

Q. Reference: Newfoundland Power's 2027 Capital Budget Application, 2027-2031 Capital Plan

Newfoundland Power is also forecasting to proactively replace an average of three power transformers annually to address the Company's aging power transformer fleet. Power transformer replacements are forecast to account for an average of \$7.3 million annually from 2027 to 2031.

- a) Does Newfoundland Power have a strategy, which includes proactive power transformer replacements, increasing spare-transformer inventory, and the additional proposed portable substation, to determine the least-cost option for managing power transformer reliability risk?**
- b) Explain how each of the aforementioned approaches affects the need for the others.**
- c) If Newfoundland Power did not evaluate all three approaches together, please provide the reason.**

A. General

Newfoundland Power manages substation and power transformer risk through an integrated substation asset management approach that includes:

- The *Substation Power Transformer Strategy* which incorporates planned power transformer replacements, spare power transformer inventory, and portable substations;
- Substation refurbishment and modernization ("R&M") projects; and
- In-service failure programs.

These projects and programs serve different but complementary purposes in supporting reliability of the Company's substation infrastructure and are considered together as part of Newfoundland Power's overall substation strategy. The *Substation Power Transformer Strategy* was introduced in the *2026 Capital Budget Application* in response to the aging profile of Newfoundland Power's transformer fleet, the results of Gannett Fleming's service life study related to the Company's substation power transformers, increasing transformer procurement lead times, and the need to maintain adequate emergency response capabilities.

Power transformer replacements are intended to reduce the probability of equipment failures by replacing deteriorated transformers before failure occurs. Transformer replacement decisions are based on factors including asset condition, age, probability of failure, customer impacts and system impacts. Planned replacement avoids additional costs associated with emergency failures, including emergency procurement, extended customer outages, overtime labour, and deployment of emergency backup resources.

1 Portable substations provide immediate emergency response capability following power
2 transformer failures, as well as support of planned maintenance and capital projects.
3 Portable substations are not considered spare transformers and are generally intended
4 to provide short-term system support until a more permanent solution can be
5 implemented. The availability of portable substations reduces customer outage duration
6 during equipment failures and supports the execution of maintenance and capital
7 projects throughout the system.
8

9 The spare power transformer inventory is intended to reduce the consequences of
10 transformer failures that occur despite planned replacement efforts. A suitable spare
11 transformer can significantly reduce portable substation installation times by providing
12 either a long-term solution or a medium-term replacement while a permanent
13 replacement transformer is procured. A spare power transformer can typically be
14 installed within a month of a transformer failure which would allow the portable
15 substation to be removed from service. Maintaining an appropriate inventory of spare
16 transformers is consistent with good utility practice and supports reliable system
17 operation.
18

19 Substation R&M projects address a broader range of substation assets beyond power
20 transformers, including protection and control equipment, station service equipment,
21 structures, infrastructure, and other deteriorated or obsolete substation assets. While
22 transformer replacement projects may be coordinated with planned R&M projects where
23 practical, the purpose of R&M projects differs from that of the *Substation Power*
24 *Transformer Strategy*. Transformer replacement projects are primarily driven by
25 transformer condition and reliability risk, while R&M projects are intended to maintain
26 the overall condition of all substation infrastructure. In some cases, coordinating
27 transformer replacements with R&M projects improves construction efficiency and
28 minimizes customer impacts.
29

30 In-service failure projects are another important component of Newfoundland Power's
31 overall approach to managing substation risk. In-service failure projects address critical
32 substation assets that have failed in service or have deteriorated to a point where failure
33 is imminent. These projects are reactive in nature and are intended to restore power,
34 replace failed equipment, and mitigate risks associated with the continued operation of
35 assets that can no longer be safely or reliably maintained.
36

37 While asset management strategies such as the *Substation Power Transformer Strategy*
38 and the *Substation Refurbishment and Modernization Plan* are intended to proactively
39 reduce the probability of equipment failures, Newfoundland Power recognizes that not
40 all failures can be predicted or prevented. The in-service failure projects therefore
41 remain an important component of the Company's overall approach to maintaining
42 reliable service.
43

44 Together these projects and programs form an integrated approach to maintaining
45 reliable service to customers while managing substation reliability risk. Planned power
46 transformer replacements reduce the probability of failures, portable substations provide

1 immediate restoration capability to respond to failures, spare transformers reduce
2 pressure on limited portable substation resources, R&M projects maintain the broader
3 substation asset base, and in-service failure projects ensure there is sufficient response
4 capability to restore service as quickly and safely as practical when failures occur.
5

6 The Board has recognized the criticality of substation power transformers in the
7 provision of service. In Order No. P.U. 38 (2022), the Board stated "*The substation*
8 *power transformers are critical infrastructure in the provision of safe and reliable service*
9 *to customers. The evidence shows that the risk of failure has increased with aging*
10 *transformers and that the consequences of a substation power transformer can be*
11 *significant in terms of outage duration and number of customers affected.*"
12

- 13 a) Yes, as outlined above Newfoundland Power has adopted an integrated power
14 transformer strategy that combines planned power transformer replacements,
15 spare transformer inventory and portable substations to manage power
16 transformer risk in a cost-effective manner. The strategy recognizes that no
17 single approach is sufficient on its own.
18

19 The strategy is intended to balance reliability, risk, and cost by reducing the
20 probability of failures through planned replacement while maintaining sufficient
21 emergency response resources to address failures that do occur. Planned
22 replacement allows transformer retirements to be planned based on condition
23 assessments, operational priorities, and system requirements. This avoids the
24 higher costs associated with emergency failures, reactive procurement, extended
25 customer outages, and emergency response activities.
26

27 Newfoundland Power recognizes that not all failures can be prevented. As a
28 result, the Company maintains a spare transformer inventory and portable
29 substations to mitigate customer impacts when failures occur. The five-year plan
30 included in the 2026 and 2027 *Substation Power Transformer Strategy* reports
31 reflect Newfoundland Power's ongoing assessment of transformer replacement,
32 spare transformers, and portable substation requirements.
33

- 34 b) Planned power transformer replacements, increasing spare-transformer
35 inventory, and portable substations are all critical and interrelated components of
36 the *Substation Power Transformer Strategy*.
37

38 Planned power transformer replacements reduce the probability of transformer
39 failures by replacing higher risk units before they fail. The service life study
40 conducted by Gannett Fleming¹ suggested that Newfoundland Power would
41 replace on average approximately three power transformers annually through
42 2052. In the *Substation Power Transformer Strategy*, Newfoundland Power
43 indicates that without a structured and planned replacement plan, the Company

¹ See the 2026 Capital Budget Application, report 2.2 Substation Power Transformer Strategy, Appendix C, page IV-3.

1 would experience an increase in power transformer failures that would likely
2 exceed its current emergency response capabilities.
3

4 Portable substations provide the initial emergency response capability needed to
5 restore service quickly following a transformer failure. If a portable substation is
6 readily available, service can typically be restored to customers within 24 to 36
7 hours. Following a transformer failure, the length of time a portable substation
8 must remain in service varies depending on whether the power transformer
9 requires repair or replacement, and if a suitable spare transformer is available. In
10 some cases, transformers can be repaired on site within days or weeks. In other
11 cases, transformers must be shipped out of province to a third-party repair
12 facility, which can require 18 to 24 months. When replacement of a transformer
13 is necessary, it can require between 24 and 36 months to design, procure,
14 deliver, install and commission the transformer. If spare transformers are
15 unavailable, a portable substation will need to remain in place for extended
16 periods of time.
17

18 Spare transformers provide medium-to-long-term solutions to transformer
19 failures. A spare power transformer can typically be installed within a month of a
20 transformer failure. A spare unit can be installed on a permanent basis, or as a
21 temporary solution while equipment repairs are completed or while waiting for
22 the procurement of an appropriately sized replacement. If a spare unit is used on
23 a temporary basis, additional costs are typically incurred in transportation and
24 integration into the system.
25

26 Planned power transformer replacements reduce transformer failure probability,
27 portable substations provide immediate restoration response, and spare
28 transformers reduce resource requirements of Newfoundland Power's limited
29 portable substation fleet. Together these measures reduce overall risk more
30 effectively than a single approach.
31

- 32 c) Newfoundland Power did evaluate all three approaches together, as outlined in
33 this response.