

Q. Reference: Newfoundland Power's 2027 Capital Budget Application, Section 2.2, Substation Power Transformer Strategy, Response to CA-NP-045

- a) Are there alternatives to the LBK-T1 transformer replacement that can be completed without replacing or upgrading the bridge? Explain.**
- b) Was replacement with smaller single-phase transformers considered as an alternative, and could this option reduce transport weight sufficiently to avoid replacing or upgrading the bridge?**

A. (a) No practical long-term alternative was identified that would address the condition of power transformer LBK-T1 without requiring suitable access via the only access road. The alternatives assessed to address transformer LBK-T1 are described in Appendix B of the *Substation Power Transformer Strategy*.¹ Continuing condition-based monitoring would defer the immediate requirement to replace the bridge, but would not provide a viable long-term solution given the condition of LBK-T1, the absence of a compatible spare transformer and the potential for an extended loss of generation following a failure. Removing and repairing LBK-T1 would require the transformer to be transported from and subsequently returned to the site and would therefore not avoid the requirement for suitable bridge access. Replacement of LBK-T1 similarly requires delivery of a power transformer to the site. Accordingly, both long-term alternatives require suitable bridge access.

Under Newfoundland Power's procurement arrangements, the power transformer supplier is responsible for delivery of the transformer to the site. The supplier's heavy-haul carrier requires confirmation that bridges along the delivery route can safely accommodate the combined loading of the transformer and transportation equipment.

The existing bridge infrastructure at Lookout Brook Hydro Plant is constructed using non-standard, aged, and deteriorated structural materials such as non-rated timber, utility poles, and, in one case, a rail car chassis. As such, Newfoundland Power is unable to provide the bridge-capacity approval required by the supplier's heavy-haul carrier.

Based on the condition and construction of the existing infrastructure and the requirement to provide confirmed suitable access for transformer delivery, bridge replacement was determined to be a necessary condition for completion of the *LBK-T1 Power Transformer Replacement* project.

- (b) No, replacement of LBK-T1 with three smaller single-phase transformers was not assessed as an alternative. The project was developed based on replacing the existing three-phase transformer with an equivalent three-phase unit.

¹ See the 2027 Capital Budget Application, report 2.2 Substation Power Transformer Strategy, Appendix B.

1 For context, an equivalent single-phase configuration would require three
2 transformers, each rated approximately 2.5/3.33 MVA. Although this
3 configuration could reduce the weight of each individual transformer shipment, it
4 would not eliminate the requirement for suitable bridge access from the supplier.

5
6 Quotation data for a replacement 333 kVA single-phase transformer, operating at
7 a comparable high-voltage level, shows a total assembled mass of approximately
8 8,900 kilograms and a heaviest shipping mass of approximately 5,400 kilograms.
9 This demonstrates that even a substantially lower-capacity single-phase
10 transformer represents a sufficiently heavy transportation load. Each single-
11 phase transformer required for LBK would have a considerably higher electrical
12 rating, although its actual shipping mass would depend on the manufacturer's
13 design. The total load imposed on the bridge would also include the
14 transportation vehicle and associated equipment.

15
16 Regardless of the transformer configuration, transportation across the existing
17 bridge would require an engineering assessment confirming that the bridge, in its
18 current condition, could safely accommodate the specific transportation load,
19 including the transformer, transportation vehicle, and associated equipment.
20 Given the deteriorated condition of the bridge and the presence of non-standard
21 structural components, the bridge cannot be load rated and replacement is
22 therefore required.