

- 1 Q. Reference: Pre-Filed Testimony of Patrick Bowman, page 2, lines 15-18,
2 InterGroup Consultants Ltd. (“InterGroup”) states that the Modified Total Resource
3 Cost test (“mTRC”) and Total Resource Cost test (“TRC”) should be used as a
4 secondary test, with the Program Administrator Cost (“PAC”) test, Net Present
5 Value (“NPV”) test, and assessment of rate impacts as the primary tools for
6 assessment.
- 7 a) Footnote 1, page 2 references “an equivalent NPV analysis”. Please advise
8 whether the NPV test and the equivalent NPV analysis are two different tools used
9 for assessment. If so, please explain the difference between them.
- 10 b) Please advise whether InterGroup’s opinion that the mTRC (and TRC) test
11 should be used as a secondary test also applies to the application of the TRC test
12 currently approved by the Board in Order No. P.U. 18(2016) for the evaluation of
13 CDM programs.
- 14 c) Please confirm that it is InterGroup’s opinion that it is appropriate for the
15 Utilities to use an NPV test, similar to what is provided in the Application, and a
16 PAC test as primary tests and use the mTRC/TRC test as a secondary test to
17 evaluate electrification and CDM programs.

18 A.

- 19 (a) This response addresses TC-PUB-IC-001(a) as well as matters addressed in TC-
20 PUB-IC-002(a), TC-PUB-IC-003(a).

21 Mr. Bowman is referring to 2 different concepts in the referenced sections, as
22 described below. For simplicity, this response focuses on energy efficiency rather
23 than electrification, though the same principles broadly apply. The key principle is
24 that for NL Hydro, NPV assessment, whether for electrification or for energy
25 efficiency, should include analyses that include the changes to utility revenues
26 (positive or negative).

27 Utility focused tests use a selection of the program characteristics to measure
28 impacts on the utility (and its other ratepayers). These either focus on (a) the
29 resource costs or values, or (b) the impact on rates. Broadly the difference is as
30 follows.

1 1. **Resource cost/value tests** would include in the measure of benefits the
2 avoided system supply costs, and in the measure of costs the expenses
3 incurred to acquire the power – but they ignore revenue impacts. For
4 example, if the utility paid 5 cents to someone to avoid using one kW.h, and
5 in the process avoided 10 cents of Holyrood fuel, and made this same deal
6 with 10 people. This could be reported as 2:1 **Program Administrator**
7 **Cost (“PAC”)** result given 50 cents benefit to 25 cents spent (PAC results
8 are a ratio). This could also be reported as a 5 cent/kW.h **Levelized Cost**
9 **(“LC”)** metric (25 cents spent divided by 5 kW.h), which a system planner
10 would compare to the 10 cent/kW.h marginal cost to determine if the
11 resource was worth pursuing (LC is a unit cost result levelized over time if
12 this same transaction were to occur each year for a period of time, which
13 would in itself include an NPV calculation). Finally, the program could be
14 analyzed by an **NPV Analysis (“NPV Analysis”)** which would say there
15 was a 25 cent NPV benefit (50 cents benefit less 25 cents spent).
16 Summarizing:

- 17 ○ PAC of 2.0 (or 2:1)
- 18 ○ LC of 5 cents/kW.h
- 19 ○ NPV of 25 cents

20 Each of these results is useful for testing different things. For example, the
21 PAC can be very large, but on a tiny program so it may not be worth pursuing
22 in favour of programs with a broader reach – if one only looked at the PAC
23 the program scale would not be apparent. Or on a large program, the NPV
24 can appear significant, but the PAC could be very near to 1, which indicates
25 even a small change in assumptions could mean the program metrics would
26 turn negative – such a program may also be less than advisable.

27 The key failure in all of the above metrics is that even if all of the measures are
28 overwhelmingly positive (meaning the revenue requirement would be reduced),
29 the program can still have significant adverse rate impacts. This can be illustrated
30 keeping with the above example, but adding in the assumption that in the system
31 in question, rates are 30 cents/kW.h. This could be, for example, because rates
32 also pay for all of the fixed costs of a system, not only the variable costs. This leads
33 to the second group of tests that are required (as intended to be referenced in Mr.
34 Bowman’s Footnote 1 at page 2):

1 2. **Rate impact tests** look at the net financial impact on the utility, including
2 impacts on revenues. One such test that is often mentioned is the **Rate**
3 **Impact Measure (RIM) Test**, which is a ratio. In this case, the benefits of
4 the above program would remain 50 cents, but the cost impacts of the
5 program would be the 25 cents paid out to customers plus the \$1.50 in lost
6 revenue (5 kW.h at 30 cents/kW.h). In this case, the ratio would be 50:175
7 or 0.285. In other words, from the perspective of the other ratepayers, this
8 program is not fair or reasonable as it serves to shift fixed cost recovery
9 from the participants to the non-participants. As for the tests above, one
10 can also measure the impact in other ways, such as **NPV Analysis**. In this
11 case, the program would have a benefit of 50 cents, but a cost (including
12 lost revenue that has to be made up by the remaining ratepayers) of \$1.75,
13 or an NPV of negative \$1.25.

14 The key to this second group of tests – focused on rate impacts – is that one should
15 be somewhat careful using them as screening tools. In the above example, it is
16 generally clear that paying someone 5 cents so that NL Hydro can immediately save
17 10 cents in fuel should be a positive transaction that likely should be considered. This
18 is often the case on a high variable cost system on the margin (like the situation with
19 Holyrood). But it must be noted that the overall substance of the transaction, without
20 other mitigative measures, results in net impacts on each group that are not just:

- 21 - each participating customer will receive 35 cents in benefits (30 cents avoided
22 on their bill, plus the 5 cent payout),
- 23 - NL Hydro's net revenue requirement will go down 5 cents (5 cent cost of the
24 payout offset by 10 cents in avoided fuel)
- 25 - The other customers will be faced with NL Hydro having a 5 cent lower revenue
26 requirement, but with 30 cents less revenue coming from the participating
27 customer, so the remaining customers will have to face increases in their rates
28 of 25 cents for each customer that participated.

29 In short, the above program, with positive PAC and NPV looking at utility resource
30 costs or value, would not be an effective rate mitigation measure for the Island, as
31 most customer bills would go up (as shown by metrics like RIM or NPV inclusive of
32 lost revenues). The above issues are compounded with a low variable cost system at
33 the margin, which Hydro is becoming as avoided exports start to form the marginal

1 cost in the analysis. In these cases, ratepayer impacts and distributional fairness
2 considerations have to be very carefully considered¹.

3 In short, the PAC/LC/NPV Analysis absent consideration of revenue impacts is clearly
4 a positive and important suite of tests, but ratepayer impacts also need to be
5 assessed. The ratepayer impact can be assessed through RIM and/or NPV analysis
6 which includes the effects of lost revenue. This last approach is what is referenced in
7 Footnote 1 at page 2 of Mr. Bowman's pre-filed testimony.

8 (b) Yes.

9 Board Order No. P.U. 18(2016) approved the TRC (consolidated) and PAC (utility
10 focused) tests without distinction as to priority. It appears the utilities are proposing
11 to use the TRC or consolidated tests as the priority. It is Mr. Bowman's view that
12 the opposite should occur – the PAC or utility focused tests should be the priority.

13 It should be noted that this in no way implies less ECDM will be justified. There are
14 many types of programs that are stronger on the PAC test than on the TRC test,
15 and many programs which are advisable which may pass a PAC test but fail a TRC
16 test. It simply means that achieving bona fide revenue requirement reductions
17 should be the priority.

18 (c) Confirmed, that is Mr. Bowman's opinion, particularly in a jurisdiction focused on
19 the challenges of looming rate increases, a relatively low marginal cost of energy,
20 and clear rate mitigation concerns.

¹ How to address distributional issues arising from significant rate increases due to excessive CDM is a matter more appropriate for a GRA. Using RIM and rate impact NPV at the ECDM design stage can help identify issues and avoid programs that excessively exacerbate rate impact issues. But where residual adverse impacts arise, further measures could include, for example, ensuring the class which benefits from a CDM program being allocated the costs, rather than the overall customer base. It could also include alterations to rate design – for example increase the fixed charge components in rates. Such matters have recently been explored in some detail in Alberta as part of the Distribution System Inquiry, where adverse rate impacts have been identified to be occurring to non-participants in distribution-connected customer-owned solar developments, and a shift to more demand pricing (including for residential) and more fixed charges with reduced variable energy charges are being explored.