

Q. Reference: Newfoundland Power's 2027 Capital Budget Application, Section 2.2, Substation Power Transformer Strategy

- a) Confirm that a Net Present Value analysis was not used to compare:**
- (i) the Substation Power Transformer Strategy with identified alternatives for managing power transformer asset risk; and**
 - (ii) alternative combinations of the three components (planned transformer replacement pace, spare transformer inventory level and emergency response capability, including portable substation availability) within the Substation Power Transformer Strategy.**
- b) Explain how Newfoundland Power determined that the proposed Substation Power Transformer Strategy is the least-cost approach to managing transformer asset risk.**

A. GENERAL

Substation power transformers are the most critical assets in a substation.¹ The failure of a power transformer can have significant impacts on the electrical system, including extended outages to generation plants, transmission lines, or distribution lines, potentially affecting a large number of customers.²

The *Electrical Power Control Act, 1994* contains the provincial power policy, which requires that power be delivered to customers at the lowest possible cost, in an environmentally responsible manner, consistent with reliable service.³

¹ The Board has acknowledged the criticality of power transformers in the provision of service. In Order No. P.U. 38 (2022), the Board stated "*The substation power transformers are critical infrastructure in the provision of safe and reliable service to customers. The evidence shows that the risk of failure has increased with aging transformers and that the consequences of a substation power transformer can be significant in terms of outage duration and number of customers affected.*" See also the response to Request for Information PUB-NP-002 filed as part of the *2027 Capital Budget Application*.

² For example, on August 10, 2026, a Hydro-owned power transformer in Rocky Harbour in Western Newfoundland experienced issues resulting in an unplanned outage to over 1,000 customers for approximately 44 hours. The response included the deployment of Newfoundland Power's portable substation "P4", where it currently remains in service while alternative solutions are determined and implemented for the power transformer. News outlets reported significant impacts on customers in the area, particularly during the height of tourist season, with one customer reporting losses of approximately 200 hours in labour and \$3,000 in tips. See <https://www.cbc.ca/news/canada/newfoundland-labrador/let-there-be-light-power-back-after-44-hours-for-2-west-coast-newfoundland-towns-9.7304458>

³ See Section 3 of the *Electrical Power Control Act, 1994*.

1 The *Electrical Power Control Act, 1994* does not establish a hierarchy of these
2 requirements, which has been acknowledged by the Board.⁴
3

4 Newfoundland Power first submitted its Substation Power Transformer Strategy in the
5 *2026 Capital Budget Application*, which outlined the Company's approach to managing
6 its power transformers, an overall fleet-level risk assessment of the Company's power
7 transformers, and an overview of the strategy for managing the increased risk to the
8 Company's power transformers.⁵ The Substation Power Transformer Strategy was not a
9 capital project for which the Company sought approval or is currently seeking approval
10 in the *2027 Capital Budget Application*. Rather, capital projects to replace power
11 transformers identified as being at end-of-life due to a number of criteria are proposed
12 for approval in accordance with the Substation Power Transformer Strategy.⁶
13

14 Capital projects proposed to replace power transformers in accordance with the
15 Substation Power Transformer Strategy undergo detailed engineering assessments,
16 including assessments of alternatives which comply with the Provisional Guidelines.⁷
17 These assessments of alternatives confirm that proposed capital projects have been
18 determined to be consistent with the delivery of reliable service, in an environmentally
19 responsible manner, at the lowest possible cost.
20

21 Newfoundland Power completed assessments of alternatives for the power transformers
22 approved for replacement in previous capital budget applications, including power
23 transformers KBR-T3, MOL-T2 and MOP-T1, and the additions of spare power
24 transformers.⁸
25

26 For the four power transformers proposed in the *2027 Capital Budget Application*,
27 assessments of alternatives were undertaken in accordance with the Provisional
28 Guidelines as follows:
29

- 30 1. Power transformer LAU-T1 – three alternatives were identified and assessed
31 including deferral and continued monitoring, remove and repair, and replace.
32 Given the advanced degradation exhibited on the power transformer, deferral

⁴ In Board Order No. P.U. 31 (2025) determining the request for reconsideration of Hydro's long-term supply plan for Southern Labrador, the Board stated, "*The Board notes that in making its determinations with respect to the proposed project it is required to assess whether approval would be consistent with the provision of reliable, environmentally responsible service at the lowest possible cost. All three aspects must be considered and, as a result, there are circumstances where the least-cost project may not be approved. In making this determination the Board considers all of the circumstances including the magnitude of the differences in costs between each of the alternatives and the associated risks and benefits, including cost, schedule and service risks.*" See Board Order No. P.U. 31 (2025), page 14, lines 25 to 31.

⁵ See the *2026 Capital Budget Application*, report 2.2 Substation Power Transformer Strategy.

⁶ See the response to Request for Information PUB-NP-015 for a discussion of the criteria included in the analysis of power transformers proposed for replacement in accordance with the Substation Power Transformer Strategy.
⁷ The Provisional Guidelines require for capital projects with materiality greater than \$1,000,000 an assessment of alternatives. See the Provisional Guidelines, page 15 of 18.

⁸ See the *2026 Capital Budget Application*, report 2.2 Substation Power Transformer Strategy, Appendix E. See also the *2023 Capital Budget Application*, report 2.2 Substation Spare Transformer Inventory.

1 is not a viable option, nor was the remove and repair alternative. The only
2 viable alternative is to replace power transformer LAU-T1.⁹
3

- 4 2. Power transformer LBK-T1 - three alternatives were identified and assessed
5 including deferral and continued monitoring, remove and repair, and replace.
6 Given the deteriorated condition of the power transformer, persistently long
7 lead times associated with the procurement of power transformers and the
8 backup capability for the power transformer, deferral is not a viable option.
9 Similarly, the extended time required to remove and repair the power
10 transformer, in addition to the risk associated with transporting a 64-year-old
11 power transformer resulted in the determination that removal and repair is
12 also not a viable option. The only viable alternative is to replace power
13 transformer LBK-T1.¹⁰ An updated lifecycle cost analysis confirmed that
14 undertaking this work remains economically beneficial to customers.¹¹
15
- 16 3. Power transformer HAR-T1 - three alternatives were identified and assessed
17 including deferral and continued monitoring, remove and repair, and replace.
18 Given the deteriorated condition of the power transformer, persistently long
19 lead times associated with the procurement of power transformers and the
20 backup capability for the power transformer, deferral is not a viable option.
21 Similarly, the extended time required to remove and repair the power
22 transformer, in addition to the risk associated with transporting a 57-year-old
23 power transformer resulted in the determination that removal and repair is
24 also not a viable option. The only viable alternative is to replace power
25 transformer HAR-T1.¹²
26
- 27 4. Power transformer RRD-T3 - three alternatives were identified and assessed
28 including deferral and continued monitoring, remove and repair, and replace.
29 Given the deteriorated condition of the power transformer, persistently long
30 lead times associated with the procurement of power transformers and the
31 backup capability for the power transformer, deferral is not a viable option.
32 The estimated cost to install a portable substation as well as to transport,
33 assess, complete a three-phase rewind, test, and integrate the existing RRD-
34 T3 transformer back into the system is approximately \$2,900,000.¹³ This
35 exceeds the cost to purchase and install a new power transformer, with no

⁹ See the *2027 Capital Budget Application*, report 2.2 *Substation Power Transformer Strategy*, Appendix A, section 4.0 Assessment of Alternatives.

¹⁰ *Ibid.*, Appendix B, section 4.0 Assessment of Alternatives.

¹¹ *Ibid.*, Appendix B, section 5.0 Lifecycle Cost Analysis. See also the responses to Requests for Information CA-NP-045 and CA-NP-072.

¹² *Ibid.*, Appendix C, section 4.0 Assessment of Alternatives.

¹³ *Ibid.*, Appendix D, section 4.0 Assessment of Alternatives, page D-7. In addition, since the filing of the *2027 Capital Budget Application* the estimated cost to transport, assess, and complete a three-phase rewind of a power transformer has increased to approximately \$3,800,000 and would require approximately 18 months to complete, based on recent quotes.

1 guarantee of extended life compared to a new power transformer. As a
2 result, the recommended alternative is to replace power transformer RRD-T3.
3

4 Newfoundland Power also completed an assessment of alternatives for the procurement
5 of an additional portable substation.¹⁴ These alternatives included maintaining its
6 existing portable substation inventory (i.e. deferral), increasing its spare power
7 transformer inventory, and procuring an additional portable substation. Deferral is not a
8 viable option given the forecast of future portable substation utilization to complete
9 capital projects and maintenance work, address the risks of an aging power transformer
10 fleet, and maintain sufficient emergency response capabilities. Increasing the spare
11 power transformer inventory is not a viable option given the medium- to long-term
12 nature of the deployment of spare power transformers. Relying solely on spare
13 transformers would not mitigate the risk associated with aging assets, increased failure
14 frequency requiring an immediate response, and growing demands on portable
15 substation resources. As a result, the only viable alternative is to procure an additional
16 portable substation.
17

18 **RESPONSE**

19
20 a) Newfoundland Power confirms it has not completed a net present value analysis
21 as described in this Request for Information.
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23 Regarding part i) of the Request for Information, Newfoundland Power has
24 outlined how it manages its power transformer assets as part of report 2.2
25 *Substation Power Transformer Strategy* filed with the Application. The
26 management of power transformer assets and their associated risk is a
27 combination of planned power transformer replacements, spare transformers,
28 and portable substations. The management of the Company's power transformer
29 assets in this way is consistent with good utility practice.¹⁵
30

31 Regarding part ii) of the Request for Information, Newfoundland Power notes
32 that the Gannett Fleming *Service Life Study* forecasts an average of three power
33 transformer retirements per year through 2052. This determination is based on
34 statistical modeling that considers the expected average service life of the
35 Company's power transformers and the age profile of the existing transformer
36 fleet. As discussed in the response to Request for Information PUB-NP-015, this
37 statistical result is used as a long-term planning guide, and not a set pace or
38 target. If the Company were to replace, on average, less than three power

¹⁴ Newfoundland Power identified the need to procure an additional portable substation in its *2026 Capital Budget Application*. See the *2026-2030 Capital Plan*, Appendix A, page A-3. See also the *2026 Capital Budget Application*, report 2.2 *Substation Power Transformer Strategy*, section 4.0.

¹⁵ A 2021 survey conducted through the Centre for Energy Advancement through Technological Innovation ("CEATI") indicated that a majority of utilities maintain both an inventory of spare power transformers and portable substations. A separate survey conducted through CEATI in 2023 indicated that a majority of utilities have a program for planned replacement of power transformers. See the *2026 Capital Budget Application*, report 2.2 *Substation Power Transformer Strategy*, section 2.5 Current Utility Practice.

transformers per year, it would statistically result in aging power transformers being run to failure. This would not be consistent with the Company's obligation to deliver reliable service and would result in additional costs to customers,¹⁶ increased emergency usage of its existing portable substation fleet to restore service to customers, and increased usage of its spare power transformer inventory to maintain service to customers.¹⁷

- b) See the section titled "General," above. As stated in the response to Request for Information PUB-NP-002, the Substation Power Transformer Strategy recognizes that no single approach is sufficient on its own. While a separate assessment of alternatives to the Substation Power Transformer Strategy was not completed, the projects proposed in accordance with the Substation Power Transformer Strategy undergo detailed engineering assessments and assessments of alternatives. These assessments confirm that, individually, the proposed capital projects represent the considered alternative that is least-cost and consistent with reliable, environmentally responsible service delivery. Cumulatively, capital projects proposed in accordance with the Substation Power Transformer Strategy constitute the least-cost approach to addressing the risk associated with the aging power transformer fleet.

¹⁶ For example, in 2023, the Company filed a supplemental capital budget application to purchase and install a power transformer at Memorial Substation due to an identified imminent failure. This imminent failure resulted in capital expenditure requirements of approximately \$1.6 million in addition to the capital expenditures identified in the *2023 Capital Budget Application*. See the *2023 Supplemental Capital Expenditure Application – Memorial Substation Power Transformer Replacement*. The Board approved the purchase and installation of the power transformer in Board Order No. P.U. 14 (2023).

¹⁷ If a spare power transformer were deployed for permanent installation upon a power transformer failure, the Company would have to acquire a spare unit to replenish its spare power transformer inventory.