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June 19, 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: Cheryl Blundon
Director Corporate Services and Board Secretary

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

June 19, 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, as contained in Hydro's Quarterly 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 May 2023.¹

10 **2.0 System Hydrology**

11 Reservoir inflows in May 2023 were approximately 26% below 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 (%)
31-May-2023	1,843	2,533	2,132	1220 ³	2,586	71

¹ Effective April 2023, Hydro added sections 2.1 Ponding, 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 Based on the May 2022-23 Minimum Storage Limit. 2023-24 Minimum Storage Limits are currently under development and expected to be released in the near future.

1 The aggregate reservoir storage level on May 31, 2023 was 1,843 GWh, which is 29% below the seasonal
2 maximum operating level and 51% above the minimum storage limit.^{4,5} Weather conditions continued
3 to be mostly dry across the Island in May, with very little precipitation recorded in all of Hydro's
4 reservoirs. Any remaining snow within the Bay d'Espoir System melted by mid-May. May inflows to the
5 Bay d'Espoir System were approximately 47% below average. Inflows due to spring runoff accelerated
6 throughout the month of May at Hinds Lake and Cat Arm where snow pack was reported to be 99% and
7 134%, respectively, during the snow survey conducted in early April. Inflows were approximately 23%
8 and 8% above average during the month at these two locations.

9 A planned outage on Bay d'Espoir Unit 4 took place from May 1, 2023 to May 17, 2023. There was a
10 second brief planned outage on Bay d'Espoir Unit 4 on May 22, 2023. The Bay d'Espoir Unit 3 outage
11 that began on April 2, 2023 ended on May 24, 2023. There were brief planned outages on both Bay
12 d'Espoir Units 1 and 2 on May 8, 2023. The annual planned maintenance outages for Bay d'Espoir
13 Units 5 and 6 began on May 24, 2023 and continued until the end of the month. There was also a brief
14 planned outage on the Paradise River Unit on May 25, 2023.

15 Figure 1 plots the 2022 and 2023 storage levels, 2022-23 minimum storage limits, maximum operating
16 level storage, and the 20-year average aggregate storage for comparison.

⁴ 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, maximum generation at the Holyrood Thermal Generating Station ("Holyrood TGS"), and non-firm imports. 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.

⁵ Based on the May 2022-23 Minimum Storage Limit.

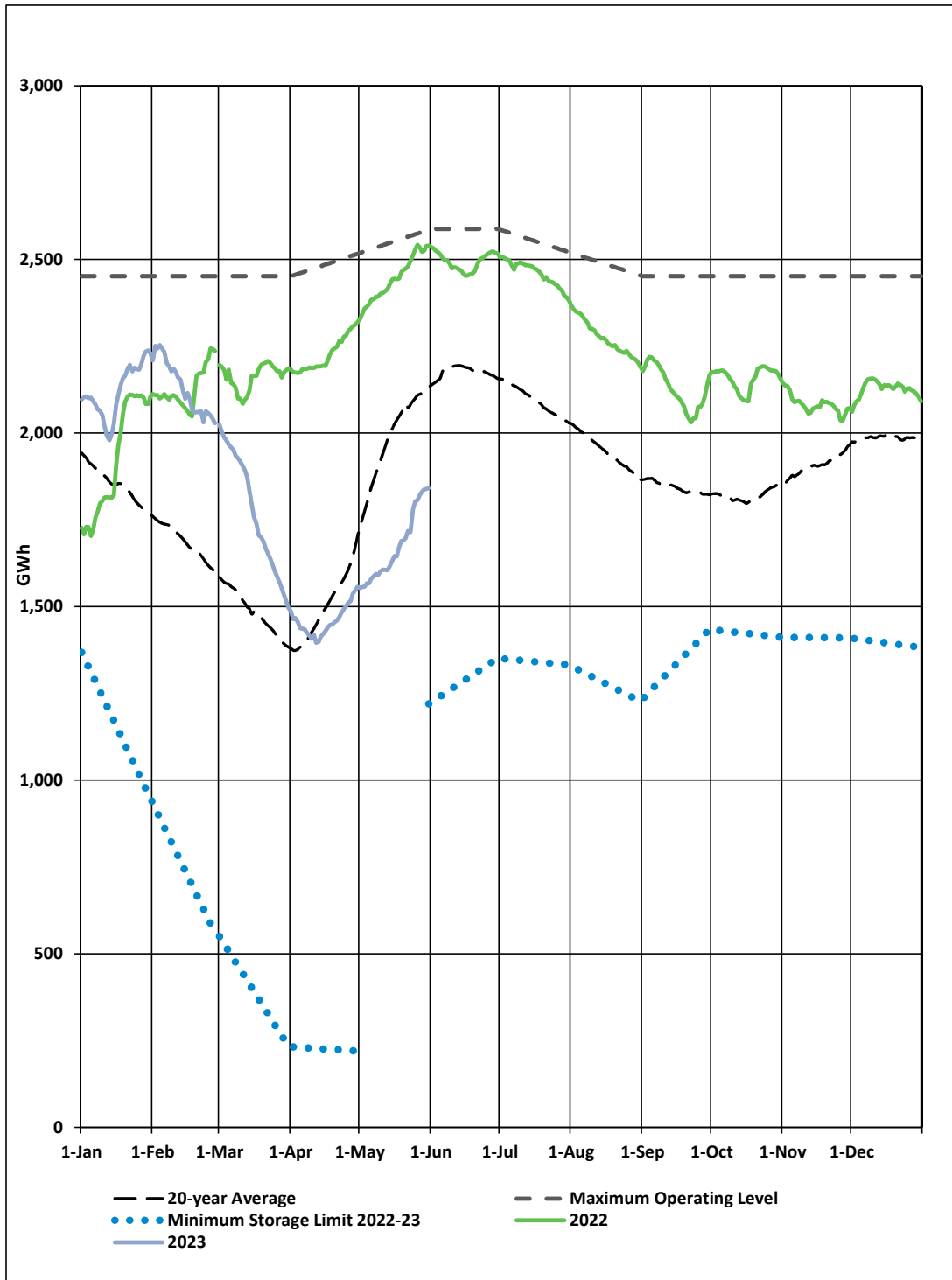


Figure 1: Total System Energy Storage⁶

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 May 2023.

2.2 Spill Activity

Bypass flows at North Salmon Spillway continued throughout May to support Long Pond reservoir storage while the Upper Salmon unit remains offline. Bypass at this location is expected to continue until the Upper Salmon generating unit is released for service. No spill occurred at any other locations during May 2023.

A summary of the amount spilled or bypassed in both MCM⁹ and GWh for May 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. Energy exports to mitigate spill were not required in May 2023.¹⁰

Table 2: Spill Activity¹¹

	Burnt Dam Spillway		Granite Canal Bypass		Upper Salmon Bypass	
	MCM	GWh	MCM	GWh	MCM	GWh
31-May-2023	0	0	0	0	488.5	63.7
YTD Total	122.7	80.8	19.8	1.9	1675	218.4

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 in *Public Utilities Act*, RSNL 1990, c P-47, Board Order No. P.U. 35(2022), Board of Commissioners of Public Utilities, December 16, 2022.

⁹ Million cubic metres (“MCM”).

¹⁰ Pursuant to the Pilot Agreement for the Optimization of Hydraulic Resources, exporting when system load is low allowed 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.

1 **3.0 Production and Purchases**

2 Appendix B provides a breakdown of power purchases, including imports, and production by plant
 3 during May 2023.

4 **4.0 Thermal Production and Imports**

5 All three units at the Holyrood TGS were required to operate from time to time in May 2023 for system
 6 requirements.¹² Total energy production from the Holyrood TGS units was 25.1 GWh. Standby
 7 generation was not required to support reservoir storage. Holyrood TGS and gas turbine operating hours
 8 are summarized in Table 3.

Table 3: Holyrood TGS and Gas Turbine Operating Hours

	Operating Hours	Synch Condense Hours	Available Hours
Holyrood TGS			
Unit 1	34.6	0	434.6
Unit 2	423.5	0	501
Unit 3	0	413.0	413.0
Gas Turbines			
Hardwoods	1.1 ¹³	742.9	744
Stephenville	2.6 ¹⁴	38.4	744
Holyrood	2.6	0	738

9 Table 4 summarizes the Muskrat Falls energy deliveries, Corner Brook Pulp and Paper Limited (“CBPP”)
 10 energy repaid to Energy Marketing, and emergency supply to Nova Scotia in May 2023.

¹² Please refer to Section 5.0 of this report for more detail.

¹³ Hardwoods Gas Turbine generation was approximately 25 MWh for the month of May.

¹⁴ Stephenville Gas Turbine generation was approximately 30 MWh for the month of May.

Table 4: Muskrat Falls Energy Deliveries and Export Activity

	Energy (GWh)
Muskrat Falls Energy Deliveries	
Muskrat Falls Power Purchase Agreement (Hydro)	123.0
Nova Scotia Block and Supplemental Energy ¹⁵	124.7
Energy Marketing Bulk Surplus Exports ¹⁶	101.8
Other Activity	
CBPP Energy repaid to Energy Marketing	0.0
Emergency Supply to Nova Scotia ¹⁷	0.0

1 5.0 Unit Deratings

2 Unit 1 at the Holyrood TGS was online with full capability at the beginning of May 2023. On May 2, 2023,
 3 the unit was taken offline to complete an in-situ inspection of the turbine last stage blades. This work
 4 was completed on schedule on May 15, 2023. At that time the unit remained offline in cold standby
 5 because it was not required by the system operator to meet energy supply demands. It was in standby
 6 for the remainder of the month.

7 Unit 2 was online with full capability at the beginning of May 2023. On May 15, 2023, the unit was
 8 derated to 50 MW for approximately 8.5 hours due to a control valve issue. This was corrected later the
 9 same day and full capability of the unit restored. The unit was taken offline for the planned annual
 10 maintenance outage on May 21, 2023.

11 Unit 3 was placed on line in synchronous condenser mode on May 14, 2023 after being on outage since
 12 April 9, 2023 and remained in operation as a synchronous condenser for the rest of the month. Outage
 13 work on the assets not required for synchronous condenser operation was performed in parallel.

14 The Hardwoods Gas Turbine was available at full capacity for the full month of May 2023.

15 The Holyrood Gas Turbines were available at full capacity for the entire month of May 2023, with the
 16 exception of a planned outage on May 7, 2023 to complete an internal exhaust section inspection.

¹⁵ Nova Scotia Block and Supplemental Energy quantities are reflected at the point of commercial transaction.

¹⁶ Energy Marketing has updated its reporting of Bulk Surplus Exports and CBPP energy repaid to Energy Marketing. The Bulk Surplus Exports figure now reports only Muskrat Falls energy exported to external markets. CBPP Energy repaid to Energy Marketing continues to be reported separately.

¹⁷ Under the Interconnection Operators Agreement between Hydro and Nova Scotia Power.

- 1 The Stephenville Gas Turbine was available at full capacity for the entire month of May 2023, with the
- 2 exception of an unplanned derating to 50% capacity on May 30, 2023 due to a faulty fuel pressure
- 3 switch. The switch was repaired and the unit was returned to full capacity later the same day.

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 Pondered Energy (MWh)
Opening Balance						-
Total ²	-	-	-	-	-	

Table A-2: Avoided Spill Revenue¹

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 May 31, 2023.

Appendix B

Production and Purchases



Table B-1: Generation and Purchases¹

	May 2023 (GWh)	Year-to-Date 2023 (GWh)
Hydro Generation (Hydro)		
Bay d'Espoir		
Unit 1	38.7	207.7
Unit 2	37.7	205.5
Unit 3	6.1	133.2
Unit 4	4.4	133.9
Unit 5	11.9	133.5
Unit 6	13.1	154.3
Unit 7	58.4	435.2
Subtotal Bay d'Espoir	170.4	1,403.4
Upper Salmon	0.0	108.9
Granite Canal	26.0	112.5
Hinds Lake	18.1	161.5
Cat Arm		
Unit 1	33.3	157.5
Unit 2	35.5	165.4
Subtotal Cat Arm	68.9	322.8
Paradise River	1.4	13.6
Star Lake	12.1	60.1
Rattle Brook	2.6	5.8
Nalcor Exploits	52.4	269.3
Mini Hydro	0.0	0.0
Total Hydro Generation (Hydro)	351.8	2,458.0
Thermal Generation (Hydro)		
Holyrood TGS		
Unit 1	2.3	150.9
Unit 2	22.7	200.8
Unit 3	0.0	126.2
Subtotal Holyrood TGS Units	25.1	477.9
Holyrood Gas Turbine and Diesels	0.2	13.1
Hardwoods Gas Turbine ²	0.0	1.4
Stephenville Gas Turbine ³	0.0	1.4
Other Thermal	0.0	0.3
Total Thermal Generation (Hydro)	25.3	494.2
Purchases		
Requested Newfoundland Power and Vale CBPP	0.0	0.1
Capacity Assistance	0.0	0.0
Firm Energy Power Purchase Agreement	0.0	0.0
Secondary	2.5	11.2
Co-Generation	2.3	18.8
Subtotal CBPP	4.7	30.0
Wind Purchases	18.2	88.5
Maritime Link Imports ⁴	0.0	0.2
New World Dairy	0.1	1.2
LIL Imports ⁵	332.8	1,155.2
Maritime Link Exports ^{6,7}	209.8	713.3
Net LIL Delivery to IIS ⁸	123.0	441.9
Total Purchases	355.8	1,275.2
Total⁹	732.9	4,227.4

¹ Gross generation.

² Hardwoods Gas Turbine generation was approximately 25 MWh for the month of May.

³ Stephenville Gas Turbine generation was approximately 30 MWh for the month of May.

⁴ Includes energy flows as a result of purchases and inadvertent energy.

⁵ Includes purchases as a result of testing activity as well as deliveries that are then exported over the Maritime Link.

⁶ 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 spilled energy on Hydro's behalf.

⁷ Physical delivery of the Nova Scotia Block will typically only occur when the Labrador-Island Link ("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.

⁸ Net energy delivered to the Island Interconnected System ("IIS") is less than the total energy purchased by Hydro under the Muskrat Falls Power Purchase Agreement because of transmission losses on the LIL.

⁹ Actuals reflect rounded values to the nearest tenth of a GWh. Differences between total versus addition of individual components due to rounding.