

1 **Q. (Reference PUB-NP-008; PUB-NP-010; report 2.2; Gannett Fleming Service**
2 **Life Study) The three-replacements-per-year forecast is age-based, while**
3 **individual elections are said to be condition- and risk-based.**

4 **a) Explain how the age study sets the replacement pace, how condition**
5 **and risk select units, and how both feed the five-year and portable-**
6 **substation forecasts.**

7 **b) Identify the rate needed to stabilize or reduce fleet risk. Project**
8 **through 2052 at two, three and four replacements per year, showing**
9 **units aged 50+, units over 55, and annual capital costs.**

10
11 **A. a)** See the response to Request for Information PUB-NP-015.

12
13 Portable substation requirements are based on the timing of planned capital
14 work including power transformer replacements, maintenance activities, and
15 emergency response needs rather than solely on the Gannett Fleming *Service*
16 *Life Study's* replacement forecast.

17
18 b) The *Service Life Study* was not intended to establish the replacement rate
19 required to stabilize or reduce fleet risk. The Study provides an age-based
20 forecast of expected retirements, whereas actual fleet risk is influenced by a
21 variety of factors including transformer condition, probability of failure,
22 consequence of failure, system requirements, spare transformer availability, and
23 portable substation capability. Accordingly, Newfoundland Power does not
24 identify a single replacement rate that can be demonstrated to stabilize fleet risk
25 under all circumstances. However, an age-based projection can illustrate the
26 effect of different replacement rates on the fleet's age profile.

27
28 The 2052 age profile and annual capital cost projections for replacement rates of
29 two, three, and four transformers per year are provided in Figures 1 through 6
30 below. This information is provided strictly for the purpose of responding to the
31 Request for Information and applies a number of assumptions for every
32 transformer included in the analysis. The assumptions fall into two categories:

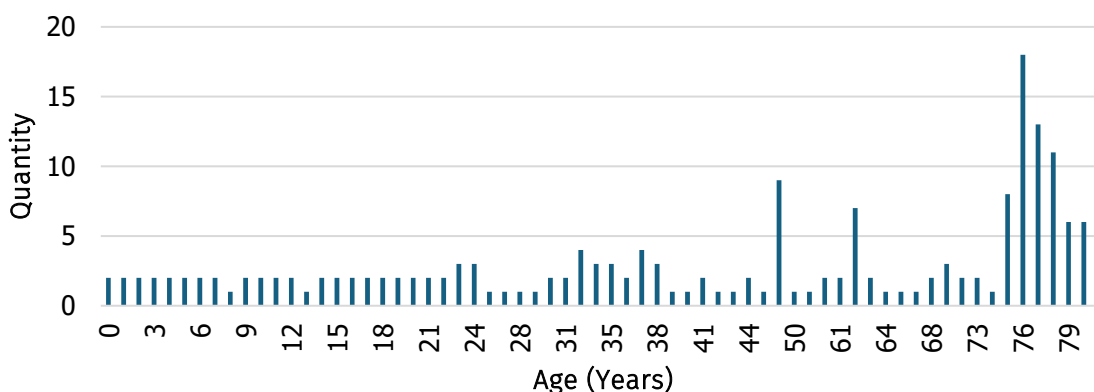
33
34 1. For power transformer replacements beyond those included in Newfoundland
35 Power's capital budget applications to date, the oldest transformers in service
36 in each year were assumed to be replaced. Accordingly, the forecast annual
37 capital costs presented in Figures 2, 4, and 6 are based on this age and
38 replacement-rate assumption and do not represent Newfoundland Power's
39 forecast or anticipated expenditures for future power transformer
40 replacements.

41
42 2. Capital costs for each transformer replacement are strictly for the supply of a
43 new power transformer and do not reflect the associated installation costs,
44 which are site specific. Estimated transformer costs are based on the most
45 recent transformer quotations and are escalated using the annual GDP
46 deflator. Capital costs were not estimated individually and are based on an

average cost for each transformer type (i.e. transmission, distribution, and generation).

Given the number of assumptions applied to this analysis, in Newfoundland Power's view, the annual capital cost projections beyond 2031 should not be relied upon for any type of analysis. Figures 2, 4, and 6 were prepared only to respond to Request for Information and should be used only to compare scale of spending for the different power transformer replacement rates. As stated in the response to Request for Information PUB-NP-016, if the Company were to replace, on average, less than three power transformers per year, it would statistically result in aging power transformers being run to failure.

Figure 1
Transformer Age Profile 2052 - Two Replacements per Year



Under the scenario of two transformer replacements per year, the projected 2052 age profile indicates that 96 transformers would be more than 50 years old, and 94 would be more than 55 years old.

Figure 2
Annual Forecasted Capital Costs - Two Replacements per Year

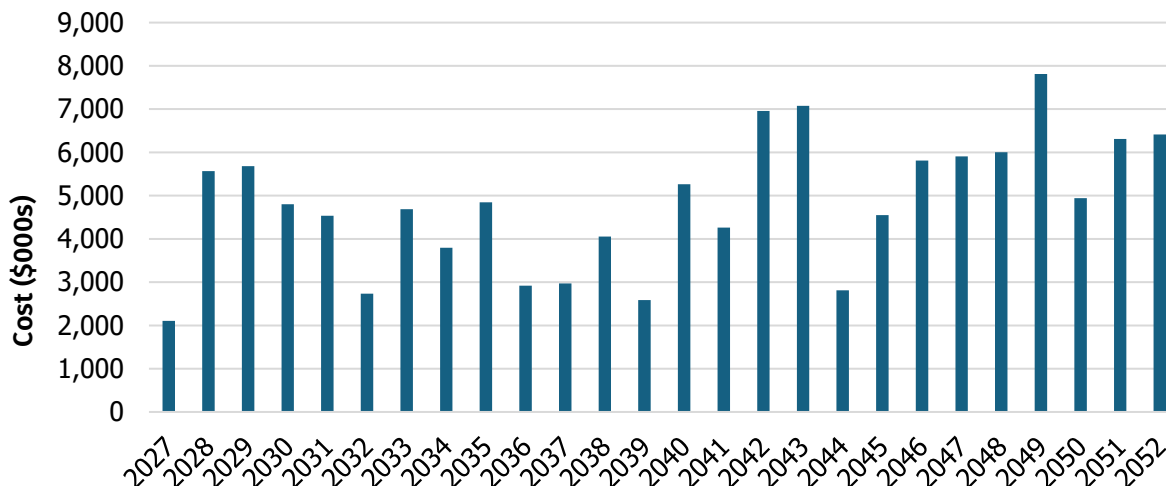
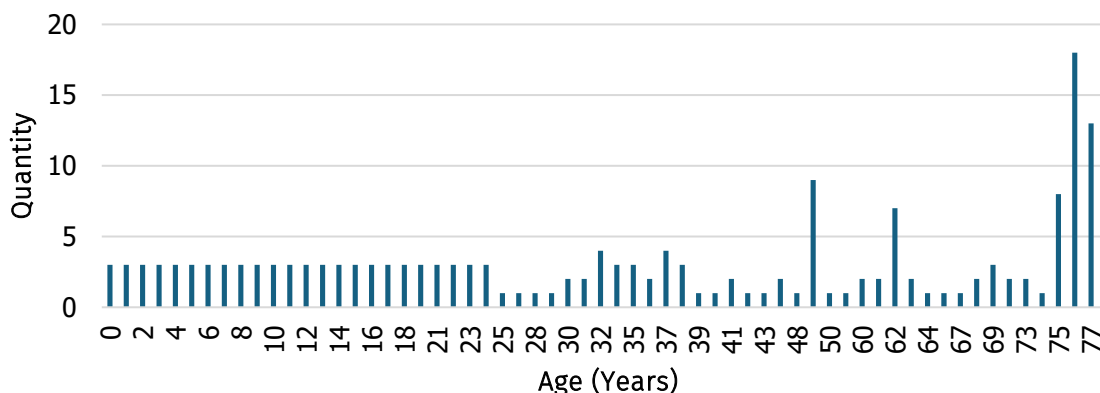


Figure 3
Transformer Age Profile 2052 - Three Replacements per Year



- 1 Under the scenario of three transformer replacements per year, the projected 2052 age
- 2 profile indicates that 74 transformers would be more than 50 years old, and 72 would be
- 3 more than 55 years old.¹

¹ In the preparation of this Request for Information a formatting error was noted in an excel table for Request for Information PUB-NP-008 that caused the 2052 age profile to incorrectly indicate 67 transformers would be more than 50 years old, and 65 would be more than 55-years old. The correct values are 74 and 72, respectively as outlined in this Request for Information under the scenario of three transformer replacements per year. Newfoundland Power has filed a revised response to PUB-NP-008.

Figure 4
Annual Forecasted Capital Costs - Three Replacements per Year

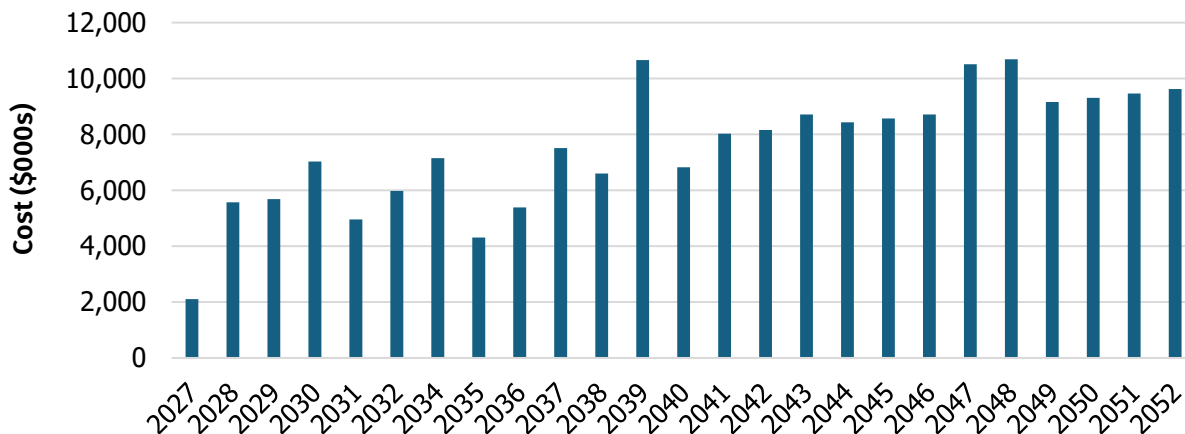
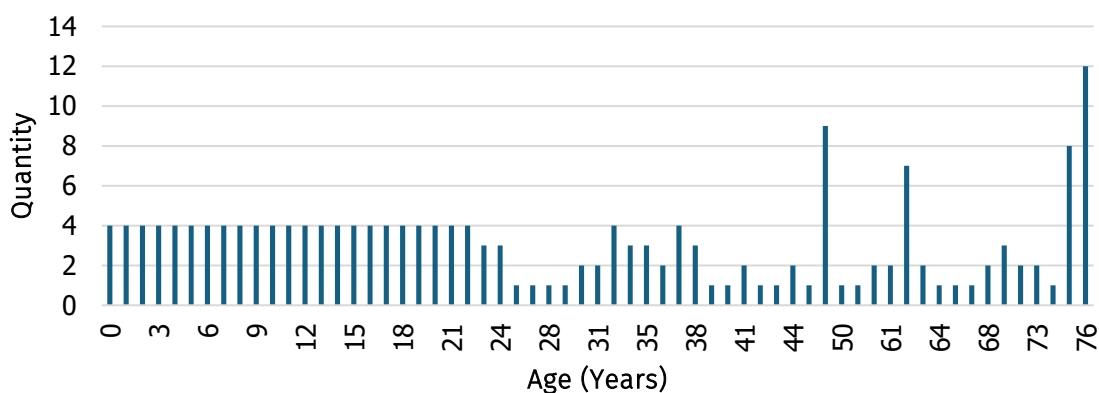


Figure 5
Transformer Age Profile 2052 - Four Replacements per Year



- 1 Under the scenario of four transformer replacements per year, the projected 2052 age
- 2 profile indicates that 48 transformers would be more than 50 years old, and 46 would be
- 3 more than 55 years old.

