Q. Regarding the chances of LIL shortfalls:

a) Does a LIL Shortfall Event assume an outage of both poles of the LIL simultaneously (an n-2 event) with the outage located on the most remote section of the LIL requiring 6 weeks to repair, and occurring at the most critical time of the year, the winter period, and a loss of additional generation determined by Hydro's probabilistic loss of load simulations during the 6 week outage period?

b) Is the LIL Shortfall Event equivalent to operating the IIS with an effective load meeting capacity of the Muskrat Falls assets of 0 MW during a six-week winter period?

c) Please provide an assessment of the probability of a six-week LIL shortfall event in winter. Please include a quantitative assessment, e.g., the probability over the next five years or next 10 years, or in terms of whether such a shortfall is a once in so-many-years event.

d) Is it common practice in North America to commit large expenditures for new resources to satisfy deterministic criterion such as a LIL Shortfall Event? Please provide examples.

e) Are there any other deterministic criterion that Hydro considers such as the loss of the transmission corridor over the Isthmus of the Avalon?

A. **a)** As discussed in the 2024 Resource Adequacy Plan, the extended Labrador-Island Link ("LIL") outage scenario assumes the LIL bipole is unavailable for six weeks[1] during the coldest period of the year (i.e., January and February) to quantify the impact on system reliability. The LIL extended outage is intended to simulate an icing situation that causes a tower collapse in a remote segment of the transmission line; however, the extended outage scenario could generally apply to any prolonged outage event, and there is a risk that such

[1] Hydro used the output of the assessments completed by Haldar and Associates Inc. in combination with the information provided in the Emergency Response and Restoration Plan as the basis for considering the potential length of a significant outage of the LIL. Please refer to "Reliability and Resource Adequacy Study – 2022 Update," Newfoundland and Labrador Hydro, October 3, 2022, vol. III, sec. 5.2.

an outage could have a duration lasting longer than six weeks. Even if the LIL consistently has a LIL bipole equivalent forced outage rate towards the bottom end of the analyzed range (1%), there is still risk of an extended LIL bipole outage due to line icing or other failure modes. A tower collapse represents the worst-case scenario but is not the only failure mode that can impact the LIL bipole during the winter period. The analysis was completed on a probabilistic basis,[2] and results are presented as 50th and 90th percentiles representing average and severe scenarios.[3]

b) The LIL Shortfall Analysis assumes no deliveries over the LIL bipole during the six-week period. Therefore, no Muskrat Falls generation or excess Recapture from the Recapture Block is being delivered from the Labrador Interconnected System to the Island Interconnected System during this time. Firm contractual commitments are also not being delivered via the Maritime Link.

c) Newfoundland and Labrador Hydro ("Hydro") initially discussed the assessment of the LIL shortfall in its 2018 Reliability and Resource Adequacy Study. In 2018, an extended bipole outage was considered a very low probability, high consequence event. Since then, studies such as the original LIL Reliability Report[4] and the Phase II LIL Reliability Report[5] indicate that the probability is greater than originally thought. While Hydro does not have tangible indications of any certain outage, planning to mitigate the consequences to customers of such a prolonged outage is essential.

Nonetheless, the Island Interconnected System remains impacted by the relationship between the LIL and the Maritime Link, which can result in Under-Frequency Load Shedding ("UFLS") events on the system when either link is subjected to interruption, as experienced during two events in February 2026. Because backup generation was available, the Island Interconnected System experienced only a transient shortfall as Hydro had the ability to restore customers

[2] The probabilistic analysis considers 2,400 random combinations of weather-driven loads, unit outage profiles, and renewable generation.
[3] For further information, please refer to the "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.
[4] "Assessment of Labrador Island Transmission Link (LIL) Reliability in Consideration of Climatological Loads," Haldar & Associates Inc., rev. April 11, 2021 (originally issued March 10, 2021).
[5] The Phase II LIL Reliability Report is considered to be the "Assessment of Labrador Island Transmission Link (LIL) Reliability in Consideration of Climatological Loads - Phase II," Haldar & Associates Inc., December 12, 2021.

within an hour. For further information, please refer to Hydro's report on UFLS events submitted to the Board of Commissioners of Public Utilities ("Board") in April 2026.[6]

d) Other utilities use deterministic criterion for transmission planning; however, the design and operation of the LIL is unique and specific to the Newfoundland and Labrador Interconnected System. For example, while the Island Interconnected System is technically interconnected with the North American Grid, the Island remains operationally distinct from a conventional, strongly interconnected regional grid, as its connection is via the LIL and the Maritime Link, rather than multiple alternating current ties to neighbouring systems. The Island must continue to maintain sufficient local generation, transmission capability, operating reserves, voltage support, and remedial-action measures to reliably withstand contingencies such as a loss of the LIL. In its expert report on the 2024 Resource Adequacy Plan, Bates Whites Economic Consulting, LLC said:

> NLH's recognition of the potential for an extended outage on the LIL and plan for such a possibility is sensible and necessary. As NLH notes, there is no specified planning criteria it can rely upon for conducting this analysis.[7]

It should be noted that the current planning criteria used by Hydro is less stringent than the Loss of Load Expectation ("LOLE") criteria of 0.1 that is commonly used by utilities in North America.[8] Utilities using the 0.1 criteria strive to maintain resource adequacy such that they are unable to serve regional load no more than one day out of every ten years. Hydro has historically planned its system to experience two outage days in a ten-year period. At that time, this translated to a LOLE of 0.2 days per year, and a Loss of Load Hours ("LOLH") in a year of 2.8.[9] In the 2024 Resource Adequacy Plan, Hydro demonstrated that a transition from 2.8 LOLH to the more stringent criteria of 0.1 LOLE is cost-prohibitive at this time, with

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[6] "February 2026 Under-Frequency Load Shedding Events – Detailed Analysis Report," Newfoundland and Labrador Hydro, April 30, 2026.
[7] "Assessment of Newfoundland and Labrador Hydro's 2024 Resource Adequacy Plan," Bates White Economic Consulting, LLC, August 30, 2024, p. 8.
[8] Electric Power Research Institute, "Practices and Standards," *Resource Adequacy,* https://msites.epri.com/resource-adequacy/metrics/practices-and-standards.
[9] The previous resource adequacy target of two outage days in ten years, or a LOLE of 0.2, was chosen at the time over the alternative criteria of one day in ten years, or a LOLE of 0.1, to decrease the cost of meeting the target. A change in software necessitated a benchmarking process to translate the LOLE to LOLH, at which point it was determined that the LOLE of 0.2 could be approximated as an LOLH of 2.8 hours per year.

the Net Present Value ("NPV") of $6.4 billion, more than twice the NPV of Hydro's recommended Minimum Investment Required Expansion Plan that recommends advancing the second capacity resource in consideration of the LIL shortfall scenario.[10] Hydro will continue to inform the Board of the cost of moving to 0.1 LOLE criteria in future Reliability and Resource Adequacy filings.

d) Hydro employs a deterministic approach to transmission planning, consistent with standard industry practice as guided by the North American Electric Reliability Corporation. The Newfoundland and Labrador System Operator Standard TP-S-007 – Transmission Planning Criteria[11] sets out the specific acceptable pre- and post-contingency (n-0 and n-1) responses of the elements within the Newfoundland and Labrador Interconnected System rated 46 kV and above.

In the event of a LIL bipole outage (n-2) or successive pole outages (n-1-1), Hydro employs operating procedures to ensure that system stability is maintained through controlled load shedding.

Hydro also applies Emergency Transmission Planning Criteria as a basis for reliable operation in the event of an extended outage to the LIL bipole. This is appropriate given the significance of the LIL as a source of supply for the Island Interconnected system and the potential long duration of such an outage (up to 6 weeks). In such circumstances, the system would be postured as defined in Section 5 of TP-S-007. Operation in this manner would be enhanced through the proposed Remedial Action Scheme.

In summary, the following criteria are applied to the transmission corridor over the Isthmus of the Avalon:

- **Normal Operation (N-0):** Refer to Section 4.3 in TP-S-007.
- **Normal Operation (N-1):** Refer to Section 4.4 in TP-S-007.
- **Emergency Operation –LIL Bipole Outage (N-2-1):** Refer to Section 5 in TP-S-007.

[10] *Supra*, f.n. 3.
[11] "NLSO Standard Transmission Planning Criteria (TP-S-007)," Newfoundland and Labrador Hydro, March 16, 2026, https://www.oasis.oati.com/woa/docs/NLSO/NLSOdocs/TP-S-007_Transmission_Planning_Criteria_UPDATED_03162026.pdf.