

**NEWFOUNDLAND AND LABRADOR
BOARD OF COMMISSIONERS OF PUBLIC UTILITIES**

AN ORDER OF THE BOARD

NO P.U. 14(2023)

1 **IN THE MATTER OF the Electrical Power**
2 **Control Act, 1994**, SNL 1994, Chapter E-5.1
3 (the “**EPCA**”) and the **Public Utilities Act**,
4 RSNL 1990, Chapter P-47 (the “**Act**”), as
5 amended, and regulations thereunder; and
6

7 **IN THE MATTER OF** an application by
8 Newfoundland Power Inc. for the approval
9 of supplemental capital expenditures to
10 proceed with the purchase and installation
11 of a replacement power transformer for
12 Memorial Substation pursuant to section
13 41(3) of the **Act**.
14
15

16 **DECISION SUMMARY**

17
18 The Board will approve the application filed by Newfoundland Power Inc. (“Newfoundland
19 Power”) for approval of supplemental capital expenditures in the amount of \$1,614,000 to
20 purchase and install a replacement power transformer for the Memorial Substation in St. John’s.
21

22 **APPLICATION**

23
24 On March 3, 2023, Newfoundland Power filed an application seeking approval of capital
25 expenditures in the amount of \$1,614,000 to purchase and install a replacement power
26 transformer for the Memorial Substation (the “Application”). The Application states that one of
27 the power transformers at the Memorial Substation, MUN-T2, which serves Memorial University
28 of Newfoundland and Labrador (the “University”) has failed and cannot return to service without
29 exposing the University and public to service reliability and safety risks. The Application proposes
30 capital expenditures of \$48,000 in 2023 and \$1,566,000 in 2024. The 2023 expenditures proposed
31 are supplemental to Newfoundland Power’s 2023 Capital Budget of \$122,869,000 approved by
32 the Board in Order No. P.U. 38(2022).
33

34 The Consumer Advocate, Dennis Browne, K.C. (the “Consumer Advocate”) and Newfoundland
35 and Labrador Hydro (“Hydro”) participated in the Application. On March 23, 2023, Newfoundland
36 Power responded to 35 Requests for Information filed by the Board, the Consumer Advocate,
37 and Hydro.

1 On March 28, 2023, Hydro filed comments on the Application which agreed with the approval of
2 the project but questioned who should fund the project. The Consumer Advocate filed comments
3 on March 29, 2023, raising questions in relation to the need for the project and the recovery of
4 the associated costs. On April 4, 2023, Newfoundland Power filed its reply requesting that the
5 Board approve the Application as submitted. The Board also received a comment from a member
6 of the public objecting to Newfoundland Power's request.

7 8 **BOARD DECISION** 9

10 Newfoundland Power supplies the University's St. John's campus through two distribution
11 substations, the Memorial Substation and the Long Pond Substation. Newfoundland Power has
12 owned and operated equipment at the Memorial Substation since 1966. The Memorial
13 Substation serves over 35 buildings on campus, including the critical loads for the Health Sciences
14 Centre and the Janeway Children's Hospital. The Long Pond Substation was approved as a special
15 facility in 2019 to improve reliability and provide an increased level of redundant supply to the
16 Health Sciences Centre and the rest of the campus as well as increased capacity flexibility on the
17 University distribution system to better accommodate load growth and future maintenance
18 activities.¹

19 20 **Transformer Failure** 21

22 The Memorial Substation has two power transformers, MUN-T1 which is 57 years old and MUN-
23 T2 which is 47 years old. Power transformers typically have service lives of 30 to 50 years, and as
24 a result MUN-T1 is well past its expected service life and MUN-T2 is approaching the end of its
25 expected service life.²

26
27 In August 2022, the University informed Newfoundland Power that MUN-T2 was operating at a
28 high noise level and experiencing higher-than-normal internal temperatures. Newfoundland
29 Power removed MUN-T2 from service for inspection. Newfoundland Power engaged van Kooy
30 Transformer Consulting Services Inc. ("van Kooy") to perform an independent assessment. van
31 Kooy confirmed that the abnormal noise and temperature levels resulted from deterioration of
32 the core lamination to lamination insulation.

33
34 With MUN-T2 removed from service, Memorial Substation is not capable of carrying the
35 University's full load and, as result, the University's load must now be shared between the Long
36 Pond Substation and the Memorial Substation. The Board notes that there is an increased
37 probability of an outage at the Memorial Substation given that the MUN-T1 transformer has
38 exceeded the typical useful life of a power transformer. The Board also notes that, based on the
39 evidence, Newfoundland Power has limited ability to mitigate an outage as:

- 40 • some load cannot be transferred to the Long Pond Substation as the result of insufficient
41 customer-owned distribution tie points; and
- 42 • a portable substation would require three days to install because of the unique location
43 and configuration of the Memorial Substation.³

¹ P.U. 5(2019).

² Application, Schedule B, page 5, footnote 9.

³ Application, Schedule B, page 6.

1 In addition, Newfoundland Power has a limited fleet of portable substations and cannot install
2 one at the Memorial Substation until 2024 without compromising the availability of portable
3 units to maintain service to customers during substation maintenance, capital projects, and
4 equipment failures.

5
6 It is clear that the loss of MUN-T1 would pose a substantial risk to portions of the University which
7 serves over 15,000 students, with approximately 1,700 students living in on-campus residences.
8 Depending on the length of an outage, a loss of supply from the Memorial Substation could lead
9 to the closure of the majority of campus buildings as the University's back-up generation only
10 operates life safety systems such as fire alarm, emergency lighting and select electric heat loads.
11 Certain buildings, such as residences, rely on electric heat and would require rotating outages to
12 maintain heat.⁴ In addition there are also health and safety risks which may be associated with a
13 failure of MUN-T1.⁵ The Board finds that the present configuration of the Memorial Substation
14 poses undue risk to the provision of safe and reliable service.

15
16 The Board notes that Hydro did not dispute the need to replace MUN-T2 whereas the Consumer
17 Advocate submitted that Newfoundland Power had not established a need for replacing MUN-
18 T2. The Consumer Advocate questioned the urgency of the project and submitted that the
19 consequence of a failure is low given the option to install a portable substation.⁶ The Board finds
20 that the Consumer Advocate's position is not supported by the evidence which clearly
21 demonstrates the potential risks associated with an outage of the remaining transformer at the
22 Memorial Substation, MUN-T1, and the limited alternatives available to mitigate such an outage.
23 The Board believes that delaying the project would present an unjustified risk to the provision of
24 safe and reliable service. The Board is satisfied that the evidence demonstrates that it is
25 necessary and appropriate to refurbish or replace MUN-T2 as soon as possible to return the
26 Memorial Substation to its normal configuration to ensure the continued provision of safe and
27 reliable service.

28 29 **Alternatives**

30
31 Newfoundland Power identified three options to return the Memorial Substation to its normal
32 configuration: refurbishing MUN-T2, replacing it with a spare unit, and replacing it with a new
33 unit. As Newfoundland Power does not have a spare unit available to replace MUN-T2,⁷ it
34 assessed two technically viable alternatives to return the Memorial Substation to its normal
35 configuration: refurbishment of MUN-T2 at an estimated cost of \$1,572,000 and replacing MUN-
36 T2 with a new unit at a cost of \$1,614,000.⁸

37
38 Refurbishing MUN-T2 would involve replacing the core and transformer windings as well as
39 auxiliary components such as the external bushings, gauges and lightning arresters.⁹ The
40 evidence shows refurbishing MUN-T2 has the potential for cost increases due to unforeseen

⁴ Application, Schedule B, page 6.

⁵ CA-NP-023.

⁶ Consumer Advocate's Comments, page 6.

⁷ Application, Schedule A, page 3.

⁸ Application, Schedule B, pages 7-8.

⁹ Application, Schedule B, page 7.

1 deterioration that cannot be determined until the unit is factory assessed. This work would
2 extend the service life of MUN-T2, but its service life would still be less than that of a new power
3 transformer.¹⁰ van Kooy noted that, in comparison to purchasing a new unit, refurbishing MUN-
4 T2 would present a higher risk because the quality of work undertaken by a repair facility is
5 generally less than that of an original equipment manufacturer and Newfoundland Power would
6 not achieve cost savings or reduction in delivery times.¹¹ In addition, there are operational
7 benefits to replacing MUN-T2 with a new unit as it would require less maintenance.¹²

8
9 The Board notes that intervenors did not comment on the alternatives. The Board is satisfied that
10 replacing MUN-T2 with a new unit is the preferred option. While the costs of a new transformer
11 are marginally higher there is a risk of cost increases with a refurbished unit and a new
12 transformer will have a significantly longer service life and lower maintenance costs.

13 14 **Cost Recovery**

15
16 Both the Consumer Advocate and Hydro submitted that the University, and not other ratepayers,
17 should be responsible for the costs of replacing MUN-T2. Hydro argued that expenditures
18 incurred on transmission assets serving only one customer should be recovered from that
19 customer through a direct contribution or through customer rates in a specifically-assigned
20 charge. The Consumer Advocate argued that it is inappropriate for other customers to supply
21 facilities that benefit only the University. Newfoundland Power replied that the Memorial
22 Substation is not a special facility because it is the University's original point of supply and the
23 University is a general service customer.

24
25 The Board notes that General Service customers are supplied through a single supply point which
26 is included in Newfoundland Power's cost of service and funded by all ratepayers. If a customer
27 wants a second supply point, it is provided at the customer's expense as a special facility under
28 Newfoundland Power's Schedule of Rates, Rules & Regulations or through a Contribution in Aid
29 of Construction. The evidence demonstrates that the Memorial Substation is the primary supply
30 point to the University while the Long Pond Substation is a redundant supply point which was
31 fully funded on behalf of the customer as a special facility. When the Long Pond Substation was
32 approved as a special facility for the University in 2019 the approved capital expenditures of
33 \$4,600,000 were fully funded by Government and not recovered from other ratepayers.¹³

34
35 Under normal operating conditions, the load on the Long Pond Substation consists of the new
36 Core Science Facility, as well as the Health Sciences Centre and surrounding buildings such as the
37 Janeway Children's Hospital. If the Long Pond Substation fails, Newfoundland Power would
38 normally transfer its load to the Memorial Substation. However, with MUN-T2 out of service, this
39 is no longer possible. This means that the redundant supply the University acquired with the Long
40 Pond Substation has been lost as the Long Pond Substation has become the primary supply for
41 certain buildings on campus. Returning the Memorial Substation to its normal configuration by

¹⁰ Application, Schedule B, page 7.

¹¹ Application, Schedule B, page 8.

¹² Application, Schedule B, page 8.

¹³ P.U. 5(2019).

1 replacing MUN-T2 would have the effect of restoring the Long Pond Substation to its role of
2 providing redundant supply.

3
4 The Board notes that maintaining the Memorial Substation as a primary point of supply and the
5 Long Pond Substation as a special facility is consistent with the cost of service methodology
6 accepted by the parties in Newfoundland Power's most recent General Rate Application and
7 approved by the Board in Order No. P.U. 3(2022). The Board agrees with Newfoundland Power
8 that failing to replace MUN-T2 and relying on the Long Pond Substation would call into question
9 whether the Long Pond Substation continues to be a special facility. The Board finds that the
10 Memorial Substation represents the single supply point that the University is entitled to receive
11 from Newfoundland Power and is not a special facility under Newfoundland Power's Schedule of
12 Rates Rules & Regulations. In addition Newfoundland Power's approved cost of service and
13 customer rates do not currently provide for specifically-assigned charges for general service
14 customers. Such a significant change would require a full review of Newfoundland Power's cost
15 of service and customer rates with the input of stakeholders, likely in a general rate application.

16
17 The Consumer Advocate also submitted that the replacement of MUN-T2 ought to be funded
18 from amounts approved in Newfoundland Power's 2023 Capital Budget, specifically from one of
19 three areas: the Substation Replacements Due to In-Service Failures budget, the Spare Power
20 Transformer Inventory project, or the Allowance for Unforeseen Expenses. Newfoundland Power
21 advised that it evaluated and ruled out these funding options prior to filing the Application.

22
23 The Board notes that funding the replacement of MUN-T2 using expenditures that were
24 approved in Newfoundland Power's 2023 Capital Budget application has the potential to
25 negatively impact projects which were found to be necessary and appropriate in the capital
26 budget application process. In particular the Board accepts the evidence that the Substation
27 Replacements Due to In-Service Failures program would not accommodate work of the
28 magnitude required to replace MUN-T2 as diverting funds from this project would impact the
29 expenditures for substation equipment failures that require immediate attention to maintain
30 reliable supply to customers. In addition there would be no cost savings through the Spare Power
31 Transformer Inventory project since Newfoundland Power would still have to acquire a spare unit
32 to mitigate the increasing risks of outages due to its aging power transformer fleet. Further, the
33 Board agrees with Newfoundland Power that the circumstances do not present the urgency
34 necessary for the use of the Allowance for Unforeseen Items which is intended for projects which
35 cannot wait for Board approval through a supplementary application process. The Board accepts
36 that the proposed replacement of MUN-T2 was appropriately filed as a supplementary capital
37 expenditure application.

38 39 **Transformer Maintenance Program**

40
41 The Consumer Advocate requested that the Board direct Newfoundland Power to conduct a
42 review of its transformer maintenance practices to determine the adequacy of its staff training
43 and its adherence to industry best practices.¹⁴ The Consumer Advocate stated that
44 Newfoundland Power staff recorded 42 service tasks at the Memorial Substation between

¹⁴ Consumer Advocate Comments, page 5.

1 January 1, 2020, and August 17, 2022, to conduct maintenance, tests, and inspections. The
2 Consumer Advocate stated this level of activity makes it difficult to understand how
3 Newfoundland Power “completely missed” the deteriorating condition of MUN-T2.

4
5 The Board notes that both transformers at the Memorial Substation received regular
6 maintenance in 2022, including routine oil sampling to monitor their condition. The oil samples
7 did not indicate any concerns. Newfoundland Power’s expert, van Kooy, stated there is no
8 industry standard for monitoring the core deterioration that caused the MUN-T2 failure.
9 Identifying this type of deterioration would require removing a transformer from service,
10 partially draining the oil and inspecting internal components. van Kooy noted that it is aware of
11 only one instance of a similar failure in 35 years. Newfoundland Power indicated that this is the
12 first such failure in the utility’s history. The Board finds that the evidence does not demonstrate
13 that there is a need for Newfoundland Power to review its transformer maintenance practices to
14 determine adherence to best practices.

15 16 **Spare Transformer Inventory**

17
18 The Consumer Advocate questioned the adequacy of Newfoundland Power’s spare power
19 transformer inventory given that it does not have a spare available to replace MUN-T2. The
20 Consumer Advocate requested that the Board direct Newfoundland Power to develop a
21 comprehensive spare transformer plan that includes sharing arrangements with Hydro and other
22 utilities in eastern Canada.

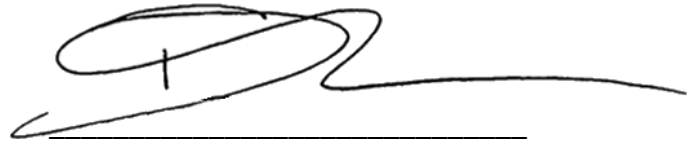
23
24 The Board notes that MUN-T2 has a configuration that is not common in Newfoundland Power’s
25 system and does not match the specifications of the more adaptable spare unit to be purchased
26 in 2023. The Board reviewed Newfoundland Power’s spare transformer inventory in its 2023
27 Capital Budget application and approved the proposed spare transformer. The 25 MVA power
28 transformer which will be purchased provides the maximum coverage and risk mitigation for in-
29 service power transformers. Newfoundland Power estimated that it would cost \$45,000,000 to
30 \$60,000,000 to secure spares to cover every type of transformer in the Newfoundland Power
31 fleet.¹⁵ The Board finds that the evidence does not demonstrate that it is necessary or
32 appropriate to direct Newfoundland Power with respect to its spare transformer inventory plan.

33 34 35 **IT IS THEREFORE ORDERED THAT:**

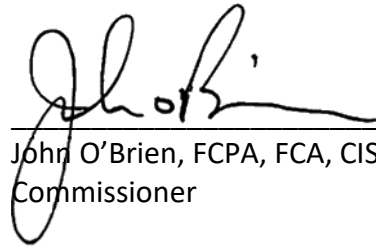
- 36
37 1. The proposed capital expenditures in the amount of \$48,000 in 2023 and \$1,566,000 in 2024
38 to purchase and install a replacement power transformer for MUN-T2 at the Memorial
39 Substation in St. John’s is approved.
40
41 2. Newfoundland Power shall pay all expenses of the Board arising from this Application.

¹⁵ CA-NP-001.

DATED at St. John's, Newfoundland and Labrador, the 31st day of May 2023.



Dwanda Newman, LL.B.
Vice-Chair



John O'Brien, FCPA, FCA, CISA
Commissioner



Christopher Pike, LL.B., FCIP
Commissioner



Sara Kean
Assistant Board Secretary