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December 15, 2023

The Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John's, NL A1A 5B2

Attention: Jo-Anne Galarneau
Executive Director and Board Secretary

Re: Monthly Energy Supply Report for the Island Interconnected System for November 2023

Enclosed please find Newfoundland and Labrador Hydro's Monthly Energy Supply Report for the Island Interconnected System as directed by the Board of Commissioners of Public Utilities.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

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Encl.

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Monthly Energy Supply Report for the Island Interconnected System for November 2023

December 15, 2023

A report to the Board of Commissioners of Public Utilities



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1 **1.0 Introduction**

2 On February 8, 2016, the Board of Commissioners of Public Utilities (“Board”) requested Newfoundland
3 and Labrador Hydro (“Hydro”) file a biweekly report containing, but not limited to, the following:

- 4 1) System Hydrology Report;
- 5 2) The thermal plant operated in support of hydrology;
- 6 3) Production by plant/unit; and
- 7 4) Details of any current or anticipated long-term derating.

8 In July 2016, the Board indicated that a monthly report would thereafter be sufficient. This report
9 provides data for November 2023.¹

10 **2.0 System Hydrology**

11 Reservoir inflows in November 2023 were 8% above the month’s historical average.² Table 1
12 summarizes the aggregate storage position of Hydro’s reservoirs at the end of the reporting period.

Table 1: System Hydrology Storage Levels

Date	2023 (GWh)	2022 (GWh)	20-Year Average (GWh)	Minimum Storage Limit (GWh)	Maximum Operating Level (GWh)	Maximum Operating Level (%)
30-Nov-2023	2,167	2,061	1,967	1,038	2,452	88

13 The aggregate reservoir storage level on November 30, 2023 was 2,167 GWh, which is 12% below the
14 seasonal maximum operating level and 109% above the minimum storage limit.³ Inflows across Hydro’s

¹ Effective April 2023, Hydro added Section 2.1 (Ponding), Section 2.2 (Spill Activity), and Appendix A (Ponding and Spill Transactions) within this report. “Newfoundland and Labrador Hydro – Streamlining of Quarterly Regulatory Report to Parties – Board’s Decision on Reporting,” Board of Commissioners of Public Utilities, May 11, 2023.

² Calculated in terms of energy (gigawatt hours).

³ Minimum storage limits are developed annually to provide guidance in the reliable operation of Hydro’s major reservoirs—Victoria, Meelpaeg, Long Pond, Cat Arm, and Hinds Lake. The minimum storage limit is designed to indicate the minimum level of aggregate storage required such that if there was a repeat of Hydro’s critical dry sequence, or other less severe sequence, Hydro’s load can still be met through the use of the available hydraulic storage supplemented with maximized deliveries of power from the Muskrat Falls Hydroelectric Generating Facility over the Labrador-Island Link (“LIL”). Hydro’s long-term critical dry sequence is defined as January 1959 to March 1962 (39 months). Other dry periods are also considered during this analysis to ensure that no other shorter-term historic dry sequence could result in insufficient storage.

1 system continued to be above the long-term historical average in November 2023. Inflows to the
2 reservoirs of the Bay d’Espoir system were 107% of average during the month, while inflows to the
3 Hinds Lake Reservoir were 112% of average and inflows to the Cat Arm Reservoir were 102% of average.
4 The Island reservoirs once again experienced multiple rainfall events during November 2023, including
5 an event from November 18 to 19, 2023 which brought between 30–85 mm of precipitation. Another
6 event brought approximately 20–50 mm of rain on November 23–24, 2023, and an additional weather
7 event saw a further 20–35 mm of precipitation across Hydro’s reservoirs on November 28, 2023.

8 At the beginning of November 2023, Bay d’Espoir Units 1 and 2 continued their previously ongoing
9 planned outages, with the units returning to service on November 10, 2023 and November 9, 2023,
10 respectively.⁴ The Granite Canal Unit was taken offline on a forced outage on November 8, 2023 due to
11 a failed bearing oil cooler. Repairs were made and the unit was returned to service on
12 November 13, 2023. The Hinds Lake Unit was taken offline on November 15, 2023 to complete its
13 annual outage, and returned to service on November 25, 2023. A brief planned outage occurred on Cat
14 Arm Unit 1 on November 17, 2023, with the unit returning to service the same day. Finally, the Upper
15 Salmon Hydroelectric Generating Station (“Upper Salmon”) outage continued in November 2023, with
16 the unit remaining offline for the full month.⁵

17 Figure 1 plots the 2022 and 2023 storage levels, minimum storage limits, maximum operating level
18 storage, and 20-year average aggregate storage for comparison.

⁴ Two brief outages also occurred on Bay d’Espoir Units 4 and 6 during the month (November 20, 2023 and November 24, 2023, respectively); these outages took place to complete winter readiness checks and both units were returned to service the same day.

⁵ Upper Salmon was released for service on December 12, 2023.

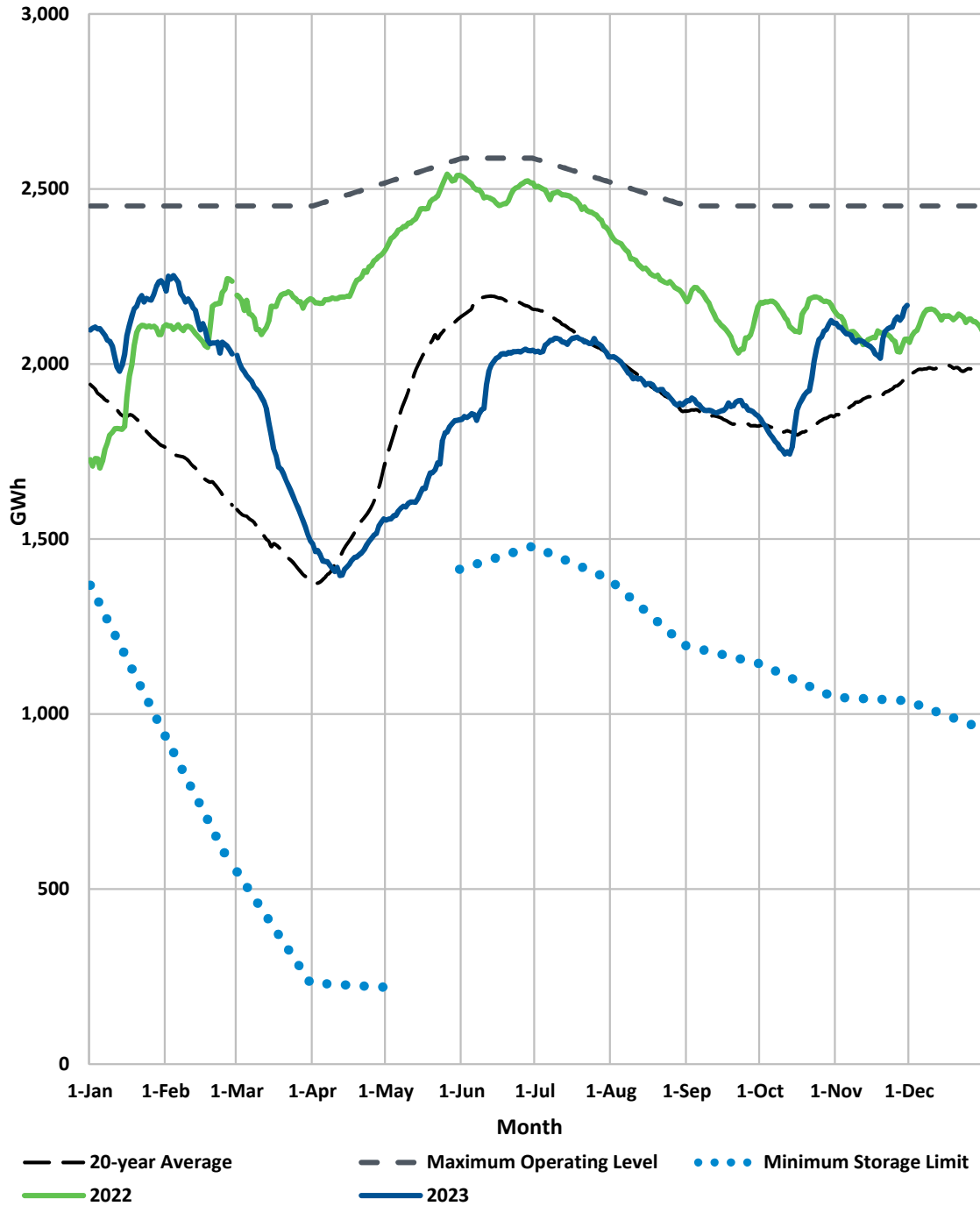


Figure 1: Total System Energy Storage⁶

⁶ Data points in Figure 1 represent storage at the beginning of each day. Table 1 reports the end-of-day storage values, which results in a small difference between the storage data presented in Table 1 and Figure 1.

2.1 Ponding

In Order No. P.U. 49(2018),⁷ the Board approved Hydro’s application for approval of a Pilot Agreement for the Optimization of Hydraulic Resources (“Pilot Agreement”).⁸ The intent of the Pilot Agreement is to optimize Hydro’s hydraulic resources through the strategic use of its storage capabilities, taking advantage of the variability of energy pricing in external markets over time.

Appendix A provides a log of imported and exported energy transactions under the Pilot Agreement during the month. No ponding imports or exports occurred in November 2023.

2.2 Spill Activity

Bypass flows at North Salmon Spillway continued throughout November 2023 to support Long Pond Reservoir storage while the unit at Upper Salmon was offline. Bypass at this location is expected to continue into December 2023 due to the Upper Salmon outage, as well as current high storage levels in Meelpaeg Reservoir. Spill was not required at any additional locations in November 2023.

A summary of the amount spilled or bypassed in both MCM⁹ and GWh for November 2023 as well as year-to-date (“YTD”) totals are provided in Table 2. Appendix A provides a log of spill avoidance export transactions during the month.¹⁰ Energy exports to mitigate spill were not required in November 2023.

Table 2: Spill Activity¹¹

	Burnt Dam Spillway		Granite Canal Bypass		Upper Salmon Bypass		Cat Arm Spillway	
	MCM	GWh	MCM	GWh	MCM	GWh	MCM	GWh
30-Nov-2023	0	0	0	0	423.1	55.2	0	0
YTD Total	122.7	80.8	19.8	1.9	3629.6	473.3	40.7	36.6

⁷ *Public Utilities Act*, RSNL 1990, c P-47, Board Order No. P.U. 49(2018), Board of Commissioners of Public Utilities, December 18, 2018.

⁸ The Third Amended and Restated Pilot Agreement for the Optimization of Hydraulic Resources was approved as per *Public Utilities Act*, RSNL 1990, c P-47, Board Order No. P.U. 35(2022), Board of Commissioners of Public Utilities, December 16, 2022, and was extended as per *Public Utilities Act*, RSNL 1990, c P-47, Board Order No. P.U. 30(2023), Board of Commissioners of Public Utilities, December 12, 2023.

⁹ Million cubic metres (“MCM”).

¹⁰ Pursuant to the Pilot Agreement, exporting when system load is low allows for sustained generation from Island hydraulic facilities and the utilization of water (energy) that would have otherwise been spilled, while not increasing the risk of spill elsewhere in the system.

¹¹ Numbers may not add due to rounding.

3.0 Production and Purchases

Appendix B provides a breakdown of power purchases, including the import and export activity over the LIL and Maritime Link, and production by plant during November 2023. Corner Brook Pulp and Paper Limited (“CBPP”) repaid 1.7 GWh of energy to Energy Marketing as per the Temporary Energy Exchange Agreement during November 2023. This energy was also exported over the Maritime Link.

4.0 Thermal Production

Two Holyrood Thermal Generating Station (“Holyrood TGS”) units were online for minimum generation requirements during November 2023 and total energy production from the Holyrood TGS was 83.9 GWh during the month. The operating hours for the Holyrood TGS and the Hardwoods, Stephenville, and Holyrood Gas Turbines are summarized in Table 3. Standby generation was not required to support reservoir storage.

Table 3: Holyrood TGS and Gas Turbines Operating Hours

	Operating Hours	Synch Condense Hours	Available Hours
Holyrood TGS			
Unit 1	622.0	0	622.0
Unit 2	0	0	0
Unit 3	720.0	378.5	720.0
Gas Turbines			
Hardwoods	10.4	693.9	704.2
Stephenville	0	0	0
Holyrood	0.3	0	720.0

5.0 Unit Deratings

At the beginning of November 2023, Holyrood TGS Unit 1 remained derated to 124 MW¹² due to burner/flame scanner issues. Flame scanner replacement was completed on November 4, 2023; however, a load test could not be completed because of a leak that had developed on the economizer inlet piping. The unit was taken offline for a planned maintenance outage from November 7 to 11, 2023 to correct the leak. After the unit was returned to service, a load test was completed to 125 MW, with

¹² A load test conducted on October 18, 2023 increased the available capacity of Holyrood Unit 1 from 122 MW to 124 MW.

1 the unit limited by a turbine controls issue. It was determined that one of six control valve stems had
2 failed and a General Electric Controls Expert would be required to increase available load with five
3 valves in service. This work was completed on November 17, 2023; however, it was discovered that the
4 sixth valve, which does not open under normal conditions with the other five valves in service, would
5 not open completely and the load was limited to 140 MW. An outage of approximately two to three
6 weeks is required to refurbish the valves and remove the derating. This outage began on
7 December 11, 2023. The unit remained derated to 140 MW for the remainder of November 2023.

8 Unit 2 at the Holyrood TGS was offline for the entire month of November 2023 on a forced extension to
9 the planned annual maintenance outage. This is a result of cracking discovered on the low pressure
10 turbine blades.

11 Unit 3 at the Holyrood TGS was operating with a forced derating to 50 MW until November 25, 2023 due
12 to the start-up failure of the east forced draft fan motor. On November 25, 2023, the refurbished motor
13 was returned to service enabling full load operation. On November 27, 2023, a load test revealed start-
14 up issues with the firing system that limited the load to 122 MW. On November 29, 2023, the firing
15 system issues were resolved and the unit was successfully tested to 150 MW.

16 The Hardwoods Gas Turbine was available for the full month of November 2023, with the exception of
17 two brief planned bus outages on November 17, 2023 and November 24, 2023 to complete corrective
18 maintenance work in the terminal station.

19 The Holyrood Gas Turbine was available at full capacity for the entire month of November 2023 with the
20 exception of a planned outage from November 1 to 5, 2023 to complete corrective and preventative
21 maintenance activities.

22 The Stephenville Gas Turbine remained unavailable during the full month of November 2023 due to
23 damage to the generator resulting from the failure of a generator cooling fan. The onsite work to
24 disassemble and repair the generator continued through November 2023. The exact return to service
25 date remains unknown, but is currently estimated to be the beginning of February 2024.

Appendix A

Ponding and Spill Transactions



Table A-1: Ponding Transactions¹

Date	Ponding Imports (MWh)	Ponding Exports (MWh)	Ponding Imports Purchased by Hydro (MWh)	Transfer of Pond Balance to Spill Avoidance (MWh)	Energy Losses to Export (MWh)	Cumulative Poned Energy (MWh)
Opening Balance						-
Total ²	-	-	-	-	-	

Table A-2: Avoided Spill Energy¹

Date	Avoided Spill Exports (MWh)	Energy Losses to Export (MWh)	Transfer of Pond Balance to Spill Avoidance (MWh)	Cumulative Avoided Spill Energy (MWh)
Opening Balance				73,427
Total ²	-	-	-	

¹ Numbers may not add due to rounding.

² As of November 30, 2023.

Appendix B

Production and Purchases



Table B-1: Generation and Purchases (GWh)¹

Table B-1 Generation and Purchases¹

	November 2023	YTD November 2023
Hydro Generation (Hydro)		
Bay d'Espoir		
Unit 1	27.2	407.3
Unit 2	28.0	414.8
Unit 3	39.3	308.9
Unit 4	30.0	238.8
Unit 5	28.9	213.2
Unit 6	27.6	209.9
Unit 7	90.0	706.0
Subtotal Bay d'Espoir	<u>271.0</u>	<u>2,498.8</u>
Upper Salmon	0.0	108.9
Granite Canal	21.1	230.4
Hinds Lake	22.2	359.3
Cat Arm		
Unit 1	36.1	337.3
Unit 2	35.8	367.6
Subtotal Cat Arm	<u>71.9</u>	<u>705.0</u>
Paradise River	3.8	29.0
Star Lake	0.0	107.3
Rattle Brook	1.5	15.3
Nalcor Exploits	46.5	573.3
Mini Hydro	0.0	0.0
Total Hydro Generation (Hydro)	<u>438.1</u>	<u>4,627.3</u>
Thermal Generation (Hydro)		
Holyrood TGS		
Unit 1	44.7	232.9
Unit 2	0.0	200.8
Unit 3	39.2	169.6
Subtotal Holyrood TGS Units	<u>83.9</u>	<u>603.4</u>
Holyrood Gas Turbine and Diesels	0.0	15.1
Hardwoods Gas Turbine	0.1	1.7
Stephenville Gas Turbine	0.0	1.5
Other Thermal	0.0	0.5
Total Thermal Generation (Hydro)	<u>84.0</u>	<u>622.1</u>
Purchases		
Requested Newfoundland Power and Vale CBPP	0.0	0.1
Capacity Assistance	0.0	0.0
Secondary	3.6	29.0
Co-Generation	8.7	40.9
Subtotal CBPP	<u>12.3</u>	<u>69.9</u>
Wind Purchases	14.4	156.0
Maritime Link Imports ²	0.0	0.2
New World Dairy	0.0	1.8
LIL Imports ³	291.5	2,491.5
Maritime Link Exports ^{4,5}	189.8	1,770.4
Net LIL Delivery to IIS ⁶	101.7	721.1
Total Purchases	<u>318.3</u>	<u>2,719.6</u>
Total⁷	<u>840.4</u>	<u>7,969.0</u>

¹ Gross generation.

² Includes energy flows as a result of purchases and inadvertent energy.

³ Includes purchases as a result of testing activity as well as deliveries that are then exported over the Maritime Link.

⁴ Totals include the provision of emergency and inadvertent energy to Nova Scotia Power Inc., provision of the Nova Scotia Block, the Supplemental Block, and export activity conducted by Energy Marketing including the export of CBPP repaid energy and spilled energy on Hydro's behalf.

⁵ Physical delivery of the Nova Scotia Block will only occur when the LIL is online and able to transfer power. CBPP energy repaid to Energy Marketing may be used to supply the Nova Scotia Block while the LIL is offline.

⁶ Net energy delivered to the Island Interconnected System is less than the total energy delivery to Hydro under the Muskrat Falls Power Purchase Agreement because of transmission losses on the LIL.

⁷ Actuals reflect rounded values to the nearest tenth of a GWh. Differences between total versus addition of individual components due to rounding.