IN THE MATTER OF the *Electrical Power Control Act, 1994*, SNL 1994, Chapter E-5.1 ("EPCA") and the *Public Utilities Act*, RSN 1990, Chapter P-47 ("Act");

AND IN THE MATTER OF the Application regarding Long-Term Supply for Southern Labrador filed by Hydro.

Requests for Information
by the Labrador Interconnected Group

Long-Term Supply for Southern Labrador

LAB-NLH-001 to LAB-NLH-016

August 12, 2021

Requests for Information Regarding the Southern Labrador Interconnect proposal

LAB-NLH-1. **Re: Long-Term Supply for Southern Labrador – Phase 1, pages 4-5 (pp. 16-17 pdf)**

Citation 1:

> In order to meet firm capacity requirements for the southern Labrador system, Hydro has considered alternatives to provide firm capacity using diesel generation, small-scale hydro generation, or interconnection to the bulk electrical system, as detailed in Section 4.0. While there is a need for non-renewable sources to meet the system firm capacity requirements, these alternatives do not preclude Hydro from availing of the integration of renewable resources for the provision of energy in the future. The alternatives under consideration by Hydro will include provisions for future infrastructure required to integrate renewable sources. Alternatives involving the interconnection of multiple isolated systems are expected to further facilitate the integration of renewable energy as such systems are better suited to absorb fluctuations in supply that are commonly experienced from renewable generation, allowing for a greater penetration of renewable energy on the system. (underlining added)

a. Please describe the provisions for future infrastructure required to integrate renewable sources that are included in the recommended alternative.

b. Does the statement that integrated systems are better suited to absorb fluctuations in supply from renewable generation take into account the distance between such generation and the diesel plant providing load following services? More specifically, please describe the challenges, if any, that would arise in integrating a large wind farm near the edge of the integrated system, i.e. in Charlottetown, St. Lewis or Mary's Harbour.

LAB-NLH-2. **page 9 (p. 21 pdf), Table 1: Forecast Rate Impacts**

a. Please provide a spreadsheet demonstrating the calculation of the forecast rate impacts shown in Table 1.

LAB-NLH-3. **page 12 (p. 24 pdf)**

Citation:

> The new diesel generating station will be constructed on land adjacent to the existing station in Port Hope Simpson that is owned by Hydro.

Citation 2 (p. 60 pdf):

> Specific details on the design of the regional diesel generating station in Port Hope Simpson are as follows:
>
> > The construction of an 8,800 ft^2 steel building enclosure with a concrete foundation and would be equipped with the necessary ventilation, lighting, and fire suppression systems. The building would consist of a bathroom, lunchroom, office, electrical room, control room, battery room, workshop, and an area allocated for a fire suppression system. There would be a requirement for the purchase of land and the necessary site work including fencing.

Citation 3 (p. 61 pdf):

> Specific details on the design of the 25 kV interconnection are as follows:
>
> > …
> >
> > A 3 kilometre line between the new regional diesel generating station in Port Hope Simpson and the Port Hope Simpson distribution system. The new line would be comprised of 477 ASC conductors.

a. Please reconcile the statements in citations 1 and 2 concerning the ownership of the land where the new generating station would be built in Port Hope Simpson. Is it owned by Hydro, or would it have to be purchased?

b. Please explain why a 3-kilometre line is needed to connect to the PHS distribution system, if the new generating station is constructed on land adjacent to the existing station.

LAB-NLH-4. **Stakeholder engagement sessions (p. 30 pdf)**

a. Is the town of Port Hope Simpson supportive of the idea of building a regional generating station there? Please describe the views presented at the stakeholder engagement session there.

LAB-NLH-5. **Economic and Technical Assessment, p. 2, Table 1 (p. 35 pdf)**

Citation 1:

Table 1: Diesel Generating Station Capacities

Ratings	CHT[4,5]	MSH[6]	PHS[7,8]	SLE[9]
Installed Capacity (kW)	2,545	2,540	1,725	1,020
Design Plant Capacity (kW)	N/A[10]	1,500	1,500	2,000
Firm Capacity (kW)	1,635	1,815	1,000	565

Citation 2 (p. 18, p. 52 pdf):

> The timing of a diesel generating station replacement depends heavily on the existing condition and design capacity of the facility. Hydro has established a replacement schedule (Table 4) for the diesel generating stations in southern Labrador based on service life, plant capacity, and condition. The diesel generating stations in Mary's Harbour and Port Hope Simpson have both exceeded their design plant capacity and any future generation expansion would likely require a new plant or extension. (underlining added)

Table 4: Diesel Generating Station Replacement Schedule

Location	In-Service Year	Replacement Year (Projected)
Mary's Harbour	1994	2030
Port Hope Simpson	1995	2035
St. Lewis	2006	2045

a. Please confirm that the proposed project would replace the existing Port Hope Simpson generating station in 2024, even though it is not due for replacement until 2035.

b. Please confirm that the firm capacity in each of the communities is substantially greater than the forecast peak loads for each community in 2039.

c. Please confirm that, according to Hydro's load forecasts, future generation expansion is expected to be minimal.

d. Does Hydro generally replace gensets promptly when their scheduled Replacement Year arrives? How many gensets are currently in service that are past their projected replacement date? Please provide a table listing all such gensets, their in-service year, and the projected replacement year.

e. Please explain why the Installed Capacity in MSH is so much greater than the Design Plant Capacity.

f. Please explain the significance of the fact that the diesel generating stations in Mary's Harbour and Port Hope Simpson have both exceeded their design plant capacity. What are its implications regarding the cost and reliability of the service provided?

LAB-NLH-6. **Economic and Technical Assessment, p. 4,Table 2 (p. 38 pdf)**

a. Please provide the assumptions underlying this load forecast, including demographic assumptions and any forecast increases in commercial accounts.

LAB-NLH-7. **Economic and Technical Assessment, page 19 (p. 53 pdf)**

Citation:

> There are currently four diesel generating stations operating in the southern Labrador region and based on economies of scale it would suggest that it could be more economically feasible to minimize the number of facilities. A reduction in the number of diesel generating stations would inherently decrease the overall operating and maintenance costs in the region.
>
> Hydro forecasts that the total annual O&M cost for all four diesel generating stations would be approximately $2.15 million per year over the 50-year duration of the study. Hydro estimates that by supplying southern Labrador with one centralized diesel generating station, the overall O&M costs would reduce by approximately $670,000 per year.

a. Please explain in detail how these estimates of O&M costs were derived.

LAB-NLH-8. **Economic and Technical Assessment, page 19 (p. 53 pdf)**

Citation:

> The following initiatives would be considered during the detailed design phase for the construction of any new diesel generating station:
>
> - Waste Heat Recovery: Use the thermal energy produced by the diesel gensets to supply heating for the diesel generating station or customers in the area.
>
> …
>
> - Reduce Power Losses (I^2R) on the System's Distribution Lines and Equipment:

a. Are there any large customers in the vicinity of the proposed new Port Hope Simpson plant that could potentially use its waste heat? Has the possibility of installing a district heating system for the surrounding community been explored?

b. Are there any large customers in the vicinity of the three diesel plants that would eventually be decommissioned if this

proposal is accepted that might have been able to use their waste heat?

c. Please confirm that transmitting power from PHS to Charlottetown, Mary's Harbour and St. Lewis will result in additional line losses, compared to the status quo. Please elaborate on the tradeoffs between these additional losses and any loss reductions that may occur as a result of higher distribution voltage and other factors.

LAB-NLH-9. **Economic and Technical Assessment, page 20 (p. 54 pdf)**

Citation:

> Energy storage technologies have not yet matured to the point that they are a viable alternative for firm, reliable, least-cost provision of power when compared to diesel generation. This is supported by a National Renewable Energy Laboratory ("NREL") report "2018 U.S. Utility-Scale Photovoltaics-Plus-Energy Storage System Costs Benchmark."[26] This report includes a comparison of average energy storage durations for such systems and indicates that most storage technology is limited to 10 hours in duration, where none of which exceed an average of 100 hours.
>
> For Hydro to rely on wind, solar, or run-of-river hydro generation, energy storage technologies would need to bridge the prolonged time in which there is little exposure to these energy sources. These periods may extend for several days; therefore, energy storage solutions are not a viable option. As such, Hydro cannot consider wind and solar generation as a firm energy solution for southern Labrador.

a. Please confirm that other technologies are under development which may well allow longer storage durations in the coming years.

b. Has Hydro explored the extent to which energy storage technologies are expected to become a viable alternative for firm, reliable, least-cost provision of power when compared to diesel generation, during the expected lifetime of these investments?

c. More specifically, if cost-effective energy storage over multi-day periods were to become available later in this decade, how would this affect Hydro's analysis of the optimal solution for meeting southern Labrador needs?

d. Should cost-effective longer-term storage become available during the life of the proposed project, would it allow wind and solar power to be treated as firm supply solutions to a certain extent?

e. Please elaborate on how the proposed project would be modified if it were assumed that a substantial quantity of firmed renewable energy would become available by 2035.

LAB-NLH-10. **Re: Long-Term Supply for Southern Labrador – Phase 1, page 3 (p. 15 pdf)**

Citation 1:

> In addition to its own generation, Hydro has the ability to purchase non-firm energy through a power purchase agreement with St. Mary's River Energy, an independent power producer which owns and operates a 240 kW mini-hydro plant and is in the process of installing 187.5 kW of photovoltaic solar capacity along with a battery energy storage system.

a. Under this PPA, is Hydro obliged to purchase non-firm energy provided by St. Mary's River Energy? If so, please indicate the quantities involved.

b. Is the battery system under the control of Hydro, or of the owner? Please describe the extent to which, by virtue of this storage system, this PPA constitutes a dispatchable resource.

LAB-NLH-11.**Economic and Technical Assessment, page 21 (p. 55 pdf)**

Citation:

> With an electrical interconnection and the 25 kV voltage conversion of southern Labrador distribution systems, the fault levels on these systems will increase as shown in Table 5, therefore minimizing the effect of voltage flicker during motor starting.

a. Please explain the relationship between fault levels, "available fault current", and voltage flicker.

LAB-NLH-12.**Economic and Technical Assessment, page 34 (p. 68 pdf)**

Citation:

> Any asset currently in-service that was replaced during the study was assumed to have no salvage value.

a. Given that the Port Hope Simpson station was not expected to replaced until 2035 (Table 9), please explain why no salvage value was attributed to its generating assets.

LAB-NLH-13. **Economic and Technical Assessment, page 44 (p. 78 pdf)**

Citation:

> The forecast coincident peak for the entire southern Labrador system is about 3.6 MW by the year 2025. The southern Labrador interconnection would be designed to support approximately 8 MW of demand, assuming the incremental load is spread uniformly amongst the four communities. The capacity of each existing system is provided in Table 18, which is compared against the proposed capacity of a southern Labrador interconnection. It is evident from Table 18 that an interconnected solution provides a more effective capacity solution. Therefore, it can be concluded that some form of southern Labrador interconnection would be better equipped to accommodate incremental increases in demand. (underlining added)

a. Please explain the underlined statement (8 MW of demand).

b. Please explain why it is necessary to support 8 MW of demand, given that the load forecasts in Table A-1 show a combined 2039 demand of only 3,681 kW (only marginally greater than the 2025 forecast).

c. Has Hydro explored the implications of a substantial reduction in demand in the four communities on the economics of the proposed project? If so, please present the results of this analysis.

d. Please compare the CPW costs for serving the communities with the proposed project or the status quo approach in the event of a significant reduction in population, resulting in a of 25% reduction of energy requirements and demand in the four communities, by 2035.

LAB-NLH-14. **Economic and Technical Assessment, page 45 (p. 79 pdf)**

Citation:

> Renewable Energy Penetration: Assuming the purchase of renewable energy at 90% of fuel cost, it was concluded that consideration for renewable penetration (as per Appendix B) would have very little to no impact on the economic analysis.

a. Please justify the assumption that the purchase price of renewable energy would be at 90% of fuel cost.

b. If the cost of purchasing renewable energy were 50% of fuel cost, what would be the implications of substantial renewable energy penetration on the economic analysis?

LAB-NLH-15. **Renewable Energy Study, page 2 (p. 86 pdf)**

Citation:

The available renewable energy system capacity was calculated by subtracting the minimum diesel generation limit from available system load data for each 15 minute interval throughout an entire year. Each of these points were then added together to determine the potential energy that could be provided through renewable generation to offset diesel fuel.

a. Please confirm that the values determined in this study represent the maximum amount of renewable energy that can be integrated into the diesel system, without reference to the actual renewable energy generation potential in the region.

b. Has Hydro undertaken a survey or a review of the wind and solar energy potential in the southern Labrador region? If so, please summarize the results and provide copies of the relevant studies. If not, what does Hydro consider to be a reasonable estimate of the amount of cost-effective wind and/or solar power likely to be developed in the region by 2035.

c. Has Hydro explored the possibility of developing wind or solar power in the region on its own behalf? If not, why not?

d. Please describe Hydro's policy with respect to signing power purchase agreements with independent renewable energy generators in Labrador.

LAB-NLH-16. **Reliability Study, page 3 (p. 93 pdf)**

Citation:

The unavailability of the proposed sub-transmission line is assumed to be approximately 0.213% per 100 km on the basis of benchmark statistics in consideration of Hydro's 66 kV transmission lines as well as 138 kV transmission line L1301. The proposed interconnection line will be built to a 66 kV transmission line standard and L1301 was considered to reflect the operation of the most comparable transmission line in Labrador.

a. Given the age and length of L1301, please explain why it is believed to be comparable to a new line in Labrador, for purposes of estimating unavailability.