

1 **Q. Please describe the impact, if any, that the completion of the Muskrat Falls Project**  
 2 **is anticipated to have on the future role of Newfoundland Power’s hydro production**  
 3 **facilities.**

4  
 5 **A. Newfoundland Power’s Hydro Production Facilities**

6  
 7 Newfoundland Power operates 23 hydro production facilities (“hydro plants”) within its  
 8 service territory. The hydro plants have a combined maximum rated capacity of 97.5  
 9 MW and annual production of approximately 439 GWh.<sup>1</sup> These facilities provide low  
 10 cost energy to customers. They also provide a modest but meaningful contribution to  
 11 capacity support on the Island Interconnected System.

12  
 13 The operation of the Company’s hydro plants is coordinated with Newfoundland and  
 14 Labrador Hydro (“Hydro”) to ensure the economic dispatch of generation on the Island  
 15 Interconnected System.<sup>2</sup> To meet system reserve requirements, Hydro dispatches  
 16 Newfoundland Power’s hydro plants in accordance with its *BA-P-012 (T-001) Operating*  
 17 *Reserves* procedure.<sup>3</sup> The procedure outlines 12 sequential steps to be taken to ensure  
 18 adequate capacity is available to meet system reserve requirements. Maximizing  
 19 Newfoundland Power’s hydro generation is the 2<sup>nd</sup> step of Hydro’s 12-step resource  
 20 dispatching sequence.<sup>4</sup> This reflects the role of the Company’s hydro plants as an  
 21 economic source of energy and generating capacity.

22  
 23 In addition to contributing to overall energy production and generating capacity on the  
 24 Island Interconnected System, Newfoundland Power’s hydro plants also provide  
 25 localized reliability benefits. This includes supplying customers during maintenance

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<sup>1</sup> In 2019, Newfoundland Power’s peak demand was 1,439.8 MW and its annual energy sales were 5,846.6 GWh.

<sup>2</sup> Hydro has overall responsibility for the generation dispatch function on the Island Interconnected System. On a daily basis Newfoundland Power provides Hydro with a list of the Company’s generating units that are available, along with the maximum available generating capacity.

<sup>3</sup> The *BA-P-012 (T-001) Operating Reserves* procedure outlines the requirements to assess and maintain sufficient operating reserve to meet current and anticipated customer needs under normal operating conditions and for specific contingency situations that result in reductions in resources. The procedure was most recently filed as PUB-NLH-002, Attachment 1 as a part of Hydro’s *Reliability and Resource Adequacy Study* review.

<sup>4</sup> Hydro’s resource dispatch sequence consists of the following steps: (1) Place in service all of Hydro’s available hydroelectric generation; (2) Request Newfoundland Power to maximize their hydroelectric generation; (3) Make a Capacity Request of Deer Lake Power to maximize their hydroelectric generation; (4) Request Non-Utility Generators to maximize their hydroelectric and wind generation (i.e., start any offline wind turbines if available); (5) Maximize Holyrood thermal generation; (6) Make a request to cancel outage(s) to hydroelectric generating unit(s) that have a short recall; (7) Recall non-firm exports on the Maritime Link; (8) Start and load standby generators, both Hydro and Newfoundland Power units, in order of increasing average energy production cost with due consideration for unit start-up time; (9) request Corner Brook Pulp and Paper for Capacity Assistance (up to 90MW of load reduction in block sizes of 20, 40, 60, or 90 MW); (10) Request Vale for Capacity Assistance (7.6 MW – standby diesels); (11) Request Vale for Capacity Assistance (up to 6 MW load reduction); (12) Request Newfoundland Power to interrupt its Curtailable loads (typically up to 10 MW and can take up to two hours to implement).

1 work and unplanned localized transmission line outages.<sup>5</sup> It also includes supplying  
 2 customers during periods of major electrical system distress, particularly on the Avalon  
 3 Peninsula.<sup>6</sup>

#### 4 5 **B. The Bulk Electricity System**

6  
7 The completion of the Muskrat Falls Project will change the bulk electricity supply to the  
 8 Island Interconnected System. The changes will affect the sources of generation and  
 9 supply as well as the marginal cost of electricity.

10  
11 Prior to the completion of the Muskrat Falls Project, bulk electricity supply on the Island  
 12 Interconnected System is primarily characterized by large hydroelectric generation  
 13 capability located off the Avalon Peninsula, the 230 kV bulk transmission system  
 14 extending from Stephenville in the west to St. John's in the east, and the Maritime Link  
 15 transmission line connecting Newfoundland to Nova Scotia. The two largest sources of  
 16 generation on the island are the Bay d'Espoir Hydroelectric Generating Facility on the  
 17 south coast of Newfoundland and the Holyrood Thermal Generating Station  
 18 ("Holyrood") on the Avalon Peninsula.<sup>7</sup>

19  
20 Traditionally, the marginal energy cost of electricity on the Island Interconnected System  
 21 has been high, reflecting the cost of production at Holyrood. Hydro's 2019 Test Year  
 22 estimate of Holyrood production is 18.165 cents / kWh.<sup>8</sup>

#### 23 24 **C. Changes to the Bulk Electricity System**

25  
26 Following the completion of the Muskrat Falls Project, the bulk electricity system  
 27 supplying the Island Interconnected System is expected to change significantly.  
 28 Hydroelectric generation from the Muskrat Falls generating facility, together with the  
 29 1,100-kilometre Labrador Island Link transmission line ("LIL") from Muskrat Falls to  
 30 Soldiers Pond on the Avalon Peninsula, will contribute 662 MW of firm capacity to the  
 31 Island Interconnected System.<sup>9</sup>

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<sup>5</sup> For example, Newfoundland Power operates its Rose Blanche hydro plant on the southwest portion of its service territory for approximately 1 week each summer to allow Hydro to maintain its radial transmission lines TL214 and TL215 which serve the Port aux Basques area. The Rose Blanche hydro plant is also used to restore service to customers in the area when unplanned outages occur on these transmission lines.

<sup>6</sup> For example, the Company's hydro plants on the Southern Shore of the Avalon Peninsula can supply priority customers, such as hospitals, when the bulk transmission system feeding the St. John's area is unavailable. Approximately 59.5 MW, or 61%, of Newfoundland Power's 97.5 MW of hydroelectric generating capacity is located on the Avalon Peninsula.

<sup>7</sup> Hydro's Bay D'Espoir hydroelectric generating facility is located on the south coast of Newfoundland and has a capacity of 613 MW. Holyrood is located on the Avalon Peninsula and has a capacity of 490 MW.

<sup>8</sup> Hydro's 2019 Test Year fuel forecast was approved by the Board in Order No. P.U. 16 (2019).

<sup>9</sup> The Muskrat Falls hydroelectric generating facility has a capacity of 824 MW. The LIL transmission line has a capacity of 900 MW. Losses of 80 MW and firm exports to Emera of 158 MW reduce the firm capacity available at Soldiers Pond to 662 MW (900 MW – 80 MW – 158 MW = 662 MW).

1 Hydro plans to retire some of its older generating capacity in the years leading up to and  
 2 following the completion of the Muskrat Falls Project.<sup>10</sup> Hydro expects to retire  
 3 Holyrood and the Hardwoods Gas Turbine (“Hardwoods”) once the Muskrat Falls  
 4 generating station and the LIL have proven to be reliable.<sup>11</sup> Hydro also plans to retire the  
 5 Stephenville Gas Turbine (“Stephenville”) in 2023.<sup>12</sup> The retirement of Holyrood,  
 6 Hardwoods, and Stephenville will result in a decrease in firm capacity on the Island  
 7 Interconnected System of 590 MW, with the overall result being a modest net increase in  
 8 firm generating capacity of 72 MW.<sup>13</sup> Newfoundland Power is also now considering  
 9 whether it’s Greenhill and Wesleyville gas turbines should be retired.<sup>14</sup>

10  
 11 Marginal energy costs of electricity will change following the completion of the Muskrat  
 12 Falls Project. Marginal capacity costs are not expected to change.<sup>15</sup>

13  
 14 Marginal energy costs will no longer reflect the high cost of production at Holyrood.  
 15 Rather, marginal energy costs will reflect opportunity costs related to importing  
 16 electricity from, and selling electricity to, jurisdictions outside of the Newfoundland and  
 17 Labrador Interconnected System.<sup>16</sup> For example, the updated marginal energy cost of  
 18 replacing the production from Newfoundland Power’s Topsail hydro plant through  
 19 imports/exports is calculated to be 6.25 ¢/kWh.<sup>17</sup>

#### 20 21 **D. Future Role of Newfoundland Power’s Hydro Production Facilities**

22  
 23 Newfoundland Power does not anticipate that the role of its hydro plants will change  
 24 materially following the completion of the Muskrat Falls Project. The hydro plants will  
 25 continue to provide low cost energy to customers and provide a modest but meaningful  
 26 contribution to capacity support on the Island Interconnected System. Newfoundland  
 27 Power will continue to coordinate the operation of its hydro plants with Hydro following  
 28 the completion of the Muskrat Falls Project.

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<sup>10</sup> See Hydro’s *Near Time Reliability Report, May 15, 2020, Section 3.3 Asset Retirement Plans*, filed in relation to Hydro’s *Reliability and Resource Adequacy Study* review.

<sup>11</sup> Holyrood Units 1 and 2 were commissioned in 1971 and Unit 3 was commissioned in 1979. The 50 MW Hardwoods Gas Turbine was commissioned in 1976.

<sup>12</sup> The 50 MW Stephenville Gas Turbine was commissioned in 1975.

<sup>13</sup> See Hydro’s *Marginal Cost Study Update – 2018, Summary Report, November 15, 2018, Section 2.3 – System Expansion*.

<sup>14</sup> See *2021 Capital Budget Application, Volume 1, Capital Plan, Section 4.4 – Risks to Planned Expenditures*, page 41, lines 17-20. Newfoundland Power’s Greenhill gas turbine has a capacity of 20 MW and has been in service for 45 years. The Wesleyville gas turbine has an 8 MW capacity and has been in service for 51 years. Recent inspections have identified required refurbishment work on both gas turbines. Newfoundland Power is completing a system planning study to inform the long-term plan for these gas turbines.

<sup>15</sup> Marginal capacity costs for generation are not expected to change as a result of Muskrat Falls Project since marginal capacity costs for generation continue to be based on the cost of avoiding the construction of the least cost, capacity only, generation source.

<sup>16</sup> See Hydro’s *Marginal Cost Study Update – 2018, Summary Report, November 15, 2018, Section 3.1 – Marginal Generation Costs*.

<sup>17</sup> Hydro provided Newfoundland Power with an update to its marginal costs on April 9, 2020. See the response to Request for Information CA-NP-105 for additional information regarding the marginal cost of replacing the production from Newfoundland Power’s Topsail hydro plant.

**Low Cost Production**

The cost of production from Newfoundland Power's hydro plants is lower than the forecast marginal cost of production for the Island Interconnected System following the completion of the Muskrat Falls Project.<sup>18</sup> It is also lower than prices currently paid by Hydro under arms-length negotiated Power Purchase Agreements, such as those for the purchase of wind energy.

Capital expenditures required for continued operation of Newfoundland Power's hydro plants are evaluated in the context of forecast marginal costs that will apply following the completion of the Muskrat Falls Project. Only expenditures that result in production costs that are lower than forecast marginal costs of supply from the Island Interconnected System are proposed by the Company.<sup>19</sup>

**Reliability**

The completion of the Muskrat Falls Project and Hydro's planned retirement of Holyrood, Hardwoods and Stephenville will result in a modest increase in generating capacity on the Island Interconnected System. Hydro's *Reliability and Resource Adequacy Study – 2019 Update* shows that additional capacity may be required during the 2024 to 2029 period.<sup>20</sup> A reduction in the capacity provided by Newfoundland Power's hydro plants could effectively advance the timeframe for future capacity requirements.

The retirement of Holyrood, and Hardwoods and the completion of the Muskrat Falls Project will effectively shift the production capacity of Holyrood and Hardwoods from Newfoundland Power's load centre on the Avalon Peninsula to Muskrat Falls in Labrador. As a result, transmission line outages that affect supply to the Avalon Peninsula will not be mitigated to the extent they would be with Holyrood and

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<sup>18</sup> Based on Newfoundland and Labrador Hydro's 2020 marginal cost update, the energy-related value of the production from the Company's hydro facilities is estimated at \$18.4 million annually, while the capacity-related value is estimated at \$18.3 million annually. This totals \$36.7 million annually. See the *2021 Capital Budget Application, Volume 1, Schedule B*, page 3. This compares to the cost of production of approximately \$20.3 million annually. See response to Request for Information CA-NP-019.

<sup>19</sup> For example, see the response to Request for Information CA-NP-105 for information regarding the economics of the continued operation of the Topsail Hydro Plant, using the latest marginal cost information.

<sup>20</sup> See Hydro's *Reliability and Resource Adequacy Study – 2019 Update, November 15, 2019, Section 8.0 Results and Recommendations*.

1 Hardwoods still available.<sup>21</sup> With the completion of the Muskrat Falls Project,  
2 Newfoundland Power's hydro plants on the Avalon Peninsula will continue to provide  
3 support to customers on the Avalon Peninsula in the event of significant transmission line  
4 outages. The hydro plants will also continue to supply customers during maintenance  
5 work, and when unplanned localized transmission line outages occur.  
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### 7 ***Coordination with Hydro***

8  
9 Following the completion of the Muskrat Falls Project, Hydro's *BA-P-012 (T-001)*  
10 *Operating Reserves* procedure is expected to change. This is to account for the  
11 introduction of supply from Muskrat Falls through the LIL and the retirement of  
12 Holyrood, Hardwoods, and Stephenville. Newfoundland Power expects that the  
13 coordination of the economic dispatch of its hydro plants with Hydro will continue in  
14 order to ensure generation resources are dispatched in a manner that results in least-cost  
15 delivery of service to customers on the Island Interconnected System.

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<sup>21</sup> Newfoundland Power customers on the Avalon Peninsula have experienced outages in the past due to transmission line outages and constraints. For example, during the period January 2-8, 2014, Newfoundland Power customers experienced extensive outages due to a generation shortfall and a series of major system disruptions involving Hydro's 230 kV transmission system on the Avalon Peninsula. On March 4, 2015 approximately 83,000 Newfoundland Power customers on the Avalon Peninsula experienced an outage due to insufficient available generation and low voltage conditions on Hydro's 230 kV transmission system. In December 1994, a severe winter storm caused widespread damage to the 230 kV transmission lines supplying the Avalon Peninsula. This resulted in widespread customer outages that lasted several days. During these periods, Newfoundland Power's hydro generation assisted in serving customers on the Avalon Peninsula.