

1 **Q. (Reference Schedule B, Portable Substation)**

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3 **Page 5 states "Each power transformer replacement is expected to require a**
4 **portable substation to remain in service for approximately four to ten weeks**
5 **depending on the scope of work and offload capability. In addition to**
6 **transformer replacement activities, the project scopes may include new spill**
7 **containment systems and upgrades to the existing protection and control**
8 **systems."**
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- 10 **a) Could NP reduce the number of annual transformer replacements (i.e.,**
11 **from 3 per year to 2 per year), and the number of capital projects?**
12 **b) Please quantify the probability of insufficient emergency response**
13 **capability.**
14 **c) Please identify the number of service interruptions greater than 24**
15 **hours, and alternatively 36 hours, following a transformer failure in**
16 **each of the past 10 years.**
17 **d) How many portable substations do small/medium distribution**
18 **companies typically carry?**
19 **e) Why is the procurement of one portable substation adequate versus**
20 **two/three?**
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- 22 **A.** a) At this time, Newfoundland Power does not recommend altering the timing or
23 pacing of planned substation capital and maintenance plans. Newfoundland
24 Power's current replacement and capital investment plans balance asset
25 conditions, customer reliability, operational requirements, emergency response
26 capability, and costs. Newfoundland Power's capital plan is reviewed and adjusted
27 annually as part of the capital budget process to determine the required
28 investment needed to maintain reliable substation operations that can be
29 completed cost effectively using available resources.¹
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31 See the response to Request for Information PUB-NP-008 for more information on
32 the justification of three power transformer replacements per year.
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34 See the response to Request for Information PUB-NP-002 for more information on
35 the overall substation asset management strategy.
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- 37 b) Newfoundland Power has not quantified the probability of insufficient emergency
38 response capability.
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40 The occurrence and severity of power transformer failures are impacted by
41 transformer condition, operating conditions, loading, failure modes, weather
42 events, and the availability of emergency response equipment. The variability and
43 interdependence of these factors make developing a statistically meaningful
44 estimate of insufficient emergency response capability impractical.

¹ See the 2027 Capital Budget Application, 2027 Capital Budget Overview, Section 2.2 Capital Planning at Newfoundland Power.

The Company's assessment identified periods where portable substation fleet utilization is expected to be high due to planned power transformer replacements, substation capital projects, maintenance activities, and emergency response requirements. During these periods, an unplanned power transformer failure could create competing demands for portable substation resources.

See Figure 5 of report *2.3 Portable Substation* for the historical and forecasted portable substation fleet usage. The analysis indicates that periods are forecast to occur when demand for portable substations exceeds the capacity of the existing fleet.

Newfoundland Power's assessment focused on identifying periods where portable substation fleet capacity may be constrained rather than developing a probabilistic estimate of emergency response capability.

- c) Power Transformer BVA-T1 experienced an internal failure in November 2018 resulting in a power outage of 23 hours and 54 minutes affecting all 2,566 customers supplied from the Bonavista Substation.

Power Transformer TRN-T1 experienced a bushing failure in 2020 resulting in a service interruption of approximately 25 hours and 58 minutes affecting 3,503 customers in the Bonavista North area. Initially, all customers supplied from transmission lines 115L and 116L were impacted by the bushing failure which included Hare Bay Substation, Trinity Substation, Greenspond Substation, and Wesleyville Substation. Once the bushing failure was identified, the outage was isolated to customers supplied by Trinity Substation.

Based on Newfoundland Power's review of transformer failures during the past ten years, no customer outage associated with a power transformer exceeded 36 hours. Other power transformer failures have occurred over the past 10 years, however substation offload capabilities have reduced service interruption durations.

- d) Newfoundland Power conducted power transformer surveys through CEATI in 2021 and 2023 that included questions on portable substation ownership among utilities with varying system sizes and characteristics. The survey results indicate that portable transformer inventories vary based on system configuration, redundancy, reliability requirements, and operating practices.

Across both surveys, utilities that maintained portable transformer capacity generally reported inventories equivalent to approximately one percent to six percent of their fleet. Several utilities reported maintaining no portable transformers. Utilities that did not maintain portable transformers generally indicated that their systems were designed with sufficient redundancy to meet N-1 reliability criteria, could offload transformer load to other facilities, or could accommodate extended outages for maintenance activities. One respondent

1 indicated that it utilized external generation resources to support substations that
2 did not meet N-1 criteria rather than maintaining portable transformer capacity.

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4 Overall, the survey results demonstrated that utility practices vary considerably
5 and are influenced by individual system characteristics, reliability objectives,
6 available redundancy, and asset management strategies.

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8 e) Newfoundland Power is proposing one additional portable substation as its
9 assessment identified a gap between the forecasted demand for portable
10 substations and the capability of the existing fleet. The additional unit will
11 maintain emergency response capability while supporting increased transformer
12 replacement activity, maintenance requirements, and capital projects.
13 Newfoundland Power has not identified a requirement for two or three additional
14 units based on current planning assumptions. The proposal therefore represents
15 the minimum increase in portable substation capacity necessary to address the
16 forecast deficiency identified in the Company's analysis. The adequacy of the
17 portable substation fleet will continue to be reassessed through the annual review
18 of the Substation Power Transformer Strategy and capital planning process.