Q. **Reference: 2024 Resource Adequacy Plan**

Please confirm that battery energy storage is selected in all capacity expansion model runs where its assumed ELCC is 60% or greater. If not confirmed, please explain.

A. Battery energy storage as a resource option was tested specifically in Scenario 1 (Reference Case)[1] and Scenario 4 (Minimum Investment Required).[2] A description of the Expansion Plan sensitivities discussed in this response can be found in the 2024 Resource Adequacy Plan,[3] and is provided in Table 1 for ease of reference.

[1] Scenario 1 (Reference Case or "S1"): Represents the expected case, or the scenario that incorporates assumptions that are considered most reasonable at this time by combining the Reference Case load forecast for the Island Interconnected System and the expected LIL bipole EqFOR of 5%. The expected case has historically formed the foundation of the recommended Expansion Plan.

[2] Scenario 4 (Minimum Investment Required or "S4"): Represents the scenario requiring the minimum investment (least amount of resource additions) based on a high level of LIL reliability (1% LIL bipole EqFOR) that can reasonably be expected in the long term and the lowest load growth (Slow Decarbonization) that can be reasonably anticipated on the Island Interconnected System. This scenario is intended to bookend the Expansion Plan scenarios by identifying the Minimum Investment Required on the Island Interconnected System.

[3] "2024 Resource Adequacy Plan – An Update to the Reliability and Resource Adequacy Study," Newfoundland and Labrador Hydro, rev. August 26, 2024 (originally filed July 9, 2024), app. C, sec. 6.2, p. 48, Table 5.

Table 1: Expansion Plan Sensitivities

Sensitivity	Description
A	Fixed wind profile to meet firm energy criteria
AB40	Same as Sensitivity A with an assumed battery ELCC of 40%
AB80	Same as Sensitivity A with an assumed battery ELCC of 80%
AC	Same as Sensitivity A and removes forced CT fuel burn-off in consideration of the potential for contract negotiation and/or shelf life extension negating this requirement
AD	Same as Sensitivity A with the exception of increasing all Newfoundland and Labrador Hydro ("Hydro") capital costs by 50% in consideration of potential cost overruns
AE	Same as Sensitivity A and removes batteries as a resource option
AH	Same as Sensitivity A with exception of increasing all CT capital costs by 50% in consideration of potential cost overruns
AEC	A combination of Sensitivities A, AC, and AE to determine the impact of removing forced CT fuel burn-off in consideration of restricting batteries as a resource option
AEF	Same as Sensitivity AE with the additional restriction of limiting CT additions to 150 MW in consideration of current diesel fuel limitations on the Island
AEG	Same as Sensitivity AE with the exception of increasing CT fuel costs by 50% in consideration of potential future volatility in fuel costs
AEH	Same as Sensitivity AE with the exception of increasing CT capital costs by 50% in consideration of potential cost overruns
AEI	Same as Sensitivity AE with the addition of the potential Newfoundland Power 25 MW CTs in the years 2028, 2029, and 2030.[4]

In the four runs where an ELCC[5] of 80% was assigned to battery storage, they were selected as a preferred expansion option (S1AB80, S1AB80H, S4AB80, and S4AB80H).

There were ten runs where an ELCC of 60% was assigned to battery storage and they were selected in five of them (S1A, S1AD, S1AH, S4A, and S4AH). In the other five of the ten runs (S1, S1AC, S4, S4AC, and S4AD), batteries were not selected. Explanations for why they were not selected in each of these runs are provided below.

S1 and S4 represent expansion runs with no restrictions. In both of these cases, there is significantly reduced wind penetration (the model was not forced to build sufficient wind resources to meet the firm energy criteria). In these cases, the benefits of the battery systems are greatly reduced as there is no excess wind energy to be stored. As Hydro proceeds with the

[4] As a result of Newfoundland Power Inc.'s ("Newfoundland Power") intention to retire gas turbines in Wesleyville and Greenhill, Newfoundland Power has informed Hydro that it is exploring the addition of a total of 75 MW of combustions turbines ("CTs"), with 25 MW becoming operational in 2028, another 25 MW in 2029, and the final 25 MW in 2030.
[5] Effective Load Carrying Capability ("ELCC").

Expression of Interest for sources of supply, further analysis will be needed to understand production profiles and the role of short-term energy storage. As described above, the value and effectiveness of battery systems will be dependent on the quantity, type, and profile of these new resources.

S1AC and S4AC used a fixed wind build profile and eliminated the requirement for an annual fuel burn-off in the model, making the overall cost of CT more attractive. The fact that batteries were not selected in these cases indicates that the CTs are more cost effective than batteries at 60% ELCC if the annual fuel cost is reduced.

S4AD used a fixed wind build profile and increased the capital cost of hydro resources by 50%. Compared to S4A in which the model selected Bay d'Espoir ("BDE") Unit 8 in 2031 and one 50 MW battery in 2034 to meet capacity needs, when the hydro capital cost was increased, it was more cost effective to build a CT in 2031, and a second CT in 2034, eliminating the need for batteries in 2034. This result can be attributed to the fact that the construction of the 142 MW CT completely fulfilled the need for capacity in the modelling horizon.

Hydro can conclude from these results that, at a 60% ELCC, batteries are becoming an attractive resource option when paired with volumes of intermittent generation (e.g., wind and/or solar). Additionally, as batteries are selected in some runs and not others, Hydro can conclude that they are cost-competitive capacity resources with BDE Unit 8 and CTs. Hydro recognizes that battery technology is constantly improving and the costs are reducing, which makes it a viable option to meet future load growth requirements. To be prepared for the potential future load growth, Hydro is committed to further study of battery ELCC to understand their feasibility and potential benefits for the Island Interconnected System. These improvements will be completed to inform the 2026 Resource Adequacy Plan update, where Hydro will put forward its Expansion Plan to meet the Reference Case.