Q. Page B-3 states "*The project will benefit the Company and its customers by providing least cost, reliable energy for years to come.*"

Please provide the analysis completed to demonstrate that the Pierre's Brook refurbishment is consistent with the least cost provision of service to its customers over the life of the project.

A. **1. Introduction**

Pierre's Brook Plant

Newfoundland Power Pierre's Brook hydroelectric generating plant (the "Pierre's Brook Plant") located on the Avalon Peninsula provides 3.4 MW of capacity and 24.4 GWh of annual energy production.[1] Independent engineering assessment indicates that significant investment in the plant is required.

The Company proposes to undertake a comprehensive refurbishment of the Pierre's Brook Plant with engineering and procurement to commence in 2015. The refurbishment is estimated to cost $14,280,000. This is approximately 3.5 times the current annual avoided cost of fuel at Hydro's Holyrood Thermal Generating Station (the "Holyrood Plant").[2]

Refurbishment and continued operation of the Pierre's Brook Plant will cost 4.87¢/kWh over a 50-year period. This is consistent with the future least cost provision of electrical service to the customers of Newfoundland Power.

In addition, following refurbishment, the Pierre's Brook Plant will continue to provide a modest, but meaningful, contribution to capacity support on the Island Interconnected System.

System Planning Context

Hydro accounts for over 75% of both net capacity and firm energy for the Island Interconnected System. Hydro has primary responsibility for supply planning for the Island Interconnected System.[3] In addition, Newfoundland Power is required, with certain exceptions, to purchase the electricity it provides to its customers from Hydro.[4]

---

1 At current fuel costs, annual energy production at the Pierre's Brook Plant avoids approximately $4 million in fuel costs at Hydro's Holyrood Plant (16.76¢ x 24.4 million kWh = $4,089,440).

2 $14,280,000 / $4,089,440 = 3.49.

3 See, for example, Hydro's *Generation Planning Issues, November 2012*, filed in response to Request for Information PUB-NLH-1 in Hydro's 2013 Capital Budget Application, pages 7-8.

4 See *An Act to Amend the Electrical Power Control Act, 1994, The Energy Corporation Act and the Hydro Corporation Act, 2007*, SNL 2012, Ch. 47, Section 3. Section 3 of this legislation specifically permits Newfoundland Power to own and operate those generating facilities which existed on December 31, 2011. Pierre's Brook Plant is included in this exception as it existed on December 31, 2011.

The Pierre's Brook Plant is part of the overall system capability of the Island Interconnected System and is reflected in Hydro's supply planning.[5] Any analysis of whether the proposed Pierre's Brook Plant refurbishment is consistent with the least cost provision of service to Newfoundland Power's customers necessarily requires consideration of supply costs of, and alternatives available to, Hydro for future supply on the Island Interconnected System.

2. Assessment of Least Cost Supply

The Muskrat Falls Project

Hydro's long-term generation plan is focused upon the 824 MW Muskrat Falls Hydroelectric generating plant and associated transmission connection with the Island Interconnected System (the "Muskrat Falls Project").

In Hydro's currently outstanding General Rate Application, the cost of service implications associated with these facilities are indicated to be uncertain.[6] Recently, the Power Purchase Agreement between Hydro and Muskrat Falls Corporation, a Nalcor affiliate (the "Muskrat PPA"), became available. However, the Muskrat PPA does not provide a significant additional degree of certainty to the forecast cost of service implications to customers associated with the Muskrat Falls Project.[7]

Hydro has provided evidence of forecast costs associated with the Muskrat Falls Project.

---

[5] See Hydro's *Generation Planning Issues, November 2012*, Table 3-1. Pierre's Brook Plant is part of Newfoundland Power's 96.9 MW of hydraulic production and 430 GWh of average energy recognized by Hydro for planning purposes on the Island Interconnected System. Section 3 of *An Act to Amend the Electrical Power Control Act, 1994, The Energy Corporation Act and the Hydro Corporation Act, 2007*, SNL 2012, Ch. 47, specifically permits the refurbishment of generating facilities existing on December 31, 2011. This permission applies to Pierre's Brook Plant.

[6] See *Cost of Service Study/Utility and Industrial Rate Design Report*, July 7, 2013, Exhibit 9, Hydro's 2013 General Rate Application. There, Hydro's cost of service experts, Lummus Consultants International, observed "Hydro's current least cost generation plan is the Labrador Interconnection. At this point, the contract terms, demand and/or energy constraints, and resultant cost of service methodology are uncertain. The appropriate marginal price signal is therefore uncertain", page 17.

[7] One aspect of this uncertainty relates directly to the cost of the facilities. For example, the Muskrat PPA is dated November 29, 2013, prior to the June 2014 public update by Nalcor of cost increases associated with the Muskrat Falls Project. The Muskrat PPA provides for specific updating of costs prior to commencement of payments by Hydro to Muskrat Falls Corporation once electricity from Muskrat Falls Project is available (see, for example, Schedule 1: Base Block Capital Costs Recovery which specifically provides for recalculation of payments to reflect changes in the amount and timing of capital and financing costs). Another aspect of this uncertainty relates to the treatment of export revenues associated with the Muskrat Falls Project. Payments under the Muskrat PPA commence once electricity supply is available to Hydro, which is not expected prior to 2017. Between now and 2017, the treatment of export revenues associated with the Muskrat Falls Project might change. For example, recent political statements indicate that future export revenues associated with the Muskrat Falls Project might be made available to reduce the costs to Hydro of electricity supply under the Muskrat PPA.

Table 1 provides marginal energy cost estimates for the Island Interconnected System for the period 2018 through 2022, following commissioning of the Muskrat Falls Project.[8]

Table 1
Island Interconnected System
Marginal Energy Cost Estimates
2018-2022
(¢/kWh)[9]

Year	Cost
2018	5.4
2019	5.9
2020	6.6
2021	6.9
2022	7.2

Hydro PPAs

In addition to the Muskrat PPA, Hydro has Power Purchase Agreements ("PPAs") which were negotiated with various arms- length third parties.[10] These PPAs provide capacity and energy which serves customers on the Island Interconnected System.

Hydro has provided evidence of the costs associated with these PPAs.[11]

[8] See the response to Request for Information CA-NLH-033 filed in Hydro's 2013 General Rate Application. These estimates were indicated to be subject to further study. Hydro specifically indicated "the marginal cost of demand and energy should reflect the commercial arrangements between Nalcor and Hydro for costs of electricity from Muskrat Falls and for the costs of the new transmission infrastructure. After those arrangements have been finalized, a marginal cost study would be required to determine Hydro's future marginal costs of demand and energy." (page 1 of 3, lines 18-22)

[9] The information provided in the response to Request for Information CA-NLH-033 is provided in MWhs. 1 MWh = 1000 kWh.

[10] These include PPAs with developers of wind power facilities (Fermeuse and St. Lawrence), hydro facilities (Rattle Brook, Star Lake and Exploits River) and thermal facilities (Corner Brook cogeneration).

[11] See Exhibit 6A: Reference to the Board, *Review of Two Generation Expansion Options for the Least-Cost Supply of Power to Island Interconnected Customers for the Period 2011-2067*. Exhibit 6A also indicated that energy costs associated with these facilities tended to increase over time.

Table 2 provides details on Hydro's 2015 energy costs associated with these PPAs.

Table 2
Island Interconnected System
2015 PPA Energy Costs
(¢/kWh)

Facility	Cost
Fermeuse Wind	7.65
St. Lawrence Wind	7.16
Rattle Brook	8.85
Star Lake	7.94
Exploits River	7.75
Corner Brook Co-Gen	13.22

Least Cost Assessment

The proposed refurbishment of the Pierre's Brook Plant is expected to provide energy over the next 50 years at a levelized cost of 4.87¢/kWh.

This cost is less than the most current available estimate of marginal energy cost for the Island Interconnected System following the Muskrat Falls Project. This cost is also less than that currently paid by Hydro under arms-length negotiated PPAs. This is, in Newfoundland Power's view, clear indication that the refurbishment of the Pierre's Brook Plant as proposed in the Company's 2015 Capital Budget Application is consistent with the least cost provision of service to its customers.

In Order No. P.U. 35 (2003), the Board indicated that a discussion between Newfoundland Power and Hydro to ascertain and document that needless expenditure does not occur with generating facilities was appropriate. Such discussions routinely occur at the Hydro-Newfoundland Power Inter-Utility System Planning and Reliability Committee (the "Planning Committee").

At the May 20, 2014 meeting of the Planning Committee, the proposed refurbishment of Pierre's Brook Plant was discussed. The minutes of this meeting indicate:

> "5. System Planning
> b. Generation Projects
>
> [Newfoundland Power] advised that for 2015 the Pierre's Brook penstock replacement, the Tors Cove unit G2 and Seal Cove G1 modernization and refurbishment are the major projects proposed for 2015. The levelized cost of

energy production associated with these projects is 4.9 cents per kWh, 2.8 cents per kWh and 1.9 cents per kWh respectively.

These costs of energy production figures compare favourably both Holyrood avoided fuel cost and the expected range on the future cost of supply."

The proposed refurbishment of the Pierre's Brook Plant is consistent with the least cost provision of service to the customers of Newfoundland Power.

3. Other Considerations

Pierre's Brook Plant is located on the Avalon Peninsula, approximately 30 km south of the City of St. John's.[12]

In January 2013 and January 2014, the Island Interconnected System experienced major disruptions which resulted in extended outages for customers of Newfoundland Power, particularly those residents on the Avalon Peninsula.[13]

Following commissioning of the Muskrat Falls Project, it is Hydro's intention to decommission its 465 MW Holyrood Plant (the "Holyrood Plant"). The reliability implications, particularly for Newfoundland Power's customers on the Avalon Peninsula, of the decommissioning of the Holyrood Plant are not fully apparent to Newfoundland Power.[14]

It is not yet clear whether *additional* generation facilities, other than those currently planned, will be required to ensure reliability to Newfoundland Power's customers on the Avalon Peninsula. However, decommissioning of additional existing generation on the Avalon Peninsula does not, in Newfoundland Power's view, currently appear justified. This is particularly true when that existing generation can be refurbished at a cost lower than the expected range of future energy supply.

[12] See *1.2: Pierre's Brook Hydro Plant, Newfoundland Power's 2015 Capital Budget Application*, page 1.

[13] These disruptions are the subject of continuing Board investigation. See, generally, *In the Matter of an Investigation and Hearing into Supply Issues and Power Outages on the Island Interconnected System*, and the materials filed therein.

[14] This is a consideration in the Board's continuing investigation. Prior to the events of January 2013 and 2014, Hydro had indicated that rotating outages might be the appropriate response to reliability risks following the commissioning of the Muskrat Falls Project. See, for example, Hydro's *Technical Note, Labrador-Island HVdc Link and Island Interconnected System Reliability, October 30, 2011* filed as Exhibit 106 in the Reference to the Board, *Review of Two Generation Expansion Options for the Least-Cost Supply of Power to Island Interconnected Customers for the Period 2011-2067*. This technical note concluded "While the impact of these outage events could be further mitigated with the application of additional combustion turbines on the Island Interconnected System, given the low probability of the event and minimal impact of unsupplied energy, Nalcor, in the interest of minimizing overall cost to the customer, has opted to apply load rotation and other means to minimize the impact to customers should an event occur."