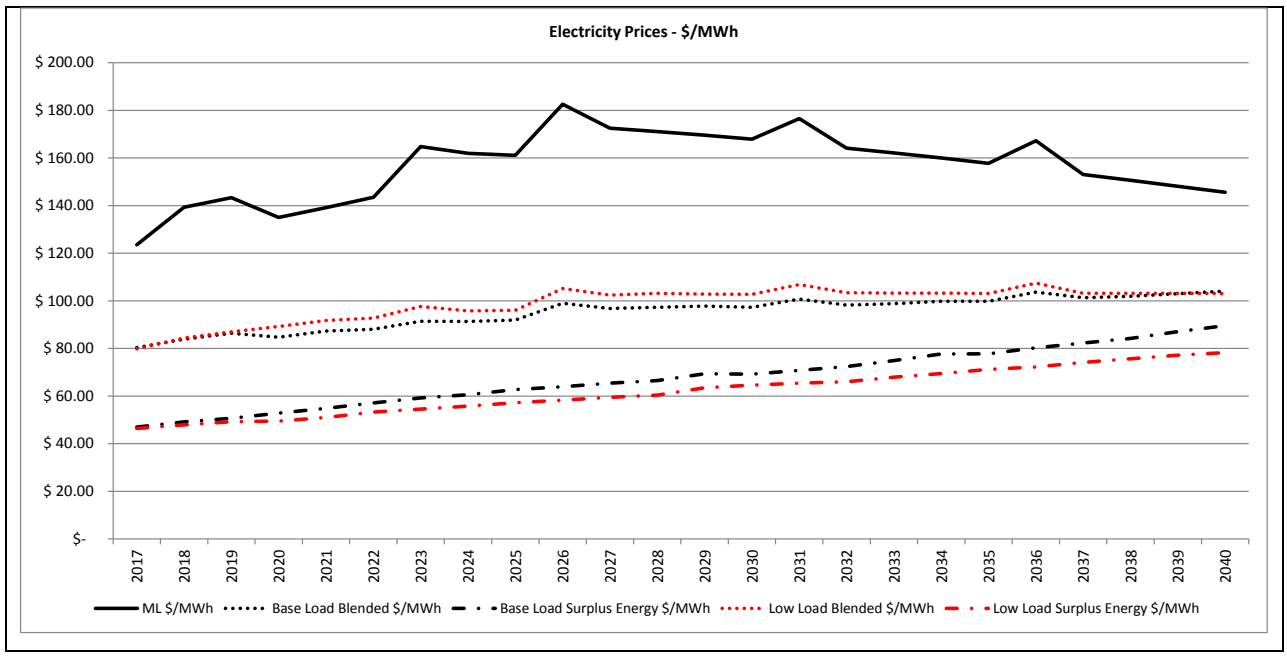
Will Nalcor find a way to meet its own Variance obligations, given the lack of Available Energy in Newfoundland and those same transmission constraints? Again, this has not been demonstrated. If not, according to s. 7e(vii), Nalcor would compensate NSPI "accordingly". (The details of the "appropriate" compensation apparently have not yet been negotiated.) Meanwhile, how will NSPI keep the lights on, if its thermal plants have been decommissioned? The Compliance Filing does not provide an answer to this question.

In the event that Emera and/or Nalcor should be unable to meet their Variance obligations, NSPI's ability to respect its reliability criteria could be called into question.

4.4. Effect on unit prices

The Condition focusses on the blended price in Fig. 4-4, which was based on the Base Load scenario. The corresponding figure in Undertaking U-3, which corresponds to the Low Load scenario, includes somewhat higher blended energy costs, as seen in the red dotted line in the following chart, drawn directly from U-3:

Fig. 4

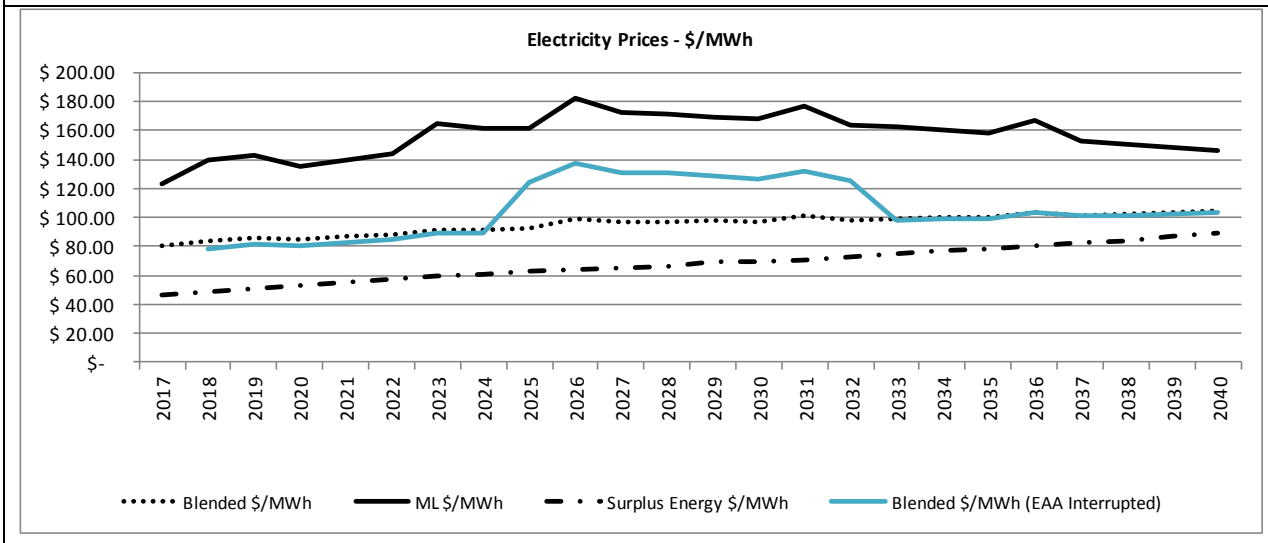


In most years from 2020 through 2032, these blended unit costs are 5-7% higher than those in Fig. 4-4. The MPE assumption in Undertaking U-3 is that shown by the blue line in Fig. 2, but in a Low Load environment. In a Base Load context, the same reduced level of MPE (1.2 GWh on average, instead of the 1.5 TWh in Fig. 4-4) results in 4-5% increase in blended unit costs for the years 2023-2036.

While these differences may seem small, they must be seen in the context of the NSUARB finding that the ML Project performed only slightly better, on an NPV basis, than the hybrid option (para. 152).

What would be the implications for blended unit costs of the "interrupted" scenario described in s. 4.2, above? The results are shown in Figure 5.

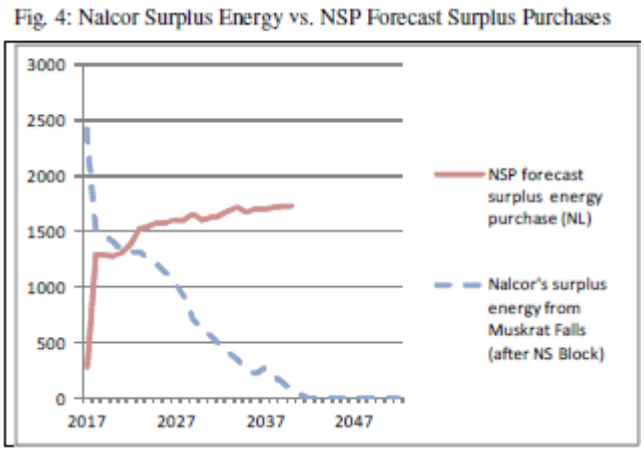
Figure 5



In the years when Available Energy is zero, blended unit energy costs would be 30-40% higher than the levels indicated in Fig. 4-4. Over the entire term, the undiscounted average blended energy cost would be more than 11% higher. Again, given the very slight superiority of the Maritime Link Project identified in the NPV analysis, this difference could well be enough to shift the balance, such that the Maritime Link Project would no longer be the least cost alternative.

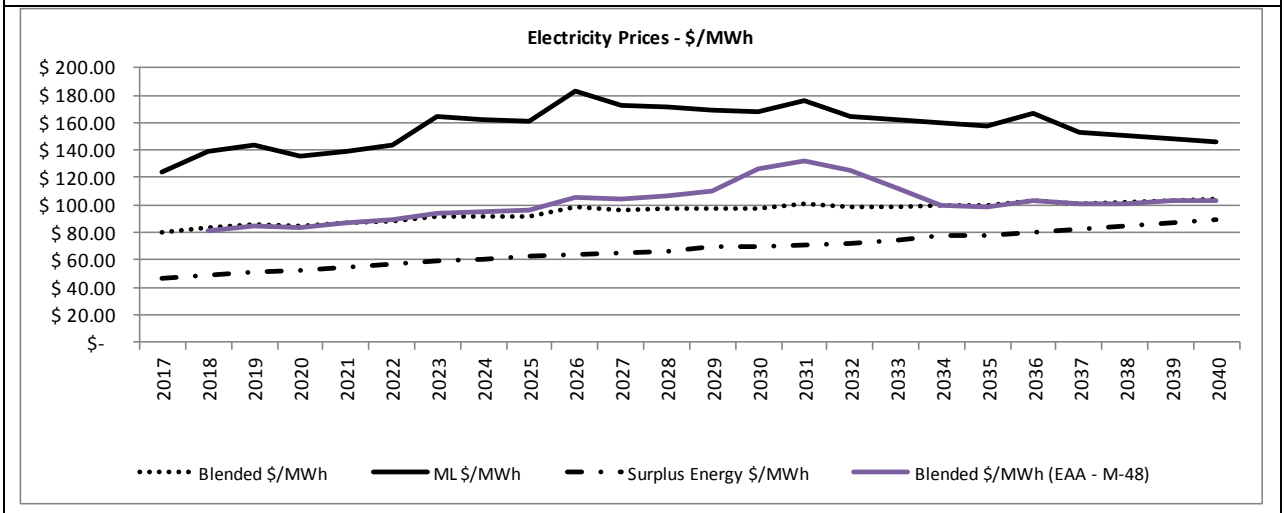
And what if available MPE should follow the pattern shown in Fig. 4a, above? In this scenario, Nalcor's Available Energy falls off rapidly, as shown in Fig. 6.

Fig. 6



The blended unit costs in this scenario would be 6.1% higher than in Fig. 4-4, as shown in Fig. 7.

Fig. 7



Because the total amount of MPE under the EAA is lower than in Fig 4-4, all scenarios under the EAA show blended costs substantially higher than those in Fig. 4-4 − calling into question the conclusion that the Maritime Link Project is in fact the least-cost option.

4.5. The "energy only" nature of the EAA and the RES

Section 3(e) of the EAA provides that Nalcor Supplied Energy is an energy-only product, and that "Nalcor retains all rights and value associated with such Energy in respect of Capacity and GHG Credits."

In the Technical Conference, in response to a question from John Athas of LaCapra Associates, Mr. Sidebottom stated (p. 92):

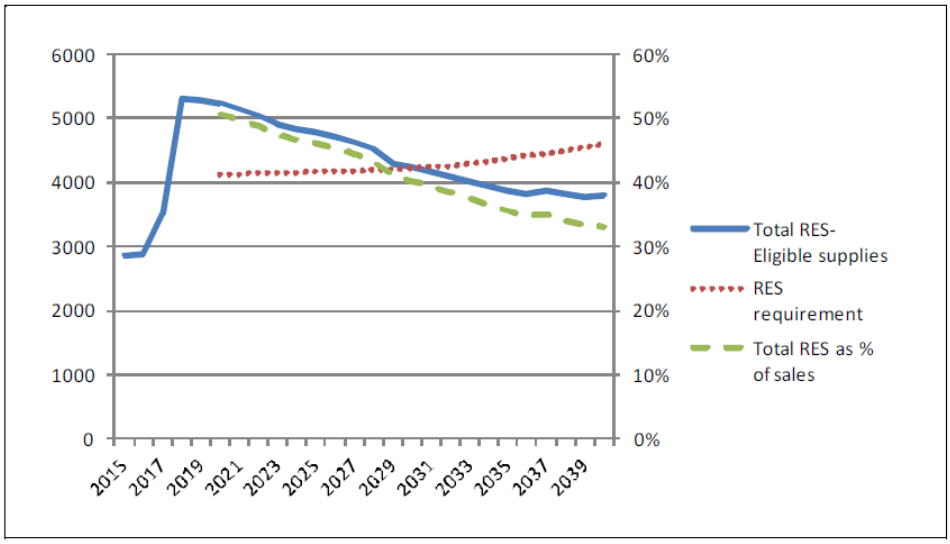
> **MR. SIDEBOTTOM:** This energy, in the low load case, was never required to allow us to qualify for RES consideration. It is an import of a non-firm or an energy-only product, and that was the case actually in the original filing, and it is still the same today. The Nova Scotia block is the firm component which is important in satisfying the RES requirements for 2020 and beyond.

The second sentence of this citation is incorrect. On the contrary, in its original filing, NSPML did indeed assume that its surplus energy imports over the ML (and also over the NB tieline) were RES eligible, as I noted on pages 36-39 of my initial testimony (M-48). In its response to CA/SBA IR-48 (Attachment 3), NSPML clearly indicated that both "surplus energy from Maritime Link" and "Imports over NS-NB Tieline" were "RES Compliant Renewables", and counted the amounts of these surplus energy imports in meeting the RES requirement.

In the rest of his response, Mr. Sidebottom appears to be saying that, **for the low load case**, the RES could be met even without counting the surplus energy over the ML. That may be true, but it is certainly not true for the Base Load case, which occupied the lion's share of NSPML's evidence during the hearing. As shown in Fig. 9 of my initial testimony, reproduced below, under the Base Case, if 100% of NL surplus energy is RES-eligible and NB surplus energy is not, the RES is only met until 2031. Thereafter, it is not.

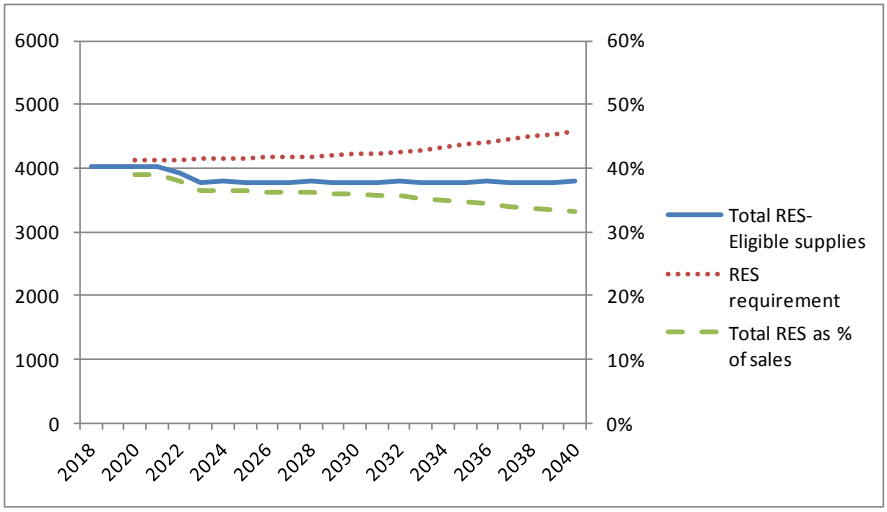
Fig. 8

Fig. 9: RES-Eligible Supplies vs Requirements (no NB Imports Eligible)



Under the EAA, ML market-priced energy is clearly not RES-eligible. As a result, under the Base Load scenario **NSPI will fail to meet its RES requirement for every year, from 2020 on,** as seen in Fig. 9.

Fig. 9: RES-eligible supplies vs. Requirements (Base Load case, surplus energy imports not RES eligible)



Thus, under the EAA and the Base Load forecast, NSPI would be unable to meet the RES requirement in any year, from 2020 on.

4.6. Foregivable events

Under s. 4e(i) of the Energy Access Agreement, Nalcor is forgiven its obligation to bid the Nalcor Forecast or to schedule delivery of the Nalcor Bid Energy if its energy is required to supply Native Load.

It is certainly understandable that Nalcor would insist on such a provision, in order to avoid finding itself in a situation where it is contractually obligated to serve Nova Scotia consumers before its own domestic loads. However, the Board's Condition is in large part made necessary precisely because, in such a scenario, Nalcor would be unable to provide NSP with the MPE on which it relied in IR-37. This is seen in my prefiled testimony and that of Morrison Park (M-46), shown above in Fig. 4.

In the Base Case scenario, as seen in Fig. 6, above, assuming no new resource development, Nalcor's surplus energy would fall below the amounts required in Fig. 4-4 as early as 2022.

In making NL Native Load a Forgivable Event, the Energy Access Agreement provides no enforceable covenant with respect to NSPI's right to access MPE from Nalcor, as required by the Condition, and hence no real remedy to the concern that led to the imposition of the Condition in the first place.

4.7. Term of commitment

The Board's Condition explicitly applies to the full term of 35 years (para. 226), but the EAA ends in 2041. The Board did conclude that, after 2041, there would likely be no shortage of market-priced energy. However, there can be no certainty about the situation post-2041. For example, should CFL(Co) sign a new contract with Hydro-Quebec at a negotiated price, CF power would not be available for sale to NSP at MassHub prices. **T**he Board's conclusion does not justify reducing the term of the Condition to 2041, given its explicit statement to the contrary in para. 226. **The explicit terms of the Condition have not been met.**

4.8. Nalcor's "Variable Energy" explanation

In the Compliance Filing (pages 13-16), NSPML affirms that the spread between average and firm hydro energy in NL will necessarily provide sufficient non-firm energy to supply the Energy Access Agreement. A presentation by Nalcor during the Technical Conference was made in support of this theory.

The average energy output of Newfoundland's existing renewables is indeed greater than their firm energy capability, and this will be true of Muskrat Falls as well. However, this observation does not support the full weight that is imposed upon it in the Compliance Filing.

According to system planning documents filed with the NLPUB, the existing Newfoundland power system has an average energy capability of 9,843 GWh/year, and a firm energy capability of 8,953 GWh/year, resulting in the production of 890 GWh/year of non-firm energy, on average. However, in the EAA, "Available Energy" is limited to "Nalcor-generated Energy". The existing NLH power system on the Island has an average energy capability of 4,510 GWh and a firm energy capability of 3,961 GWh, resulting in the production of just 549 GWh/year of non-firm energy, on average.[6]

Muskrat Falls is expected to add an additional 370 GWh/year of non-firm energy, on average, bringing the total to 919 GWh/yr, on average. This is not enough to meet the proposed commitment of 1200 GWh/yr — and much less than the 1500 GWh/yr that would be required to meet the assumptions of Fig. 4-4 (Base Load scenario).

It should also be noted that Nalcor has access to 300 MW of recall power from Churchill Falls, which is generated by CFLCo. Presumably, therefore, this recall power does not contribute to Available Energy. However, Nalcor could make some of this recall power available to firm up NLH's existing non-firm generation capability, further diminishing the volumes of Available Energy.

[6] NLH, Generation Planning Issues, July 2010, Table 3-1, page 7; Exhibit 16, NLPUB Muskrat Falls Review. See Appendix A.

Fig. 10[8]

Table 7: Hydroelectric Plant Energy and Capacity[24]

	Muskrat Falls	Round Pond	Island Pond	Portland Creek
Installed Capacity (MW)	824	18	36	23
Firm Energy (GWh)	4,540	108	172	99
Average Energy (GWh)	4,910[25]	139	186	142

The brief analysis presented in the Compliance Filing and the presentation from the Technical Conference are inadequate to address the consequences of increased load growth in Newfoundland and Labrador on available non-firm energy.

If firm load increases, new generating resources would presumably be developed to meet the planning criteria in effect, which state that "the Interconnected System should have sufficient generating capability to supply all of its firm energy requirements with firm system capability."[9] The three small hydro projects identified in the table above were often mentioned during the hearings as the most likely future projects. It should be noted that, together, they only add 88 GWh/yr of surplus energy capability.

Another possibility, if load growth is strong enough, is that NLH will find itself obliged to develop new thermal power, or to delay the decommissioning of Holyrood. I raised this possibility at the Technical Conference, and Mr. Humphries responded:

> No, actually, Holyrood will be retired shortly after the commissioning of the Maritime Link and Muskrat Falls, and a little portion of it will be retained for synchronous capability, but the generating capacity will be retired, so that when we do have a requirement for additional

[8] Manitoba Hydro International, Report on Two Generation Expansion Alternatives for the Island Interconnected Electric System, January 2012, v. 1, p. 47.

[9] Nalcor presentation, page 3.

> firm, we will build renewables and -- because of the nature of renewable, there will be a variable content with that as well, so it's important to point out that that 1.2 terawatt hour variability above the firm line will actually increase as we move forward and build new resource. (p. 128) (underlining added)

The chair, René Gallant, added :

> I think we need to reflect on the record, Philip, that your suggestion that thermal generation is possible in the future is directly contrary to what we've heard today from Nalcor, who have said that they are going to become an all-renewable system once Muskrat Falls is connected and Holyrood is decommissioned.

This last statement is simply incorrect. New thermal power played an important role in the Infeed Scenario presented by Nalcor to the NLPUB. This graphic representation, drawn from the MHI report commissioned by the NLPUB, shows that, after Muskrat Falls and Portland Creek, the next planned resource was a 170 MW combined cycle gas turbine.[10]

Fig. 11

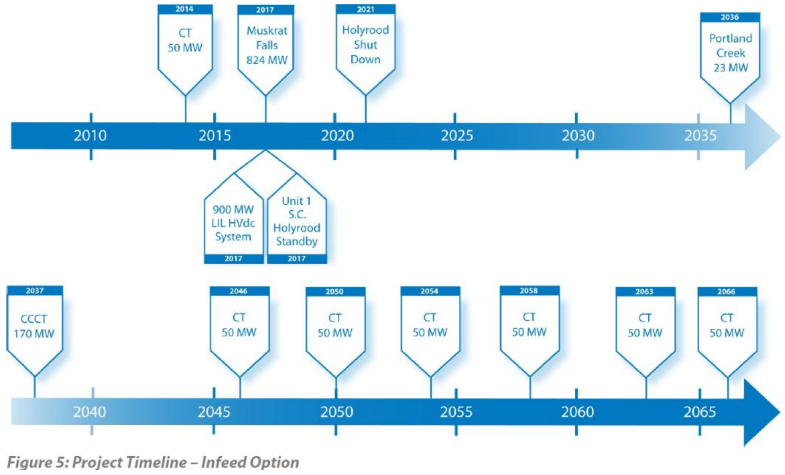


Figure 5: Project Timeline – Infeed Option

While today's policy intention might be to restrict future resource development in Newfoundland to renewables, that is not a binding commitment. Future resource decisions will be made by the

[10] MHI Report, v. 1, p. 28.

responsible authorities in Newfoundland and Labrador, based on the alternatives available at the time.

The question is important because the average/firm spread on which Nalcor is relying does not exist for thermal resources.

There is another plausible circumstance in which the available average/firm surplus energy would not be available to supply MPE sales to NSPI. This would occur if loads arise in NL that purchase non-firm energy. Such loads would qualify as Native Load under s. 6(e).[11] Thus, should non-firm loads use up some or all of the firm/average surplus, Nalcor could reduce the amount of energy offered to NSPI.

Finally, it should be mentioned that the lawsuit filed by Hydro-Québec in Québec Superior Court concerning the interpretation of the Churchill Falls contract could, if successful, have implications for the firm and non-firm energy output of Muskrat Falls. In its testimony before the NLPUB, Nalcor testified that without a Water Management Agreement, there would be significant spillage from the Lower Churchill hydroelectric projects.[12]

Nalcor stated in the Technical Conference that the WMA has no effect on non-firm energy from Muskrat Falls, but declined to provide any information in support of that statement. Under the circumstances, this affirmation should not be accorded probative value.

[11] NL Native Load is defined as "the cumulative electricity consumption within NL ... plus associated ... losses", with no distinction between firm and non-firm loads.

[12] "Irregular production at Churchill Falls will have different effects on the lower Churchill facilities depending upon the uncontrolled natural inflows at various times of the year. In many months, the lower Churchill facilities would have insufficient water for production requirements during periods of reduced production at Churchill Falls. However, during the spring runoff, there would be excess water, resulting in spillage, during periods of increased production at Churchill Falls." Nalcor, Water Management Agreement Application, Prefiled evidence, Nov. 10, 2009, p. 13.

In the hearing, NSPML made clear that all financial risks regarding the WMA were borne by Nalcor. However, under the terms of the EAA, NSPI could nevertheless be exposed to consequences in the event that the integrity of the WMA was compromised.

Once Muskrat Falls is in service, the Newfoundland and Labrador interconnected system is expected to produce, on average, 1.2 TWh of non-firm energy annually. However, there is no certainty that all this non-firm energy will be available for export to NSPI.

5. Discussion

5.1. Summary of Findings

The analysis presented above leads to the following findings:

1. In limiting the Commitment to provide Market-priced energy to an average of 1.2 TWh/yr (a total of 27.6 TWh), the Compliance Filing is non-compliant with the Condition, which called for an average of 1.5 TWh/yr (a total of 36.2 TWh), as per the assumptions in the response to NSUARB IR-37 and in Fig. 4-4.

2. In setting annual amounts of MPE which are highly variable, the EAA is not consistent with IR-37 and Fig. 4-4, which contained regular and predictable deliveries of MPE over the Maritime Link. Furthermore, this variability has significant consequences:

    a. It undermines the NPV analysis upon which the least-cost demonstration relied, by introducing uncertainty as to the costs each year and the pattern of costs over time. There is no longer any reliable evidence comparing the costs of different scenarios.

    b. It raises entirely new and unanswered questions regarding whether and how NSPI will be able to replace the ML MPE during years when there is little or no Available Energy.

c. Under such scenarios, blended unit costs are significantly greater than those shown in Fig. 4-4, even if Nalcor is able to meet its Commitment. In some such scenarios, average blended costs are more than 10% higher than in Fig. 4-4 and, for some years, are 30-40% higher. Because the total amount of MPE under the EAA is lower than in Fig 4-4, all scenarios under the EAA show blended costs substantially higher than those in Fig. 4-4 − calling into question the conclusion that the Maritime Link Project is in fact the least-cost option.

d. In the Application, market-priced energy over the Maritime Link was presumed to be RES-eligible, but under the "energy only" condition of the EAA, it clearly is not. **As a result, the Maritime Link Project fails to satisfy the RES in any year, under the Base Load scenario.**

e. In making NL Native Load a Forgivable Event, the Energy Access Agreement provides no enforceable covenant with respect to NSPI's right to access MPE from Nalcor, as required by the Condition, and hence no real remedy to the concern that led to the imposition of the Condition in the first place.

f. The Term of the EAA is not compliant with the Condition, which explicitly called for a 35-year term.

g. Once Muskrat Falls is in service, the Newfoundland and Labrador interconnected system is expected to produce, on average, 1.2 TWh of non-firm energy annually. However, there is no certainty that all this non-firm energy will be available for export to NSPI.

5.2. Conclusion

For the reasons described above, the Compliance Filing and the EAA on which it is based are not compliant with the Condition. If NSPML believed the Condition to be too restrictive, it could

have asked the Board to modify it. For example, it could have asked the Board to replace IR-37 with U-3, or asked that the term of commitment be limited to 2041.

However, the Board has stated in its letter of October 20:

> Parties are reminded that the sole purpose of the proceeding is to determine if the Board imposed terms and conditions have been met.

For the reasons described above, one must conclude that the imposed conditions have not been met.

ATTACHMENT A — Qualifications

Cofounder of the Helios Centre, Philip Raphals has extensive experience in many aspects of sustainable energy policy, including least-cost energy planning, utility regulation (including transmission ratemaking) and green power certification. He is the author of numerous studies and reports and frequently appears as an expert witness in the regulatory arena. He has explored in detail the interaction between competition and regulation as well as the environmental implications of electricity trade.

From 1992 to 1994, Mr. Raphals was Assistant Scientific Coordinator for the Support Office of the Environmental Assessment of the Great Whale hydro project, where he coauthored a study on the role of integrated resource planning in assessing the project's justification.[13] In 2001, he authored a major study on the implications of electricity market restructuring for hydropower developments, entitled *Restructured Rivers: Hydropower in the Era of Competitive Energy Markets*. In 2005, he advised the Federal Review Commission studying the Eastmain 1A/Rupert Diversion hydro project with respect to project justification. Later, he drafted a submission to this same panel on behalf of the affected Cree communities of Nemaska, Waskaganish and Chisasibi.

Mr. Raphals appeared as an expert witness on behalf of Grand Riverkeeper Labrador Inc. in the hearings of the Joint Review Panel (JRP) on the Lower Churchill Generation Project, which retained many of his suggestions. He also submitted an expert justification analysis to the Comprehensive Study with respect to the Labrador Island Transmission Link, and presented testimony to the Newfoundland and Labrador Public Utilities Board in the context of its advisory hearings concerning the Muskrat Falls project.

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[13] J. Litchfield, L. Hemmingway, and P. Raphals. 1994. *Integrated resources planning and the Great Whale Public Review*. Background paper no. 7, Great Whale Public Review Support Office, 115 pp. *(also published in French).*

Mr. Raphals chairs the advisory committee for renewable energies of the Low Impact Hydropower Institute (LIHI) in the United States, and has participated actively in developing the low impact renewable electricity guideline for the Canadian Ecologo programme.

Mr. Raphals has worked with one of the leading proponents of scenario planning, Global Business Network, on several projects. He was part of an expert panel that prepared a long-term scenario analysis for Canada's Nuclear Waste Management Organization, and was part of the strategy team, together with GBN founders Peter Schwartz and James A. Ogilvy, in a scenario planning project with Pemex Distribution.

Mr. Raphals is a frequent expert witness before the Quebec Energy Board (the Régie de l'énergie du Québec). He has been qualified by the Régie de l'énergie as an expert witness with respect to transmission tariffs (FERC), issues related to the integration of wind power, security of supply with respect to hydropower, energy efficiency and avoided costs, and sustainable development criteria.

Mr. Raphals testified on behalf of CanWEA in the initial phase of this hearing, and was qualified by the Board as an expert in sustainable energy policy.

APPENDIX A

NLH, Generation Planning Issues, July 2010, Table 3-1, page 7

(Exhibit 16, NLPUB Muskrat Falls Review)