

1 **Q. (Reference NLH-NP-020 and NLH-NP-021) Newfoundland Power indicates that the**  
 2 **marginal costs of energy and capacity used in its Sandy Brook Plant Economic**  
 3 **Evaluation are based on Hydro's estimates for 2022 to 2029, but for 2030 to 2071 are**  
 4 **escalated according to forecasts of the GDP deflator.**

5 **a) Did Newfoundland Power consider the possible effects of capacity additions**  
 6 **by Hydro after 2029; i.e., addition of another unit at Bay d'Espoir or gas**  
 7 **turbines? Did Newfoundland Power consult Hydro in this regard?**

8 **b) Did Newfoundland Power consider the impact on marginal energy and**  
 9 **capacity costs in 2041 and beyond, following the expiry of the Churchill Falls**  
 10 **contract? What does Newfoundland Power expect that impact to be, and did**  
 11 **Newfoundland Power consult Hydro in this regard? Is Newfoundland Power**  
 12 **aware of changes in marginal energy and capacity costs owing to the Churchill**  
 13 **Falls plant?**

14 **c) Did Newfoundland Power consider whether after 2029 new**  
 15 **approaches/technology (i.e., time-of-use rates, distributed energy resources**  
 16 **and energy efficiency) could have a substantial impact on marginal energy and**  
 17 **capacity costs, and did it consult Hydro in this regard?**

18 **d) Does Newfoundland Power agree that additions to capacity can have a**  
 19 **dramatic effect on marginal capacity costs so assuming that such costs rise**  
 20 **with inflation in the long-run may be unrealistic?**

21  
 22 **A. A. General**

23  
 24 An evaluation of life extension projects involving generation facilities requires  
 25 consideration of a number of factors that may affect marginal costs in the future. These  
 26 include the potential for capacity additions, as well as the potential impact of changes in  
 27 technology.

28  
 29 Newfoundland Power recognizes that a forecast of marginal costs, like any forecast,  
 30 involves some degree of uncertainty. As a result, the Company takes a conservative  
 31 approach when evaluating life extension projects for its generation plants. For example,  
 32 the Company has shown that the value of production from the Sandy Brook Plant is  
 33 approximately 3 to 4 times the cost of production from the plant based on a forecast of  
 34 marginal costs.<sup>1</sup> A sensitivity analysis shows that the plant continues to provide benefits  
 35 to customers based on reasonable changes in marginal cost estimates.<sup>2</sup>

36  
 37 The Company's conservative approach assures that the Sandy Brook Plant will provide  
 38 benefits to customers over the long-term. The alternative to completing life extension  
 39 projects required for the continued safe and reliable operation of Newfoundland Power's  
 40 generating facilities is to retire them and remove them from service. This would

<sup>1</sup> See response to Request for Information NLH-NP-018.

<sup>2</sup> For example, a reduction in marginal costs of 25% provides customer benefits of 4.47 ¢/kWh for run of river production and 6.85 ¢/kWh for fully dispatchable production. Similarly, a reduction in marginal costs of 50% provides customer benefits of 1.91 ¢/kWh for run of river production and 3.50 ¢/kWh for fully dispatchable production. See response to Request for Information NLH-NP-019.

1 effectively reduce low-cost generation capacity and energy production on the Island  
2 Interconnected System.

3  
4 Newfoundland Power consults Hydro with regards to capital expenditures related to the  
5 continued operation of the Company's hydro plants over the long term. Hydro has not  
6 objected to the continued operation of these facilities in recent years.<sup>3</sup> Newfoundland  
7 Power is also party to the Board's *Reliability and Resource Adequacy Study Review*,  
8 which considers long-term system planning. This ensures the Company is informed of  
9 ongoing matters associated with future supply requirements on the Island Interconnected  
10 System.

## 11 **B. Response**

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13  
14 a) The continued operation of hydro plants on the Island Interconnected System,  
15 including Newfoundland Power's Sandy Brook Plant, is a consideration for future  
16 capacity additions on the Island Interconnected System. A reduction in capacity  
17 available from existing hydro plants may advance the need for additional, more  
18 expensive generation capacity on the Island Interconnected System. This includes  
19 the potential addition of a new turbine at Bay d'Espoir.<sup>4</sup> It also includes the  
20 potential addition of gas turbines.<sup>5</sup>

21  
22 Avoiding or deferring large capacity additions by continuing to operate existing,  
23 low-cost generating facilities on the Island Interconnected System effectively  
24 avoids or defers incremental costs associated with those capacity additions being  
25 incurred by customers. No longer utilizing cost-effective sources of generation,  
26 such as the Sandy Brook Plant, can advance these expenditures and increase costs  
27 to customers.

28  
29 b) The expiration of the current Churchill Falls contract in 2041 is approximately 20  
30 years away. The outcome of future Churchill Falls contract negotiations and the  
31 impact on marginal costs on the Island Interconnected System will not be known  
32 for some time.

33  
34 It is currently uncertain whether electricity from Churchill Falls will be available  
35 on the Island Interconnected System following 2041. If electricity from Churchill

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<sup>3</sup> For example, Newfoundland Power's *2020 Capital Budget Application* included capital expenditures involving the long-term operation of the Rattling Brook, Petty Harbour, and Topsail hydro plants. These projects were approved by the Board in Order No. P.U. 5 (2020).

<sup>4</sup> Hydro indicates on page 45 of its *Reliability and Resource Adequacy Study – 2019 Update, Volume III Long Term Resource Plan*, November 15, 2019, that Bay d'Espoir Unit 8, with a capacity of 154 MW, is being selected by its model as the least-cost option for future generation capacity. The estimated capital cost of Bay d'Espoir Unit 8, as stated in Hydro's *Reliability and Resource Adequacy Study, Volume III: Long-Term Resource Plan*, November 16, 2018, page 43, is \$373 million.

<sup>5</sup> For example, Hydro estimates on page 17 of its *Reliability and Resource Adequacy Study – 2019 Update, Volume III: Long-Term Resource Plan* that the capital cost of one 58.5 MW simple cycle combustion turbine is approximately \$169 million.

1 Falls was eventually made available to the Island Interconnected System,  
 2 additional transmission infrastructure would be required. Recent experience has  
 3 shown that the cost of such transmission infrastructure could be expensive.<sup>6</sup> Such  
 4 expenditures may not be economic or practical.<sup>7</sup>  
 5

6 Hydro's marginal capacity costs on the Island Interconnected System reflect the  
 7 cost of capacity additions on the island.<sup>8</sup> The Churchill Falls hydroelectric  
 8 generating facility is located in Labrador.<sup>9</sup> As a result, the appropriateness of  
 9 using Churchill Falls capacity as a reliable source of supply for the Island  
 10 Interconnected System in the future is questionable.  
 11

12 A decision to avoid expenditures necessary for the continued safe and reliable  
 13 operation of existing hydro plants would effectively result in a reduction in  
 14 capacity and low-cost energy production on the Island Interconnected System.  
 15 This approach may result in the advancement of additional, more expensive  
 16 generation capacity or other alternatives on the Island Interconnected System  
 17 prior to 2041. Such a decision, on the basis that a renegotiated Churchill Falls  
 18 contract in 2041 *may* decrease marginal costs in 20 years, is likely to increase  
 19 costs to customers prior to 2041 and possibly beyond 2041. This would be  
 20 inconsistent with Newfoundland Power's obligation to provide reliable service to  
 21 customers at least cost in accordance with the *Electrical Power Control Act*,  
 22 *1994*.<sup>10</sup>  
 23

- 24 c) Newfoundland Power's conservative approach to evaluating life extension  
 25 projects for its generation plants recognizes that marginal costs in the future may  
 26 be higher or lower than forecast. This includes changes in marginal costs which  
 27 could vary beyond 2029 for a number of reasons, including changes in  
 28 technology.  
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30 Currently, the costs associated with new approaches/technology appear far less  
 31 economic than Newfoundland Power's Sandy Brook Plant. For example, the  
 32 capital cost of a similarly sized solar/battery generation facility is estimated at

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<sup>6</sup> For example, the Muskrat Falls Project required transmission line infrastructure to be constructed between Churchill Falls and Muskrat Falls and from Muskrat Falls to the Soldiers Pond on the Avalon Peninsula. The total capital cost for this transmission infrastructure was approximately \$4.6 billion.

<sup>7</sup> See *Commission of Inquiry Respecting the Muskrat Falls Project, Muskrat Falls: A misguided Project, Volume 4*, page 11, which states: "The transmission facilities required to wheel the enormous amount of electricity produced at Churchill Falls on a route through Newfoundland will be expensive and building them will carry the risk of cost overruns. The subsea portion of the route will be subject to significantly higher transmission losses than the overland transmission facilities in Quebec."

<sup>8</sup> This is based on the findings of Hydro's *Reliability and Resource Adequacy Study* which determined that if capacity additions are required to meet load growth, the capacity additions should be located on the island.

<sup>9</sup> The Churchill Falls hydroelectric generating facility is located approximately 1,350 km from Newfoundland Power's load centre on the Avalon Peninsula.

<sup>10</sup> See Section 3(b) of the *Electrical Power Control Act, 1994*.

1 approximately \$43 million.<sup>11</sup> This compares to capital expenditures of  
2 approximately \$6 million associated with the *Sandy Brook Hydro Plant Penstock*  
3 *Replacement* project. Other alternatives, including time-of-use pricing and direct  
4 load control, are not currently considered to be economic.<sup>12</sup>  
5

6 Whether new approaches/technology eventually contribute to a reduction in  
7 marginal costs in the future is uncertain. Newfoundland Power's conservative  
8 approach to considering life extension projects related to its hydro plants accounts  
9 for this uncertainty.

- 10  
11 d) Capacity additions in excess of capacity constraints can lead to low marginal  
12 capacity costs for the period in which excess capacity exists. The extent to which  
13 marginal capacity costs are reduced will depend on the extent of the excess  
14 capacity and the cost of the next least-cost source of capacity.  
15

16 Over time, depending on load growth or the need to install new capacity to  
17 replace capacity sources that have reached end of life, the marginal cost will again  
18 reflect the full cost of the next least-cost source of capacity.  
19

20 The cycle between excess capacity and the need for new capacity will continue  
21 into the future. As such, marginal costs can be expected to increase and decrease  
22 based on the cycle between excess capacity and the need for new capacity. In the  
23 long term, if the assumption is made that the cost of the next least-cost capacity  
24 addition will increase with inflation, then the marginal cost of capacity, depending  
25 on the extent to which there is excess capacity, will also tend to increase with  
26 inflation.

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<sup>11</sup> Newfoundland Power's estimate of a 6 MW solar/battery facility capable of supplying 27.6 GWh of energy production with 4 hours of battery storage is based on: (i) cost estimates included in the National Renewable Energy Laboratory ("NREL") report *U.S. Solar Photovoltaic System and Energy Storage Cost Benchmark: Q1 2020*, January 2021; and (ii) capacity factors based on information available from the Canadian Energy Regulator accessible at: <https://www.cer-rec.gc.ca/en/data-analysis/energy-commodities/electricity/report/solar-power-economics/economics-solar-power-in-canada-results.html>.

<sup>12</sup> See the *Dunsky Conservation Potential Study Final Report Volume 1 – Results*, pages 68 – 71, filed as Volume 2, Schedule C of Newfoundland Power's *2021 Electrification, Conservation and Demand Management Application*.