Q. In response to PUB-NP-010 in the 2021 Capital Budget Application, Newfoundland Power stated:

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

Please confirm if Newfoundland Power's position remains that the role of its hydro plants will not change following completion of the Muskrat Falls project and provide any update required.

A. **A. Newfoundland Power's Hydro Production Facilities**

Newfoundland Power operates 23 hydro production facilities ("hydro plants") within its service territory. The hydro plants have a combined maximum rated capacity of 97.5 MW and annual production of approximately 439 GWh.[1] These facilities provide low cost energy to customers. They also provide a modest but meaningful contribution to capacity support on the Island interconnected System.

In addition to contributing to overall energy production and generating capacity on the Island Interconnected System, Newfoundland Power's hydro plants also provide localized reliability benefits.[2] This includes supplying customers during maintenance work and unplanned localized transmission line outages. It also includes supplying customers during periods of major electrical system distress, particularly on the Avalon Peninsula.[3]

Newfoundland Power coordinates the operation of its hydro plants with Newfoundland and Labrador Hydro ("Hydro"). This is done to meet system reserve requirements and to ensure generation assets serving customers on the island are dispatched in a manner that is least cost for customers.[4]

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1 In 2020, Newfoundland Power's peak demand was 1,299.8 MW and its annual energy sales were 5,729.0 GWh.

2 For example, Newfoundland Power operates its Rose Blanche hydro plant for approximately 1 week each summer to allow Hydro to conduct maintenance on its radial transmission lines that 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. For example, a trip on transmission line TL214 on December 19, 2020 resulted in outage to approximately 5,300 customers. Operation of the Rose Blanche hydro plant in response to this outage avoided approximately 122,000 customer outage minutes.

3 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.

4 Hydro's *BA-P-012 (T-001) Operating Reserves* procedure outlines 12 sequential steps to be taken to ensure adequate capacity is available to meet system reserve requirements. Maximizing Newfoundland Power's hydro plants is the 2nd step of Hydro's 12-step resource dispatching sequence.

B. Low Cost Production

Newfoundland Power's hydroelectric production reduces the need for additional, more expensive generation to supply customers. The value of this production consists primarily of: (i) reduced marginal energy costs; and (ii) avoidance of the need to add generation capacity.[5] Based on Hydro's 2020 marginal cost update, the value of production from the Company's hydro plants is estimated at $37.1 million annually.[6]

The Company routinely assesses the economic viability of each hydro plant when additional expenditures are required to ensure the hydro plant's continued safe and reliable operation. The analyses used to assess the economic viability are based on a comparison of the cost of production from the hydro plant to the marginal cost of electricity on the Island Interconnected System over the expected life of the hydro plant.[7]

When the cost of production from a hydro plant is less than the marginal cost of electricity, production from the hydro plant is economically justified. The continued operation of the hydro plant will be less costly for customers than removing it from service. When capital expenditures are necessary and economically justified for the continued operation of a hydro plant, Newfoundland Power will propose those expenditures in an application to the Board.[8]

When the cost of production from a hydro plant is more costly than the marginal cost of electricity, Newfoundland Power will complete a plant decommissioning study. This is to determine if decommissioning the plant is less costly than its continued operation. If decommissioning the plant was determined to be the least cost alternative, Newfoundland Power would file an abandonment of plant application with the Board in accordance with the *Public Utilities Act.*[9]

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5 The Island Interconnected System's need for new capacity additions is being reviewed by the Board as part of Hydro's *Reliability and Resource Adequacy Study Review*.

6 This includes approximately $18.6 million related to marginal energy costs and $18.5 million related to marginal capacity costs. These estimates are calculated to reflect post Muskrat Falls marginal costs using the 2022 marginal cost values for energy and capacity.

7 The marginal cost of electricity is reflective of: (i) the forecast value of energy that can be exported to external electricity markets for purposes of rate mitigation; (ii) and the cost of additional capacity on the Island Interconnected System. Marginal costs used in the economic analysis of Newfoundland Power's hydro production facilities are based on Hydro's April 9, 2020 forecast of marginal costs.

8 In Newfoundland Power's *2022 Capital Budget Application* the Company is proposing a multi-year project to replace the Sandy Brook Plant penstock which accounts for approximately 27.6 GWh of energy production each year. The economic analysis provided in support of the project demonstrates economic benefits to customers of between 7.04 ¢/kWh and 10.21 ¢/kWh with the continued operation of the Sandy Brook Plant.

9 Newfoundland Power is currently studying the possible decommissioning of one of its hydro plants. See response to Request for Information PUB-NP-001 for an update on Newfoundland Power's evaluation of the decommissioning of one of its hydro plants.

C. Muskrat Falls Integration

Following the completion of the Muskrat Falls Project, the bulk electricity system supplying the Island Interconnected System is expected to change significantly. Hydroelectric generation from the Muskrat Falls generating facility, together with the 1,100 km Labrador Island Link ("LIL") from Muskrat Falls to Soldiers Pond on the Avalon Peninsula, will contribute 662 MW of firm capacity to the Island Interconnected System.[10]

Hydro's current near-term planning assumes that the Holyrood Thermal Generating Station ("Holyrood"), Hardwoods Gas Turbine ("Hardwoods"), and Stephenville Gas Turbine ("Stephenville") will be retired by March 31, 2023, reflective of the anticipated full power from Muskrat Falls Project assets in 2021.[11] The retirement of Holyrood, Hardwoods, and Stephenville will result in a decrease in firm capacity on the Island Interconnected System of 590 MW, with the overall result being a modest net increase in firm generating capacity of 72 MW. Newfoundland Power is also considering the future requirements of its Greenhill and Wesleyville gas turbines.[12]

D. 2021 Reliability and Resource Adequacy Update

The adequacy of bulk electricity supply on the Island Interconnected System is currently subject to the Board's review of Hydro's *Reliability and Resource Adequacy Study* ("*RRAS*").[13] Hydro's next *RRAS* update regarding long-term resource planning is anticipated to be filed with the Board in the summer of 2022. It is expected to address recent developments and potential load growth in Labrador that suggest additional generation may be required on the Island Interconnected System to ensure adequate supply is available to customers.[14]

In the first half of 2021, there were a number of developments regarding supply reliability risk to Newfoundland Power's customers upon completion of the Muskrat Falls Project. In early 2021, the LIL experienced ice-related damage as well as equipment

[10] The Muskrat Falls hydroelectric generating facility has a capacity of 824 MW. The 350 kV 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).

[11] See Hydro's *Reliability and Resource Adequacy Study 2021 Update – Volume II: Near-Term Reliability Report – May Report*, May 17, 2021, page 14, line 25 to page 15, line 1.

[12] 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. Both gas turbines are at the end of their service lives.

[13] Hydro filed its *RRAS* with the Board on November 16, 2018. The *RRAS* is comprised of 3 volumes: (i) Volume 1 outlines Hydro's study methodology and proposed planning criteria; (ii) Volume II provides an in-depth view of near-term resource reliability; and (iii) Volume III provides the long-term resource planning considerations and resource options available to meet Hydro's proposed planning criteria. On November 15, 2019 Hydro filed its *RRAS – 2019 Update* with the Board. On November 18, 2020 Hydro filed a further update to Volume II of the *RRAS*. In correspondence to the Board dated March 16, 2021, Hydro indicated that it was deferring the filing of Volume I and Volume III of its planned *RRAS* update.

[14] See Hydro's *RRAS Technical Conference #3 June 9, 2021* Presentation, page 115.

failures.[15] The results of failure investigations associated with the damage found that the ice and wind loads experienced at the time of failure were beyond the LIL design capacity and that the extreme ice loading experienced during the event may be more frequent than initially considered.[16] The investigations also found that transmission line galloping is common in the Southern Labrador and contributed to LIL equipment fatigue and failure.[17] Hydro is continuing to assess the implications of these findings and has outlined a schedule to the Board. [18]

In March 2021 Hydro filed an assessment of LIL reliability with the Board.[19] The assessment was completed by Hydro's consultant and examined the design and construction of the 1,100 km line, specifically considering climatology for the geographic zones in which the LIL must operate. It found that the LIL does not meet certain Canadian Standards Association ("CSA") requirements, nor does it follow Hydro's design standards with regards to unbalanced ice loads.[20] The assessment identified full line length as an important consideration in assessing the reliability of the LIL and concluded that the reliability return period for the LIL was less than 50 years.[21] This compares to return periods of 150 and 500 years which is recommended in the CSA standard for designing of transmission lines that are above 230 kV.[22]

In March 2021, Hydro also indicated it would be assessing least-cost options to add generation due to potential load growth in Labrador. Hydro stated that this could result in the development of incremental resources on the island that would reduce the reliance on

[15] In January, the LIL experienced damage due to ice accumulation following an ice storm in Labrador. Repairs commenced the day following identification of the damage (i.e. January 12, 2021) and continued through to February 24, 2021. In February, the LIL experienced additional equipment failure in Labrador that resulted in a section of bi-pole conductor falling to the ground.

[16] See Maskwa High Voltage Ltd report *Cold Eyes Review – Failure Investigation Report; L3501/2 Tower and Conductor Damage*, page 7 filed with the Board on May 31, 2021 in relation to the *RRAS* review.

[17] See Nalcor Energy *Failure Investigation Report – L3501/2 Tower and Conductor Damage – Icing Event January 2021 in Labrador*, page 72.

[18] See Hydro's *RRAS Technical Conference #3 June 9, 2021* Presentation, page 115.

[19] Hydro filed its *Labrador-Island Link Reliability Assessment – Summary Report* with the Board on March 12, 2021. A report by Asim Haldar, Ph.D., P.Eng. titled *Assessment of Labrador Island Transmission Link (LIL) Reliability in Consideration of Climatological Loads* was filed as Attachment 1 of Hydro's summary report.

[20] The assessment stated: *"Since the several important load combination criteria for unbalanced ice loads were not considered during LIL design, it is our assessment that the LIL has some inherent design weakness and less robust in certain sections, particularly in Labrador where the suspension tower carries five cables. This vulnerability needs to be examined further in depth and a plan for mitigation should be developed."* See *Assessment of Labrador Island Transmission Link (LIL) Reliability in Consideration of Climatological Loads, Revision 1,* Asim Haldar, Ph.D., P.Eng, page 87, lines 2519-2523.

[21] See Hydro's *Labrador-Island Link Reliability Assessment – Summary Report*, page 3, lines 11-19.

[22] See *CSA Standard CAN/CSA-C22.3 No. 60826-10, Design Criteria for Overhead Transmission Lines*, Section A.1.2.5. The standard suggests transmission lines should at least meet the requirements of a reliability level characterized by a return period of loads of 50 years. The standard suggests to use a reliability return period of 150 years for lines above 230 kV. A reliability return period of 500 years is suggested for transmission lines, mainly above 230 kV which constitute the principal or only source of supply to a particular electric load whose failure would have serious consequences to the power supply. The LIL is a 350 kV transmission line that is expected to deliver 662 MW of firm capacity to the Island Interconnected System.

the LIL during periods of high demand and reduce the impact of customer outages in the event of an unplanned, prolonged outage of the LIL.[23]

Most recently, in June 2021, Hydro acknowledged that additional generation may be the likely outcome to at least partially mitigate reliability concerns once the Muskrat Falls Project is fully integrated and Holyrood is decommissioned.[24] This was similar to the conclusion reached by the Commission of Inquiry Respecting the Muskrat Falls Project.[25]

The recent developments concerning the reliability and adequacy of supply and potential load growth in Labrador suggest that additional generation is likely required following the integration of the Muskrat Falls Project. It also supports the continued use of Newfoundland Power's hydro plants to provide low cost electricity production to customers.

E. Conclusion

Newfoundland Power views its hydro plants as necessary in the provision of reliable service to customers at least cost in accordance with the *Electrical Power Control Act, 1994.*[26]

The Company's position on the role of its hydro plants following the integration of the Muskrat Falls Project is unchanged in 2021. The hydro plants will continue to provide low cost energy to customers and provide a modest but meaningful contribution to capacity support on the Island Interconnected System. Newfoundland Power will continue to coordinate the operation of its hydro plants with Hydro following the completion of the Muskrat Falls Project.

[23] See Hydro's letter *Re: Reliability and Resource Adequacy Study Review – 2021 Update to the Reliability and Resource Adequacy Study, March 16, 2021.*

[24] See *Reliability and Resource Adequacy Study Review – Technical Conference #3 Follow-Up Items* filed with the Board on June 23, 2021.

[25] The Commission of Inquiry Respecting the Muskrat Falls Project concluded in its report *Muskrat Falls: A Misguided Project,* that *"there is a reasonable likelihood that additional costs will be incurred to ensure that there is adequate reliability for Island ratepayers and, in particular, those who live on the Avalon Peninsula."* See Volume 3 – Post Sanction Events, March 5, 2020, page 389.

[26] See Section 3(b)(iii) of the *Electrical Power Control Act, 1994*.