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

IN THE MATTER OF Newfoundland and Labrador Hydro's Reliability and Supply Adequacy Study.

Requests for Information

by the Labrador Interconnected Group

LAB-NLH-001 to LAB-NLH-028

July 6, 2020

Requests for Information Regarding the Reliability and Resource Assessment Study

LAB-NLH-1. Re: RRAS, 2019 Update, Vol. I, page 3 (29 pdf)

Citation:

> As proposed in the 2018 Filing, Hydro intends to update and file its assessment of resource adequacy annually. Hydro proposes to file a more comprehensive analysis, similar to the 2018 Filing, every three years.

Please clarify, in Hydro's view, which of these filings will be subject to Board approval.

LAB-NLH-2. Re: RRAS, 2019 Update, Vol. I, page 3 (29 pdf)

Citation:

> Proposed changes included:
>
> > The migration to planning on a regional and sub-regional basis[7];
>
> Note 7 : From a capacity planning perspective, the Island Interconnected System and the Labrador Interconnected System form a planning region called the Newfoundland and Labrador Interconnected System, and Island Interconnected System forms a subregion. For additional detail, please refer to Hydro's 2018 Filing.

a) Please confirm (or correct) that, in this context, the term "regional" refers to the provincial level, and that the IIS and the LIS are considered as "sub-regions".

b) Please confirm (or correct) that Hydro now considers the IIS and the LIS to form a single planning region (the NLIS) for capacity planning purposes. If so, please explain in detail the implications of this new approach. More specifically, does it mean that:

   i. Capacity needs on the Island can be met either on the Island or in Labrador?

   ii. Capacity needs in Labrador can be met either on the Island or in Labrador?

   iii. A capacity shortfall in either Labrador or on the Island could, if unremedied, result in unserved load in either sub-region?

c) Please describe in detail the reasons that led Hydro to propose carrying out capacity planning on a regional basis (the NLIS), instead of on a subregional basis.

d) Please describe the differences, in both planning and operational terms, between conceiving of the NLIS as a single system, for capacity purposes, and conceiving of the IIS and the LIS as two distinct systems, with a reserve-sharing arrangement in place.

e) Please confirm that, due to transmission constraints, capacity planning will nevertheless be carried out separately for Labrador East and Labrador West.

LAB-NLH-3. Re: RRAS, 2019 Update, Vol. I, page 3 (29 pdf)

Citation:

> Proposed changes included:
>
> The migration to planning on a regional and sub-regional basis[7];
>
> Note 7 : From a capacity planning perspective, the Island Interconnected System and the Labrador Interconnected System form a planning region called the Newfoundland and Labrador Interconnected System, and Island Interconnected System forms a subregion. For additional detail, please refer to Hydro's 2018 Filing.

a) Please clarify if Hydro also intends to carry out energy planning on a regional, as opposed to a sub-regional, basis. If so, please explain in detail the implications of this new approach. More specifically, does it mean that:

   i. Energy needs on the Island can be met either on the Island or in Labrador?

   ii. Energy needs in Labrador can be met either on the Island or in Labrador?

b) Please describe in detail the reasons that led Hydro to propose carrying out energy planning on a regional basis (the NLIS), instead of on a subregional basis.

LAB-NLH-4. Re: RRAS, 2019 Update, Vol. I, page 9 (35 pdf)

Citation:

> 4.1.1 Pre-Existing Planning Criteria
>
> System supply investment prior to 2018 has been based on previously established resource planning criteria, detailed as follows: …
>
> •Capacity: The Island Interconnected System should have sufficient generating capacity to satisfy a LOLH expectation target of not more than 2.8 hours per year.
>
> • Energy: The Island Interconnected System should have sufficient generating capability to supply all of its firm energy requirements with firm system capability.

Please describe the pre-existing planning criteria for the Labrador Interconnected System, with respect to both capacity and energy.

LAB-NLH-5. Re: RRAS (2018), Vol. III, page 5 (121 pdf)

Citation:

> 3.0 Stakeholder Engagement
>
> Hydro conducted stakeholder engagement in support of the 2018 Filing to complement the technical assessments and fully inform the recommended resource plan. This involved direct consultation, specifically focused on reliability and resource planning, with Newfoundland Power, Hydro's Industrial Customers, the Consumer Advocate, and provincial electricity customers.

a) Please describe in detail the stakeholder engagement consultations undertaken with respect to the RRAS in Labrador.

b) Please provide copies of any minutes, reports or other records resulting from these consultations.

LAB-NLH-6. Re: RRAS, 2019 Update, Vol. I, page 13 (39 pdf)

Citation :

4.2.3 Energy Criterion

> A review of the system energy capability and forecast requirements have resulted in the recommendation to extend the existing energy planning criteria to cover the entire Newfoundland and Labrador Interconnected System, as follows:
>
> □□Energy: The Newfoundland and Labrador Interconnected System should have sufficient generating capability to supply all of its firm energy requirements with firm system capability.
>
> Further detail can be found in Volume I, section 3.3 of the 2018 Filing.

Preamble :

> Section 3.3.2 of the 2018 Filing (p. 20, or p. 51 pdf) provides essentially the same statement as the one cited.

a) Please identify where in the 2018 Filing further detail about the energy criterion can be found.

b) Is it Hydro's proposal to cease to prepare a supply-demand balance for energy for the Labrador Interconnected System, but only for the integrated NLIS? If so, please explain the reasoning underlying this proposed shift in planning procedures.

c) Please confirm that, until now, it has been Hydro's objective to identify least-cost means to satisfy energy needs within the Labrador Interconnected System, and within the Island Interconnected System.

d) Please confirm that, under the proposed modification, Hydro would no longer have as an objective to identify least-cost means to satisfy energy needs within either the Labrador Interconnected System or the Island Interconnected System, but only within the integrated Newfoundland and Labrador Interconnected System.

e) Please elaborate on the way that Hydro would address a scenario where additional energy resources were required in Labrador under i) the pre-existing and ii) the proposed approaches to energy planning.

f) More specifically :

i. Please elaborate on the differences between the pre-existing and the proposed planning approaches, in the event that the least-cost solution from the perspective of the LIS would not constitute the least-cost solution from the perspective of the NLIS.

ii. Please explain the assumptions that would be used, for the purposes of a least-cost analysis, to evaluate the cost of using energy provided under the Muskrat Falls Power Purchase Agreement to meet any energy shortfall in Labrador.

iii. Please explain how this proposed planning paradigm would handle a situation where the cost of meeting forecast energy demand in Labrador through new energy resources in Labrador would result in lower costs for Labrador consumers than would using energy provided under the Muskrat Falls Power Purchase Agreement.

g) In P.U. 37(2019), the Board accepted the results of a Settlement Agreement which provides that :

> Systemization
>
> 8. The Parties agree that the Labrador Interconnected System and Island Interconnected System shall continue to be treated as separate systems for Cost of Service purposes.

Please explain why, if the LIS and IIS are to continue to be treated as separate systems for Cost of Service purposes, they should not also be treated as separate systems for planning purposes.

LAB-NLH-7. Re: RRAS, 2019 Update, Vol. III, page 43-44 (159-160 pdf)

Citation 1 (Vol. 1, page 4):

From an energy perspective, Hydro completed an assessment of its ability to meet firm energy requirements in consideration of firm hydraulic energy sequences.

Citation 2 (Vol. III, page 43):

7.3 Energy Criteria

The proposed energy criterion is that there must be adequate firm generation on the system to supply firm load on an annual basis.

Energy: The Newfoundland and Labrador Interconnected System should have sufficient generating capacity to supply all of its firm energy requirements with firm system capability.

a) Please confirm that Hydro has no energy reliability criterion for either the IIS or the LIS.

b) Please explain how Hydro carries out energy planning for these two regions, taking into account their separate status with respect to cost-of-service studies and rates.

c) Please confirm that Hydro does not evaluate energy reliability on a sub-annual basis, or explain how it does.

d) Please explain how Hydro takes reservoir storage and limitations into account in its energy planning.

e) Please indicate where in the RRAS (and its update) the following elements can be found or, if they are not included, please provide :

i. The 10-year energy balance (indicating supply and demand, year by year) for the IIS;

ii. The 10-year energy balance for the LIS; and

iii. The 10-year energy balance for the NLIS.

LAB-NLH-8. Re: RRAS, 2019 Update, Vol. III, page 22 (138 pdf)

Citation:

Looking forward through the medium-term (i.e., one to five years) there are several developments that will positively influence provincial economic activity, both in Labrador and on the island. In late 2018, Greig NL's Placentia Bay aquaculture project was released from environmental assessment and the project is expected to be fully operational by 2025. Increased interest in aquaculture is expected to expand the overall fishing and aquaculture industry.

The mining sector also announced encouraging developments, including Vale's announcement that it will proceed with the development of two

underground mines at Voisey's Bay, resulting in a large capital investment and a long-term source of nickel concentrate for the Long Harbour Processing Plant. Additionally in 2018, Tacora Resources secured funding to restart the former Wabush Mines, with operations resuming in 2019.

Preamble :

The 2019 Update makes no mention of potential growth of cryptocurrency mining (data centre loads) in Labrador.

a) Please confirm (or correct) LIG's understanding that Hydro has received some 300 MW of service requests for new cryptocurrency mining customers.

b) Please describe in detail Hydro's view of the implications of each of the following factors on the expected demand for electricity by existing and new cryptocurrency mining customers in Labrador, and what the expected system requirements are for serving them:

i. The various possible outcomes of the ongoing debates concerning the adoption of a new Network Addition Policy for Labrador;

ii. The creation of a new customer class for cryptocurrency mining with obligatory curtailment provisions;

iii. The market price of bitcoin; and

iv. Any other factors.

c) Taking these uncertainties into account, please provide Hydro's best estimates (medium, high and low scenarios) of new cryptocurrency mining loads in Labrador over the 10-year planning horizon.

d) For each of these three scenarios, please indicate at what point during the 10-year planning horizon Labrador requirements for i) capacity and ii) energy would exceed available resources (i.e. Recall Power and the Twinco Block).

e) Please indicate (with reference to filed documents or to other RFI responses, if appropriate) to what resources Hydro would turn once the Recall Power and Twinco Block are exhausted, in order to maintain least-cost service for the Labrador Interconnected System.

LAB-NLH-9. Re: RRAS, 2019 Update, Vol. I, page 17-18 (43-44 pdf)

Citation 1 (p. 17):

The methodology surrounding development of each component of the Newfoundland and Labrador Interconnected System in the Reliability Model including the load modelling, capacity modelling by asset class, transmission modelling, and market modelling are discussed extensively in the 2018 Filing,

> Volume 1, section 4. Any changes to the inputs and assumptions since the 2018 Filing are discussed in the following subsections.

Citation 2 (p. 18) :

> The load forecast is a key input to the resource planning process which projects electric power demand and energy requirements through future periods. The Newfoundland and Labrador Interconnected System load forecast is segmented by the Island Interconnected System and Labrador Interconnected System and rural systems, as well as by utility load (i.e., domestic and general service loads of Newfoundland Power and Hydro) and industrial load (i.e., larger direct customers of Hydro such as Corner Brook Pulp and Paper Limited., North Atlantic Refining Limited., Vale Newfoundland and Labrador Limited, and the Iron Ore Company of Canada).

Please confirm that cryptocurrency mining loads in Labrador (also referred to as « data centre » loads) are treated as utility loads in the load forecast. If not, please explain how these loads are categorized.

LAB-NLH-10. Re: RRAS (2018), Vol. III, page 53-54 (293-294 pdf)

Citation :

> **Sensitivity cases were developed to study the impact of potential large loads in Labrador (i.e. reactivation of Wabush mine, additional load requirements from DND, potential data center development)**
>
> Table 12 presents the base forecast with sensitivities for the total LIS over the study period. The base forecast reflects Hydro Rural Load Forecast, spring 2018, which includes existing data centre requirements and additional data centre requirements of customers approved for service at June 2018. The base case forecast for this planning exercise does not currently include loads associated with Wabush mine reactivation by Tacora Resources, however, sensitivity cases were developed to study the impact of potential large loads, including the reactivation of Wabush mine, data centre development in Labrador East and West, and additional load requirements for the Department of National Defence (“DND”) at 5 Wing Goose Bay. Note that the cases were developed on a stand-alone basis, meaning any combination of the options presented could occur.

Table 12: Labrador Utility Electricity Load Growth Summary– 2018 Planning Load Forecast[42,43,44]

		2017-2023[45]	2017-2029
Base Case	MW	-3.5%	-2.4%
	GWh	2.1%	2.9%
Case I: Increased requirements at DND	MW	-0.9%	0.2%
	GWh	4.1%	4.8%
Case II: Data Centre Development – Lab East	MW	3.5%	4.6%
	GWh	12.1%	12.8%
Case III: Data Centre Development – Lab West	MW	8.0%	9.1%
	GWh	16.9%	17.6%
Case IV: Mine Redevelopment	MW	9.2%	10.3%
	GWh	20.1%	20.9%

As any combination of the cases could occur, the analysis was rationalized to focus on three potential load growth scenarios for Labrador; the base case, a high industrial growth case, and a case where all recapture is consumed in Labrador within the study period, detailed in Table 13. (underlining added)

a) Please provide the year-by-year load forecast (MW and GWh) for each of the three potential load growth scenario mentioned in the last paragraph of the citation (namely, the base case, a high industrial growth case, and a case where all recapture is consumed in Labrador within the study period).

b) In the 2018 RRAS, did Hydro examine any scenario in which all recapture energy was consumed before the end of the study period? If not, why not?

c) Please provide the year-by-year load forecast (MW and GWh) in the scenario where a combination of the load increases described in Cases I, II, III and IV is present. For each year, please indicate the surplus or shortfall of available resources (Recall Power and Twinco Block).

LAB-NLH-11. Re: RRAS, 2019 Update, Vol. III, page 27 (143 pdf)

Citation:

6.3 Considered Potential Labrador Load Scenarios

The Labrador Interconnected System load includes the power and energy requirements of the iron ore industry in western Labrador and Hydro's rural customers. The communities include Happy Valley-Goose Bay (including North West River, Sheshatshiu, and Mud Lake), Wabush, Labrador City, and Churchill Falls town site customers.

Table 6 presents the base forecast with a sensitivity case for the total Labrador Interconnected System over the study period. The base forecast reflects Hydro's Rural Load Forecast Spring 2019, which includes existing data centre

requirements as well as the loads associated with Wabush mine reactivation by Tacora Resources. A sensitivity case was developed to include additional load requirements for the Department of National Defence ("DND") at 5 Wing Goose Bay. (underlining added)

Table 6: Labrador Utility Electricity Load Growth Summary – 2019 Planning Load Forecast[38,39,40]

		2018–2024[41,42]	2018–2030
Case I: Expected Case	MW	7.4%	8.5%
	GWh	29.1%	30.1%
Case II: Increased Requirements at DND	MW	10.8%	11.9%
	GWh	31.9%	32.9%

a) Please confirm that the sensitivity case does not include:

   i. Additional mining loads;

   ii. Additional cryptocurrency mining loads; or

   iii. Any other increased loads, other than increased requirements at DND.

b) Please explain why these additional loads, which were recognized as plausible in the 2018 RRAS, were not included in this assessment.

c) Please provide a table using the following format that includes the following cases:

   i. Expected case (updated to take current economic conditions into account);

   ii. Increased requirements at DND;

   iii. Additional mining and cryptocurrency (data centre) loads (medium);

   iv. Additional mining and cryptocurrency (data centre) loads (high).

d) For each one of these cases, please indicate as of what date existing resources (Recall Power and the Twinco Block) are no longer sufficient to meet i) capacity and ii) energy requirements, as well as the amount of the shortfall:

		Date when Recall and Twinco are exceeded	Shortfall by 2029
Expected case	MW		
	GWh		
Increased requirements at DND	MW		
	GWh		
Additional mining and cryptocurrency loads (medium)	MW		
	GWh		
	MW		

Additional mining and cryptocurrency loads (high)	GWh		

LAB-NLH-12. Re: RRAS, 2019 Update, Vol. III, page 21 (137 pdf)

Citation 1 :

6.0 Load Forecasts

The purpose of load forecasting is to project electric power demand and energy requirements through future periods. This is a key input to the resource planning process, which ensures sufficient resources are available consistent with applied reliability standards. For the Newfoundland and Labrador Interconnected System, the load forecast is segmented by the Island Interconnected System and Labrador Interconnected System, as well as by utility load (i.e., domestic and general service loads of Newfoundland Power and Hydro) and industrial load, i.e., larger direct customers of Hydro such as CBPP, North Atlantic Refining Ltd, Vale, and Iron Ore Company of Canada("IOC"). The load forecast process entails translating a long-term economic and energy price forecast for the province into corresponding electric demand and energy requirements for the electric power systems.

The resource planning process considers a range of potential forecast scenarios, rather than a single forecast. This allows for evaluation of the sensitivity of results to differing economic conditions. For this planning exercise, a range of forecasts were developed independently for the Island and Labrador. The combination of those forecasts with evaluation of both the P50 and the P90 conditions for the Island Interconnected System as discrete scenarios resulted in the evaluation of 12 discrete scenarios. visualization of the scenarios considered is presented in Figure 1.

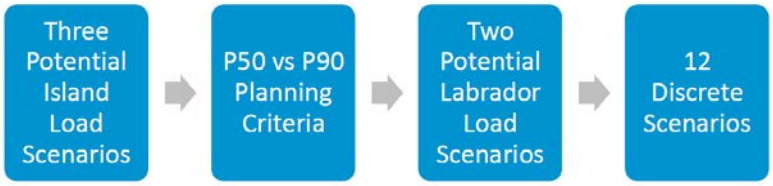

Figure 1: Modelled Scenarios

Citation 2 (page 27, pdf 143):

6.3 Considered Potential Labrador Load Scenarios

The Labrador Interconnected System load includes the power and energy requirements of the iron ore industry in western Labrador and Hydro's rural customers. The communities include Happy Valley-Goose Bay (including

> North West River, Sheshatshiu, and Mud Lake), Wabush, Labrador City, and Churchill Falls town site customers.
>
> Table 6 presents the base forecast with a sensitivity case for the total Labrador Interconnected System over the study period. The base forecast reflects Hydro's Rural Load Forecast Spring 2019, which includes existing data centre requirements as well as the loads associated with Wabush mine reactivation by Tacora Resources. A sensitivity case was developed to include additional load requirements for the Department of National Defence ("DND") at 5 Wing Goose Bay.

a) Please explain why the five load scenarios initially studied for Labrador in the 2018 RRAS were first reduced to 3 scenarios in that study, and were then to 2 scenarios in the 2019 Update.

b) Please confirm that the LIS scenarios included in the 2019 Update include only the base case (including existing data centre requirements and Tacora) and one sensitivity case (DND additional load).

c) Please confirm that no scenarios were reviewed in the 2019 Update which include any additional cryptocurrency (data centre) loads.

d) Please confirm (or correct) LIG's understanding that Hydro has received some 300 MW of service requests for new cryptocurrency mining customers, which are on hold pending resolution of the current proceeding regarding a Network Addition Policy.

e) Please indicate where in the 2019 RRAS Update a least-cost plan is found, corresponding to a load scenario in which Hydro needs to provide service to 300 MW of additional cryptocurrency customers, in addition to other additional DND and mining loads in Labrador. If such a plan is not found in the 2019 Update, please provide it.

LAB-NLH-13. Re: RRAS (2018), Vol. I, Attachment 1 (Daymark), page 8 of 14 (86 pdf)

Preamble:

> The stochastic reliability model is described, including "stochastic load (Lab East, Lab West, Island)".

a) Please explain how "lumpy" load additions (e.g., mining or cryptocurrency loads in Labrador) are modelled.

b) Please indicate the modelling assumptions used, if any, with respect to the Water Management Agreement.

LAB-NLH-14. Re: RRAS, 2019 Update, Vol. III, page 1 (117 pdf)

> Volume III of the 2019 Update addresses the long-term resource plan that is required to meet the reliability expectations defined in Volume I. Specifically, the analysis comprehensively evaluates resource options to meet projected future customer demand and energy requirements at least-cost through to 2029.
>
> The resource plan determines the least-cost additional resources required based on the reserve margin targets established by the Reliability Model, as summarized in Volume I of the 2019 Update and described in detail in the 2018 Filing, over the 10-year study period. Key inputs to the resource planning process include the long-term load forecast, resource options and costing, and other forecasts (e.g., fuel, escalation, market prices, etc.). The resource plan also considers the environmental, sustainability, and reliability attributes of all resource options considered. (underlining added)

a) Please clarify if the long-term resource plan is based on least-cost additional resources required to meet the reserve margin targets required by the LIS, the IIS, or the NLIS.

b) Please confirm that the resource additions shown in Vol. III, Attachment 2 are the least-cost additions required to meet this additional loads, from the NLIS perspective.

LAB-NLH-15. Re: RRAS, 2019 Update, Vol. III, Attachment 2 ("Full Results of Resource Planning Cases"), pages 1-2 (186-187 pdf)

Preamble:

> The three tables that constitute the entirety of this attachment show the resource additions that would be required under each of the three cases described in Table 5 (p. 24, or p. 140 pdf), under the P50 and P90 forecasts, and under the Labrador Expected and Labrador Industrial Load Growth scenarios.
>
> The tables show that no additional resources are required in the first two cases. In the third case, the only additional resource required is "BDE 8" (Bay d'Espoir Unit 8), at 154 MW, which is required in 2024 in all P90 scenarios, and in 2028 or 2029 in the two P50 scenarios.

a) Please confirm that P50 and P90 refer to the IIS load forecast, and not the LIS load forecast.

b) Please confirm that no cases were studied that included additional cryptocurrency loads in Labrador.

c) Please provide a similar table taking into account both the P90 LIS forecast and the likely level (medium scenario) of additional cryptocurrency loads in Labrador, additional DND loads and a medium scenario of additional mining loads in Labrador.

LAB-NLH-16. Re: RRAS, 2019 Update, Vol. III, page 44 (160 pdf)

Citation:

> Currently, there are no forecast violations of the proposed energy criteria. If in future a potential for violation were identified, the opportunity to procure firm imports to supplement native supply could be considered and the planning criteria modified appropriately. Other jurisdictions do consider firm imports from an energy planning perspective. (underlining added)

a) Please confirm that the statement to the effect that there are "no forecast violations of the proposed energy criteria" assumes that the resource additions set out in Attachment 2 of Vol. III will be acquired as scheduled. If not, please explain.

b) Please confirm that the statement to the effect that there are "no forecast violations of the proposed energy criteria" refers to the NLIS as a whole, and not to either the IIS or the LIS. If not, please explain.

c) Please indicate whether or not Hydro foresees violations of the energy criterion for either the IIS or the LIS during the planning period, for any of the scenarios studied.

d) Please confirm that the scenarios referred to in the previous response take into account the potential for new cryptocurrency mining activities in Labrador.

e) Please explain in detail how Hydro intends to respond to energy needs in Labrador that exceed available resources (Recall Block plus Twinco Block), taking into account the fact that purchases under the Muskrat Falls PPA are reserved for Island use only.

f) Please explain why the citation refers only to firm imports and not to the possibility of developing new generating resources.

LAB-NLH-17. Re: RRAS (2018), Vol. I, Attachment 1 (Daymark), page 13 of 14 (91 pdf)

Citation:

> The Expansion Model
>
> The expansion model is the deterministic model with similar topology, load, resource, and transmission. The focus of the expansion model is to develop a

> long-term expansion plan to minimize the net present value (NPV) of the capital and operation cost, taking consideration of market opportunities, as well as the contract obligation to Nova Scotia, subject to reliability requirements and operating reserve requirements.
>
> Detailed cost information like heat rate, fuel cost, variable operation and maintenance cost are implemented to the resources. Resource candidates included conventional hydro, CCGT, and CT. Renewable resources like wind and solar resources are also made available.
>
> 2-hour battery energy system is implemented as resource candidate and could be made available using a scenario.
>
> The expansion plan model is set up to develop a least cost plan over 10 years with infinite end-effect.
>
> The MIP convergence criteria is set to very small 0.01% to ensure least cost solution.
>
> The model also includes several load scenarios to access the robustness of the resource plan. (underlining added)

a) Did any of the load scenarios used by Daymark include additional cryptocurrency loads in Labrador? If not, why not?

b) Does the expansion model distinguish in any way between costs incurred to meet the needs of the IIS vs. the LIS? If not, please explain how this approach is consistent with the decision in P.U. 37(2019) that the Labrador Interconnected System and Island Interconnected System shall continue to be treated as separate systems for Cost of Service purposes.

LAB-NLH-18. Re: RRAS Update (2019), Vol. III, page 12 (128 pdf)

Citation 1 :

> Expansion Resource Options Under Consideration[13]
>
> Note 13: Refer to "Reliability and Resource Adequacy Study," Newfoundland and Labrador Hydro, September 6, 2019 (rev. 2), originally filed November 16, 2018, vol. III, att. 4 for details on resource options not considered.

Citation 2 (RRAS, vol. III, Att. 4 (« Resource Options Not Under Consideration, Nov. 2018"), page 1 (373 pdf)) :

> Labrador Generation

> Gull Island is a 2,250 MW hydroelectric generation project on the Churchill River with an average annual energy capability of 11.9 TWh. Located 225 kilometres downstream from the existing Churchill Falls Power Plant, Gull Island has been extensively studied over the years and the engineering work completed has led to a high level of confidence in the planned design and optimization of the facility. However, the scale of Gull Island output creates a requirement to either negotiate with neighbouring utilities for export contracts, attract investments in energy intensive industries, or to participate directly in regional wholesale markets to attain the full utilization unit cost; otherwise island supply is the only available market. At this time, the energy output of the facility is materially higher than the load growth demand of the province for the foreseeable future. Further, due to the limited capacity of the Labrador-Island Link, getting the energy to the island would be a constraint and thus not economically desirable.
>
> Therefore, the expansion option of the Gull Island Hydroelectric Development is not considered at this time, given the projected load growth in the province. (underlining added)

Citation 3 (VOCM, Oct. 9, 2019)[1] :

> Marshall says Gull Island will be done, but not until power purchase contracts are in place. Power would be shipped through Quebec.
>
> Marshall says there are very few sites left of substantial hydro energy but the biggest and best is Gull Island, and a lot of work has been on it.

Citation 4 (The Telegram, Nov. 1, 2019) :

> Ball, Legault talk mining, fixed link and Gull Island
>
> …
>
> Also up for discussion between Ball and Legault: Gull Island.
>
> The Gull Island project has been mused about for decades, with the first formal proposal coming in 1972 under premier Frank Moores. The biggest road block for the project, which would generate 2,250 megawatts compared with the Muskrat Falls project's 824 megawatts, has been getting electricity through Quebec.
>
> Ball says discussions are still very early, but he believes Quebec will begin to work with Newfoundland and Labrador towards making the project feasible.
>
> "The discussions that we've had at the Atlantic Premiers' table is how do we reduce greenhouse gas emissions as a region and look for other sources of power? It could be wind, or it could be hydro, for example," said Ball.

---

[1] https://vocm.com/2019/10/09/ready-or-not-gull-island-coming-sooner-than-you-think-says-stan-marshall/

> "What's important here is for us to speak with Quebec and how collectively we can work together — not just as four provinces, but as five provinces — to be a solution to some of the greenhouse gas emissions that we're seeing in other provinces."
>
> Ball says excess power being purchased by the rest of Atlantic Canada from Muskrat Falls is part of the short-term plan, but Gull Island remains in the long-term vision of the province.
>
> "It's too early to tell. No matter what the project is, you must have a customer, you must have a customer that can afford the power," he said.
>
> "The difference between Muskrat Falls and Gull Island … is Muskrat Falls had a forced customer – it was the rate payer of Newfoundland and Labrador. That is not something we would ever want to see another province exposed to."

a) Please confirm that Citation 2, from the 2018 RRAS, still represents Hydro's view concerning the Gull Island Hydroelectric Development. If not, please provide an update to this section.

b) In the event that forecast load growth in Labrador were to exceed the resources currently available to the LIS — namely Recall Power and the Twinco Block — would Hydro reconsider its position with respect to Gull Island? If not, why not?

c) In the event that Gull Island were developed for export, what (if any) would be the implications for Hydro and its customers a) in Labrador, and b) in Newfoundland.

LAB-NLH-19. Re: RRAS, 2019 Update, Vol. I, page 10 (36 pdf)

Citation:

> 4.2.1 Probabilistic Capacity Planning Criterion
>
> Hydro has proposed that both the Newfoundland and Labrador Interconnected System (region) and the Island Interconnected System (sub-region) should each have sufficient generating capacity to satisfy a LOLE target of not more than 0.1. …
>
> Hydro agrees with Liberty's recommendation and has implemented a minimum operational reserve in its Reliability Model …Hydro proposes to maintain a minimum reserve of 70 MW within the island system when the LIL is out of service to provide for acceptable frequency regulation …

a) Please explain why no probabilistic capacity planning criterion was mentioned for the Labrador Interconnected System.

b) What is Hydro's proposed probabilistic capacity planning criterion for the Labrador Interconnected System?

c) What is Hydro's proposal for a minimum reserve margin for the Labrador Interconnected System? For Labrador East? For Labrador West?

LAB-NLH-20. Re: RRAS (2018), Vol. I, Attachment 1 (Daymark), page 5 of 14 (83 pdf)

Citation:

> Daymark Energy Advisors ("Daymark") performed a high-level review of the methodology implemented by Newfoundland and Labrador Hydro ("NLH") in determining the probabilistic planning reliability criteria for the Island Interconnected System (sub-region) as well as the Newfoundland and Labrador Interconnected System (region).

Please explain why Daymark was asked to review the probabilistic planning reliability criteria for the IIS and the NLIS, but not for the LIS.

LAB-NLH-21. Re: RRAS, 2019 Update, Vol. III, page 14 (130 pdf)

Citation 1:

> 5.3.1 Critical Peak Pricing
>
> One area of interest for Hydro is critical peak pricing ("CPP"), a rate structure whereby customers are motivated to reduce consumption during system peaks. Hydro-Québec is conducting a critical peak pricing pilot program during the winter of 2019–2020.
>
> …
>
> Hydro will continue to monitor Hydro-Québec's CPP pilot study to help determine if a similar program could have potential for customers in Newfoundland and Labrador, in the context of Newfoundland Power's upcoming rate design review.

Citation 2 :

> As noted in the Dunsky study:
>
> While TOU Rates, CPP and Equipment Control programs did not appear to offer additional DR potential, adjustments to the existing Industrial Curtailment programs, incorporating more aggressive EV adoption peak load impacts, or adding the Fuel Switching load curve impacts, all may alter conditions such that TOU Rates, CPP and/or Equipment Controls could

become effective in the future: Changes to the utility load curve or to the constraints applied in other programs have significantly impacted the interactions among programs. For example, if the NL Utilities are able to negotiate Industrial Curtailment contracts with longer DR event durations, it may be possible that TOU Rates, CPP and Equipment Programs could offer additional potential as compared to the results presented herein.

Hydro and Newfoundland Power have requested that Dunsky study the impact that revised Capacity Assistance Agreements could have on its conclusions regarding CPP and Time of Use ("TOU") rates. The results of this additional study are expected in 2020.

a) Please confirm that Hydro-Québec's Critical Peak Pricing (« Rate Flex ») and Critical Peak Credit (« Winter Credit Option ») programmes are no longer pilot programmes, but rather are now part of HQ Distribution's standard rate sheet.

b) Please confirm that Dunsky's review of the application of these measures in the NL Utilities was limited to the IIS. In the event that Dunsky's review also addressed the capacity situation in the LIS, please describe in detail his results. If not, please explain why Labrador was excluded from his mandate.

c) Apart from the Dunsky study, has Hydro examined the potential value of this type of measure in Labrador, given the significant capacity constraints Hydro faces there? If so, please :

    i. Provide details of the review undertaken, and

    ii. Provide copies of the resulting study or analysis.

    If not, please explain why not.

d) Please provide a copy of the Dunsky study.

LAB-NLH-22. Re: RRAS, 2019 Update, Vol. III, page 16 (132 pdf)

Citation:

5.3.3 Electric Vehicles

… During its presentation of the 2019 Budget, the Government of Newfoundland and Labrador committed to increase electric vehicle usage in Newfoundland and Labrador. Hydro is planning to develop a network of 14 direct current fast chargers from St. John's to Port Aux Basques in 2020, conditional on funding approvals. As electric vehicles become more common in Newfoundland and Labrador, programs and incentives will need to be examined to encourage off-peak charging behaviors.

Does Hydro have any plans to develop a network of direct current fast chargers in Labrador? If not, why not?

LAB-NLH-23. Re: RRAS, 2019 Update, Vol. III, page 14 (130 pdf)

Citation :

> 5.3.4 Heat Pumps
>
> Both the Synpase and Dunsky studies commented on the material increase in heat pump usage on the Island Interconnected System and the potential for additional conversions to the use of heat pumps. To provide increased understanding of system load impacts of peak usage attributes of heat pumps, Newfoundland Power is undertaking a heat pump load research study. The objective of the heat pump load research project is to understand the impact that increasingly high penetration of heat pumps will have on the Island Interconnected System demand and peak load requirements.
>
> The results of this study will inform future CDM program design, customer education and system load forecasts.

Were Synapse and/or Dunsky asked to evaluate the current and potential use of heat pumps in Labrador? If not, why not?

LAB-NLH-24. Re: RRAS, 2019 Update, Vol. I, page (pdf)

Citation :

> In the Newfoundland and Labrador Interconnected System, Hydro considers the first contingency loss to be the loss of a generating unit at MFGS and the second contingency loss to be the loss of a second unit at MFGS. As such, Hydro will plan for the availability of the following operational reserves for the Newfoundland and Labrador Interconnected System to align with this criteria.
>
> - **Ten-Minute Reserves:** Hydro shall have 10-minute reserve available to it at least equal to 197.5 MW to cover its first contingency loss, where the first contingency loss is the loss of a unit at the MFGS at winter firm plant output of 790 MW.
>
> - **Thirty-Minute Reserves:** Hydro shall have 30-minute reserve available to it at least equal to 99 MW to cover one-half the magnitude of its second contingency loss (0.5 × 197.5 MW), where the second

> contingency loss is the loss of a unit at the MFGS at winter firm plant output of 790 MW**.**

a) What does Hydro consider to be the first contingency loss in the LIS? In Labrador East? In Labrador West?

b) Please identify the first and second contingency losses in a situation where, during a peak hour, a significant portion of the Island load is met not with power produced at Muskrat Falls, but with power transferred from Churchill Falls over the Labrador Transmission Assets under the Water Management Agreement.

c) Is there a possible circumstance under which the first and second contingency losses based on a power transfer over the LTA would be greater than the loss of a generating unit at MFGS? Please explain your response.

LAB-NLH-25. Re: RRAS (2018), Vol. I, page 30-31 (61-62 pdf)

Citation:

> The majority of the generators owned by Hydro are hydroelectric and therefore have limitations on the amount of annual energy available. Operation of each of Hydro's reservoirs is performed in accordance with Hydro's "Major Reservoir Operations Manual." Tables 1 and 2 provide information on the capability of the hydraulic generating fleet.

Preamble :

> Table 1 shows the Installed Capacity and Gross Continuous Unit Rating for Modelled Hydraulic Generating Units.

a) Please confirm that the figures for Gross Continuous Unit Rating represent the firm capacity that the unit can be counted on to provide to meet Hydro's peak needs. If this is not the case, please :

   i. Clarify the meaning and use of the Gross Continuous Unit Rating figures; and

   ii. Indicate where firm capacity values are presented, that can be used to evaluate Hydro's ability to meet its peak capacity requirements.

b) Please indicate where in the RRAS (2018) or the RRAS 2019 Update the year-by-year capacity balances for i) the IIS, ii) the LIS, and iii) the NLIS are presented. If they are not, please provide updated year-by-year capacity balances, over the 10-year planning horizon.

c) Please explain why Muskrat Falls is modelled as « generation owned by Hydro » rather than as a Power Purchase Agreement.

LAB-NLH-26. Re: RRAS, 2019 Update, Vol. III, page 14 (254 pdf)[ss1]

Citation:

> Existing on-island hydraulic generation is anticipated to continue to produce an average of 4,600 GWh of energy annually. Energy from the MFGS will be provided to Hydro in accordance with annual entitlements, starting at 2 TWh per year and growing to 2.5 TWh within the study period.
>
> MFGS and Bay d'Espoir are the largest energy producing facilities in the NLIS. Figure 2 shows the monthly energy profile assumed for these units. From the profiles presented it is seen that the large storage potential at Bay d'Espoir allows generation at the facility to follow the system load shape, while the generation profile for MFGS shows the seasonality associated with lower flow through the end of winter and increased production in the spring run-off period. (underlining added)

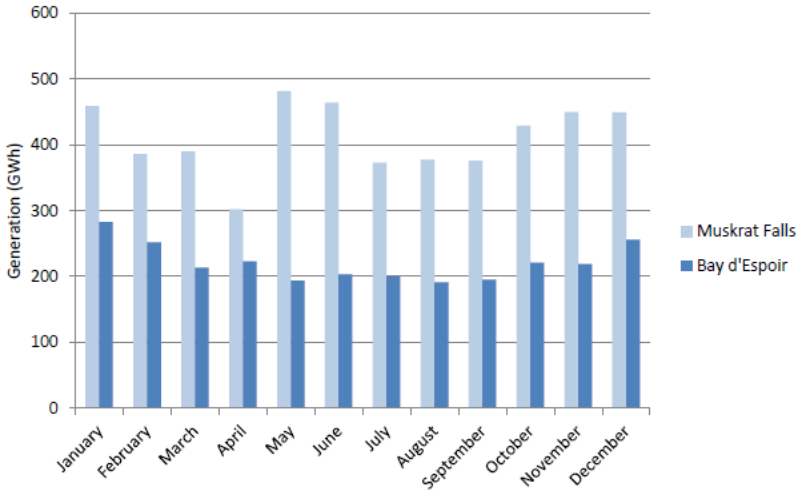

Figure 2: Muskrat Falls and Bay d'Espoir Generation Profile

a) Please confirm that a capacity shortfall in either Labrador or on the Island could, if unremedied, result in unserved load in either sub-region?

b) Please confirm that, according to Figure 2, generation from MFGS in January is expected to be around 460 GWh, and indicate the corresponding average January capacity factor.

c) Please explain how the last response is consistent with the value of 790 MW given as the « Gross Continuous Unit Rating » of the MFGS in Table 1 (page 13).

d) Please describe in detail Hydro's entitlements to capacity from the MFGS under the existing PPA.

e) Does the existence of the Water Management Agreement affect the extent to which the Muskrat Falls project can contribute to meeting the capacity needs of the NLIS in winter? If so, please explain in detail, and provide a chart similar to Figure 2 which illustrates the MFGS contribution to Hydro's capacity needs, taking into account the WMA.

LAB-NLH-27. Re: RRAS, 2019 Update, Vol. III, page 46 (162 pdf)

Preamble:

The Action Plan makes no reference to Labrador.

a) Please indicate what actions Hydro intends to take, if any, with respect to:

   i. Evaluating the potential need for additional energy resources in Labrador;

   ii. Evaluating the least-cost options for meeting future needs for additional energy resources in Labrador;

Evaluating the cost implications for LIS ratepayers in the event that electricity obtained by Hydro under the Muskrat Falls PPA is used to meet additional energy needs in Labrador.

LAB-NLH-28. Re: RRAS, 2019 Update, Vol. I, page 7 (33 pdf), Figure 1

Citation (from Liberty Report, page 6 (15 pdf)):

> Box 2 in Figure 1 depicts the Vista Model. This component addresses "medium- to long-term water storage and energy generation management that guides water operations, hydrothermal generation, and energy transactions."5 Inputs to the Vista Model include the load forecast and the hydraulic record of 67 years of hydraulic inflows. The Vista Model optimizes storage and water releases to create an economically optimum allocation of the available water to serve load. Hydro's modeling of hydrological uncertainty properly incorporated a probability distribution for Muskrat Falls. The firm capability of its other hydro stations is not affected by low water conditions, with other hydro generation represented by firm capacity ratings based on low water.

a) Please clarify if Hydro's modelling of the Muskrat Falls Generating Station is based on :

   i. The hydrology at Muskrat Falls; or

   ii. Hydro's entitlements to power and energy from Muskrat Falls according to its Power Purchase Agreement with the Muskrat Falls Corporation.

b) Please explain how and to what extent (if any) Hydro's modelling of the Muskrat Falls Generating Station takes into account the provisions of the Water Management Agreement between Nalcor Energy and the CF(L)Co.

c) Please explain in detail how the Water Management Agreement is taken into account in determining the firm capacity available to Hydro from the Muskrat Falls Generating Station. If it is not taken into account, please explain why not.