Q. (Reference Application, 4.1 Lookout Brook Hydro Plant Refurbishment)

a) What is the payback period for this project?

b) What is the probability of the plant becoming stranded?

c) Please provide evidence that this project is needed to supply customers in an environmentally responsible manner.

d) On page 15 it is stated "*Deferring the proposed refurbishment to a future year would increase the risk of failure of a major Plant component*." Has there been a continuing risk of failure for the past 10 years? How much greater is the risk now?

e) What are the results of the economic analysis if the plant is assumed to become obsolete in 2035?

A. a) When preparing financial analyses for capital investments, Newfoundland Power follows the Provisional Guidelines. The Provisional Guidelines specify lifecycle cost evaluations with calculations completed on a net present value basis for projects with investment classifications of Renewal.[1] Newfoundland Power does not compute payback periods to evaluate projects for inclusion in its capital budget applications.

The textbook *Principles of Engineering Economy* discusses capital budgeting and the weaknesses of using payback periods, or payout periods, for investment decisions. The textbook states:

> *Except for the special case where funds are so limited that no outlay can be made unless the money can be recovered in an extremely short time, the payout period is never an appropriate way to compare a group of proposed investments. The objection is that the payout period fails to give weight to the difference in consequences of different investment proposals after the date of the payout.*[2]

The lifecycle cost analysis of the Lookout Brook hydroelectric generating plant (the "Plant") completed as part of the *2024 Capital Budget Application* shows that the benefits of the Plant's production exceed the cost of production. The analysis shows a net benefit of Plant production between 2.11 ¢/kWh and 2.97 ¢/kWh.[3] Considering the normal production of the Plant is 31.51 GWh, this equates to annual benefits of between approximately $665,000 and $936,000.[4]

b) Newfoundland Power considers the risk of stranding of the Plant to be very low. This is demonstrated by the results of the lifecycle cost analysis and various sensitivity analyses included in the *2024 Capital Budget Application*.[5]

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1 See the Provisional Guidelines, page 16 of 18.

2 See *Principles of Engineering Economy, Seventh Edition*, John Wiley & Sons, 1987, pages 562 and 563.

3 See Newfoundland Power's *2024 Capital Budget Application,* report *4.1 Lookout Brook Hydro Plant Refurbishment*, Appendix A, page 5, Table A-3.

4 2.11 ¢/kWh x 31.51 GWh = $664,861. 2.97 ¢/kWh x 31.51 GWh = $935,847.

5 See Newfoundland Power's *2024 Capital Budget Application,* report *4.1 Lookout Brook Hydro Plant Refurbishment,* Appendix A, section 4.0.

The need for new sources of generation capacity on the island interconnected system was described by Newfoundland and Labrador Hydro ("Hydro") in its *Reliability and Resource Adequacy Study - 2022 Update* (the "2022 Update"). In the 2022 Update, filed with the Board on October 3, 2022, Hydro recommends extending operations of the 490 MW Holyrood Thermal Generating Station ("Holyrood") and the 50 MW Hardwoods Gas Turbine ("Hardwoods"), potentially through 2030, because of limited options available to backup the Labrador Island Link due to reliability concerns.[6] Hydro also stated that the island interconnected system will be significantly capacity constrained once the Holyrood TGS and Hardwoods are retired.[7]

c) The Plant has been a source of non-emitting renewable electricity generation on the island interconnected system since 1946. Generation from the Plant, and Newfoundland Power's other hydro plants, offsets generation from non-renewable sources of generation, such as Holyrood and Hardwoods, that emit carbon dioxide emissions from the combustion of fossil fuels. Continued operation of the Plant and Newfoundland Power's other hydro plants is consistent with the purpose of the Government of Canada's proposed Clean Electricity Regulations.[8]

See part d) of the response to Request for Information CA-NP-014 for additional information pertaining to recent legislative changes that require power to be delivered to customers in an environmentally responsible manner, consistent with least cost reliable service.

d) See the response to Request for Information CA-NP-045.

Newfoundland Power does not quantify risk increases year over year. It is generally observed that risk of failure is correlated to equipment age and condition, along with other factors typically noted in a condition assessment. It has been observed that the age and condition of the equipment, as described in report *4.1 Lookout Brook Hydro Plant Refurbishment* indicates, presents an increased risk of major equipment failure. As noted in the same report, the condition of the asset has degraded relative to the 2010 assessment and presents an increased risk of failure in comparison to the refurbishment completed at that time.

6 See Hydro's 2022 Update, Volume III: Long-Term Resource Plan, page 53, lines 14-17.
7 Ibid, page 51, lines 25-27.
8 See Government of Canada, *Clean Electricity Regulations*, page 1, section 1.

e) Table 1 provides the economic evaluation results for the scenario requested where the Plant's production ceases after 2035.

Table 1
Lifecycle Analysis Results

	11 Year Levelized Value	Net Benefit
Lifecycle Cost of the Plant	**2.37 ¢/kWh**	
Cost of Replacement Production (Run-of-River)		
Energy Costs	2.86 ¢/kWh	
Capacity Costs	2.92 ¢/kWh	
Total	**5.78 ¢/kWh**	**3.41 ¢/kWh**
Cost of Replacement Production (Fully Dispatchable)		
Energy Cost	2.86 ¢/kWh	
Capacity Cost	3.63 ¢/kWh	
Total	**6.49 ¢/kWh**	**4.12 ¢/kWh**

Table 1 shows that the benefits of the Plant's production under the scenario where production ceases after 2035 will exceed its cost of production by between 3.41¢/kWh and 4.12 ¢/kWh. The large differences between costs and benefits suggest any reasonable variance in the estimates of the costs and benefits will support the continued operation of the Plant.