

- 1 Q. Please summarize Newfoundland Hydro’s views regarding potential economies that
2 might be obtained by its assumption of the operation of all Newfoundland Power
3 Island transmission (*termed the **“Reverse Island Transmission Transfer Option”** for*
4 *purposes of this set of questions*)
- 5 a. Please provide a description of whether, and if so, how Hydro would propose to
6 analyze this option.
- 7 b. Please provide any available preliminary estimates of revenue requirements
8 changes (at the Newfoundland Power customer level) that might result.

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- 11 A. Hydro anticipates the main economy that may be obtained in the Reverse Island
12 Transmission Transfer Option includes savings associated with asset
13 management and investment philosophy. Hydro has conducted a preliminary
14 review of this option including the resource requirements that would result
15 from assuming operation of Newfoundland Power’s Island Transmission.

16

17

a.

18

Asset Management and Investment Philosophy

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Hydro’s philosophy on transmission wood pole line asset management is based
20 on the “Wood Pole Line Management program, Wood Pole Line Management
21 Using RCM Principles” report attached to the 2006 Capital Budget Application as
22 Appendix G, Tab 2.

23

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Evaluating the benefits of the Wood Pole Line Management Program (“WPLM”)
25 program has continued over the years as new information is collected and
26 analyzed. Hydro filed its most recent update on the WPLM program in the 2019
27 Capital Budget Application detailing results showing “Hydro’s WPLM program is

1 achieving the goals of increasing reliability, extending asset life, and reducing
2 total cost of ownership. This WPLM Program is well aligned with best practices
3 used in the industry.”¹ Hydro spends approximately \$2.5 million per year on the
4 WPLM program, including component replacement as required, on 2,500 km of
5 69 kV, 138 kV, and 230 kV wood pole lines, and is in the second 10-year cycle
6 since implementation. To date, Hydro has not been required to complete a
7 replacement, based on age or condition, of an entire section of wood pole
8 transmission line in its system, including the oldest lines which were
9 constructed in 1965.

10
11 In 2006, Newfoundland Power started a Transmission Rebuild Program focused
12 on the replacement of sections of transmission lines that were identified as
13 being past their useful life based on ground inspections. Over the last 10 years,
14 Newfoundland Power has made capital expenditures of approximately \$40
15 million in Transmission Rebuilds for approximately 300 km (i.e., 15% of
16 Newfoundland Power’s Transmission System) of transmission line. In addition,
17 Newfoundland Power has spent on average approximately \$2 million per year
18 on various component replacements, a cost which is very similar to the work
19 completed under Hydro’s capital refurbishment program.

20
21 Newfoundland Power is proposing the expenditure of \$43 million between 2019
22 and 2023 for Capital Transmission Rebuilds.

¹ Hydro’s “2019 Capital Budget Application,” Vol. I, 2019–2023 Capital Plan, Appendix C, at p. C16/7–9

Analysis of WPLM Program vs. Transmission Rebuild

Hydro believes that the WPLM program is a proven effective method to manage transmission line life extension to ensure that maximum value can be obtained from each transmission line. Hydro would analyze this option by evaluating the potential revenue requirement savings through the utilization of its WPLM program to minimize premature transmission rebuilds. Hydro's experience with its WPLM program demonstrates it promotes asset life extension and can minimize costs associated with the replacement of transmission lines ("Transmission Rebuilds").

Due to the age distribution of Transmission assets owned by Newfoundland Power, and the assumption that the assets will deteriorate in a similar fashion, Hydro does not anticipate the capital spend on Newfoundland Power Transmission Rebuilds will decline beyond the future five-year planning period.

Table 1 below shows Newfoundland Power Transmission Lines by Vintage. It should be noted that the majority of their system (59%) was constructed during the 1960's and 1970's which in twenty years will be at a similar age, and potentially similar condition, to the line assets that they have currently replaced under their replacement program.

Table 1: Newfoundland Power Transmission Line Length by Vintage (km)

Vintage	km	Percentage of Total
1940	11	1
1950	321	16
1960	470	23
1970	748	36
1980	269	13
1990	120	6
2000	117	6
Total	2056	

1 Alternatively, management and life extension of these assets under the Hydro
 2 WPLM would eliminate the high rebuild costs. By extending life expectancy of
 3 these assets through the WPLM Program, Hydro is not avoiding investment, but
 4 investing only in those components identified as required based on condition.
 5 This has the effect of extending investment costs over a longer period.

6
 7 Hydro notes that in its report entitled “Progress Report #2 (2012-2017) Review
 8 of Wood Pole Line Management (WPLM) Program” (“WPLM Report”) filed with
 9 the Board in July 2018 and provided as PUB-Nalcor-232, Attachment 1, that the
 10 asset depreciation of pole life has increased from a useful life of 53 years to an
 11 average life of 60 years. Further, “based on the current projection (solid red
 12 curve), the expected mean life is approximately 80 years , which is significantly
 13 higher than the conventional economic life of 40 years historically used in the
 14 industry. This projection will be further refined as more data is collected, but it
 15 can be seen that life extension is being recognized through execution of this

1 project.”² The WPLM Program has contributed to this increase in asset life and
2 a future depreciation savings to customers. The WPLM Report also shows that
3 customers benefit from cost avoidance of Transmission Rebuilds through the
4 utilization of the WPLM Program. Therefore, Hydro considers the use of the
5 WPLM Program to be consistent with the provision of least cost, reliable service
6 to customers.

8 **Implementation of Transferring Transmission Assets**

9 To expand the WPLM, Hydro would enter the transmission assets from
10 Newfoundland Power into the current Hydro inspection system. There would be
11 a near-term emphasis placed on completing a preliminary inspection of the
12 assets, as well as a review of any historical inspection data that Newfoundland
13 Power has, to ensure the baseline condition of the assets is established.

14
15 Once the WPLM program is established on the transferred assets, they would
16 be maintained and operated based on life cycle inspections within the
17 inspection program. Any deteriorated components identified in accordance
18 with the criteria outlined in the program would be replaced under the capital
19 program already established to extend the life of those assets. It is expected
20 that there will be changes in the capital program with respect to capital
21 replacements as the program moves from replacement to management to life
22 extension. More detailed information on the condition of the assets would be
23 required before Hydro could quantify the potential impact on the execution of
24 the WPLM Program. After this initial overview inspection is completed, it is
25 expected that the infrastructure would follow existing life expectancy trends as

² "2019 Capital Budget Application," Vol. I, 2019–2023 Capital Plan, Appendix C, at pp. C11/8-9 to C12/1–3.

1 experienced within Hydro’s current system. Proximity of similar assets in these
 2 regions could create labour and cost efficiencies within the tendering and
 3 mobilization of internal labour, contractors, as certain inspections and
 4 refurbishment work could be bundled.

5
 6 As a result of the increase in infrastructure, it is expected that there would be
 7 an increase in Hydro’s annual program budget to accommodate the additional
 8 work load. However, it is anticipated that the program costs would be similar to
 9 Hydro’s planned capital cost of approximately \$1,500 per km due to efficiencies
 10 and economies of scale inside these operational regions. These costs would
 11 include routine Preventive Maintenance Inspections, such as helicopter patrols
 12 and ground patrols, where visual inspections and checks are carried out
 13 routinely to ensure system reliability. Table 2 and Table 3 highlight the expected
 14 changes to the existing Hydro System with the transfer of Newfoundland
 15 Power’s transmission assets. At this stage of the assessment, it is assumed that
 16 the assets would be divided into and managed by the existing Operational
 17 Regions with minimal additions to overall management resources and potential
 18 changes to line-worker compliment.

19
 20 Table 2 shows the increase in line length by region, with the largest impact on
 21 the Avalon Peninsula.

Table 2: Transmission Line Length by Region (km)

Particulars	West	Central	Avalon
Hydro	569	1429	890
Newfoundland Power	216	701	1151
Total	785 (38% Increase)	2130 (50% Increase)	2041 (130% Increase)

1 Table 3 shows the potential increase in line-worker resources required to
 2 manage the program at the field level.

Table 3: Transmission Line-worker Resources

Particulars	Resource Count
Hydro	21
New Hires	9
Total	30

3 The Hydro Transmission crews on the Island are knowledgeable with all voltage
 4 levels up to 230 kV and would have no technical or safety concerns with
 5 adopting the new infrastructure into their work execution plan.

6
 7 Hydro anticipates its Central and West regions have the required facilities to
 8 house any additional staffing, however, due to the increase in the length of
 9 transmission lines serving the Avalon, a detailed evaluation would be required
 10 to effectively evaluate the most economic and strategic crew location to
 11 minimize travel time and optimize productivity within this region. A review of
 12 Hydro’s equipment complement would also be required as Hydro
 13 predominately utilizes tracked equipment due to off-road capability
 14 requirements. It is anticipated that other than for the Avalon (St. John’s and
 15 surrounding area) area, there would be no requirement at this time for
 16 additional equipment for the regions.

17
 18 Based on a recent review of yearly operating costs published in Hydro’s and
 19 Newfoundland Power’s annual expenditure reports, it appears that Hydro’s
 20 operating costs per transmission km are higher than those of Newfoundland

1 Power. Although Newfoundland Power's operating costs are numerically lower,
2 these costs should be reviewed in the context of the operational area for each
3 utility.³

4

5 With the transfer of operation of transmission assets from Newfoundland
6 Power to Hydro, there would be a requirement for increased coordination
7 between the two utilities for infrastructure that has distribution underbuilds to
8 facilitate any required inspections or refurbishment work deemed necessary for
9 the transmission line. More information on Newfoundland Power owned
10 transmission lines with distribution underbuilds would be required to
11 adequately evaluate. However, this joint use approach is quite common in other
12 jurisdictions and would be manageable.

13

14 Additional information would be required on the existing line infrastructure in
15 each of the respective regions to critically evaluate and compile a detailed plan
16 to incorporate the existing lines into the Hydro system and determine the
17 overall benefit.

³ Hydro transmission lines are primarily located in remote areas of the province and promote straight line construction from generation facilities to terminal stations to minimize up front capital costs. The remote location of these assets greatly impacts the operating budget of a utility as in the majority of the cases, access to the infrastructure is by the use of tracked heavy equipment and all-terrain vehicles. In some cases this requires considerable time to travel to the site before the start of maintenance work. As a comparison, a material portion of Newfoundland Power's transmission lines consist of single pole construction for lower voltage, which are capable of being constructed in existing highway easements, or within municipalities. This results in readily available access to transmission line structures for the completion of maintenance and troubleshooting work. In the majority of these cases, the Newfoundland Power infrastructure is accessible through the use of wheeled bucket trucks positioned along the existing highways and within municipalities. This contributes to lower operating costs for Newfoundland Power when compared to Hydro.

1 b.

2 Hydro has not completed a detailed analysis of the estimated revenue
3 requirement impacts that would result from the transfer of the Newfoundland
4 Power transmission assets to Hydro. However, Section 6 the WPLM Report
5 concludes that the WPLM Program has the potential to reduce the \$43 million
6 five-year cumulative capital forecast by Newfoundland Power in Transmission
7 Rebuilds. For example, a \$20 million capital reduction after five years would
8 reduce future revenue requirement by approximately \$2 million in year six.⁴

9
10 In addition, the transfer of Newfoundland Power's existing transmission assets
11 would reduce the return on rate base required from customers due to Hydro
12 having a lower weighted average cost of capital than Newfoundland Power as a
13 result of the impact of income taxes and a higher equity component in
14 Newfoundland Power's capital structure. For illustrative purposes, assuming
15 that both Newfoundland Power and Hydro added \$100 million of transmission
16 assets to their respective rate base, the return component of revenue
17 requirement would be approximately 2.3%⁵ lower for Hydro or approximately
18 \$2.3 million in the first year.

⁴ Estimated savings assumes an incremental Newfoundland Power Weighted Average Cost of Capital of 8.21% (before tax) and a 55 year useful life in calculating depreciation.

⁵ Estimate assumes that both companies are currently at their target capital structure and the incremental borrowing rate is 5%. Newfoundland Power's incremental weighted average cost of capital is estimated at 8.21% (55% debt x 5%)+(45% equity * 8.5% return on equity)/(1 - 30% tax rate) vs. NLH at 5.88% (75% debt x 5%)+(25% equity * 8.5% return on equity).