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August 17, 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 July 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 July 2023

August 17, 2023

A report to the Board of Commissioners of Public Utilities



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1.0 Introduction

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

- 1) System Hydrology Report, as contained in Hydro's Quarterly report;
- 2) The thermal plant operated in support of hydrology;
- 3) Production by plant/unit; and
- 4) Details of any current or anticipated long-term derating.

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

2.0 System Hydrology

Reservoir inflows in July 2023 were approximately 66% above the month’s historical average.² Table 1 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-Jul-2023	2,023	2,368	2,029	1,387	2,521	80

The aggregate reservoir storage level on July 31, 2023 was 2,023 GWh, which is 20% below the seasonal maximum operating level and 46% above the minimum storage limit.³ Inflows in July continued to be

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 (“Muskrat Falls 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 above average for this time of year, with multiple rain events recorded throughout the month across
2 Hydro's reservoir system. Inflows to the Cat Arm reservoir were high as a result of higher than average
3 rainfall received by the Northern Peninsula in early July, as well as any last remaining snow melt in high
4 elevation areas. The Cat Arm reservoir recorded approximately 20 mm of rain on July 1, 2023 followed
5 by an additional 25 mm of rain on July 4, 2023 and 16 mm on July 13, 2023. The Hinds Lake reservoir
6 also recorded about 55 mm of rain over a four-day period in early July. About 32 mm of rain was
7 recorded at Hinds Lake on July 13–14, 2023 as well as an additional 23 mm on July 20, 2023. July inflows
8 to the Cat Arm and Hinds Lake reservoirs were 195% and 174% of average, respectively. The Bay
9 d'Espoir system was also impacted by multiple rain events in July with about 40–50 mm of rain recorded
10 on July 3–4, 2023, 30–60 mm of rain on July 13–14, 2023 and 25–65 mm on July 23–24, 2023. Inflows to
11 the Bay d'Espoir system were 148% of average in July 2023.

12 Bay d'Espoir Unit 5 continued with its planned annual outage in July, returning to service on July 7, 2023.
13 Bay d'Espoir Unit 5 was also offline on a brief outage later in the month from July 25, 2023 until
14 July 27, 2023. There were brief outages on various other Bay d'Espoir units throughout the month as
15 well, including Unit 6 outages on July 7, 2023 and July 12–13, 2023, a Unit 4 outage on July 17, 2023, and
16 a Unit 3 outage from July 12–13, 2023. Additionally, Unit 6 in Bay d'Espoir was unavailable from
17 July 25, 2023 through the end of the month.

18 Cat Arm Unit 1 was taken offline on July 9, 2023 for its planned annual outage, and remained offline for
19 the remainder of the month. Brief outages also occurred on Cat Arm Unit 2 on July 10, 2023, as well as
20 on July 30, 2023 and July 31, 2023. A pair of short, planned outages also occurred at Hinds Lake on
21 July 12, 2023 and July 16, 2023 with the unit returning to service the same day. Granite Canal was on a
22 brief outage from July 2–4, 2023. The Upper Salmon Hydroelectric Generating Station remained offline
23 throughout July 2023.

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

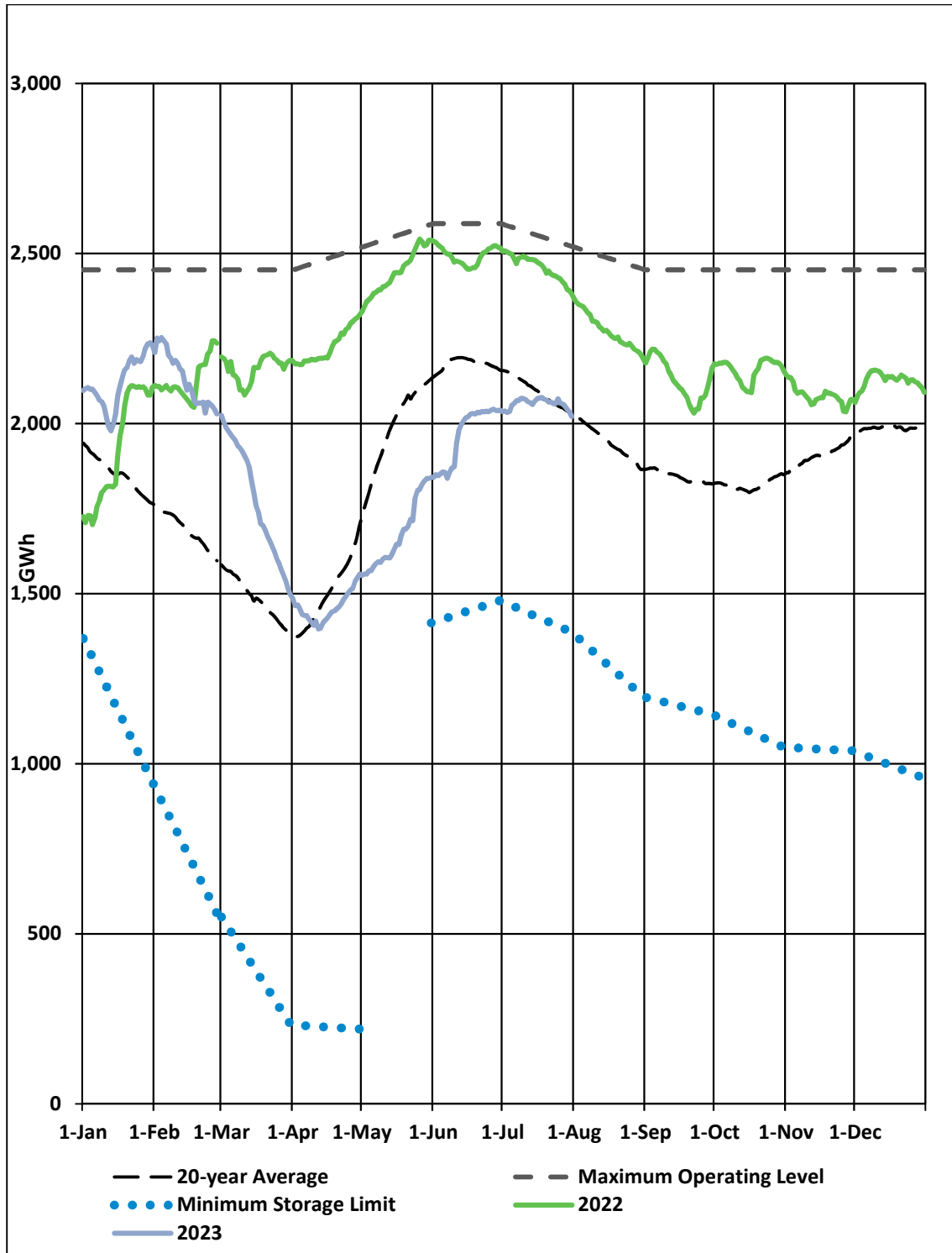


Figure 1: Total System Energy Storage⁴

⁴ 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.

1 **2.1 Ponding**

2 In Order No. P.U. 49(2018),⁵ the Board approved Hydro’s application for approval of a Pilot Agreement
3 for the Optimization of Hydraulic Resources (“Pilot Agreement”).⁶ The intent of the Pilot Agreement is to
4 optimize Hydro’s hydraulic resources through the strategic use of its storage capabilities, taking
5 advantage of the variability of energy pricing in external markets over time.

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

8 **2.2 Spill Activity**

9 Bypass flows at North Salmon Spillway continued throughout July 2023 to support Long Pond Reservoir
10 storage while the unit at the Upper Salmon Hydroelectric Generating Station is offline. Bypass at this
11 location is expected to continue until the unit at the Upper Salmon Hydroelectric Generating Station is
12 released for service.

13 Due to continued high reservoir levels and inflows, generation remained maximized at Cat Arm
14 throughout the month of July. Spill from the Cat Arm Reservoir started on July 1, 2023 and continued
15 until July 15, 2023. Hinds Lake generation also remained maximized throughout much of July due to high
16 water levels and inflows; however, spill was not required at this location. Generation was maximized
17 from the start of the month until July 27, 2023 at which point generation was decreased due to reduced
18 risk of spill. Spill was not required from any other locations in July 2023.

19 A summary of the amount spilled or bypassed in both MCM⁷ and GWh for July 2023 as well as year-to-
20 date (“YTD”) totals are provided in Table 2. Appendix A provides a log of spill avoidance export
21 transactions during the month.⁸ There were no energy exports to mitigate spill in July 2023, as there was
22 no opportunities to facilitate spill avoidance exports due to system conditions. Generation from the
23 available Cat Arm units remained maximized to the extent possible through prioritization of Island
24 generation.

⁵ *Public Utilities Act*, RSNL 1990, c P-47, Board Order No. P.U. 49(2018), Board of Commissioners of Public Utilities, December 18, 2018.

⁶ 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.

⁷ Million cubic metres (“MCM”).

⁸ Pursuant to the Pilot Agreement for the Optimization of Hydraulic Resources, 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.

Table 2: Spill Activity⁹

	Burnt Dam Spillway		Granite Canal Bypass		Upper Salmon Bypass		Cat Arm Spillway	
	MCM	GWh	MCM	GWh	MCM	GWh	MCM	GWh
31-Jul-2023	0	0	0	0	179.7	23.4	40.7	36.6
YTD Total	122.7	80.8	19.8	1.9	2204.8	287.5	40.7	36.6

1 **3.0 Production and Purchases**

2 Appendix B provides a breakdown of power purchases, including the import and export activity over the
 3 LIL and Maritime Link, and production by plant during July 2023. There was no CBPP energy repaid to
 4 Energy Marketing in July 2023.

5 **4.0 Thermal Production**

6 Total energy production from the units at the Holyrood TGS was 0 GWh in July 2023. Unit 3 at the
 7 Holyrood TGS operated in synch condense mode throughout July 2023 for system requirements.
 8 Standby generation was not required to support reservoir storage. The operating hours for the
 9 Holyrood TGS and the Hardwoods, Stephenville, and Holyrood Gas Turbines are summarized in Table 3.

Table 3: Holyrood TGS and Gas Turbines Operating Hours

	Operating Hours	Synch Condense Hours	Available Hours
Holyrood TGS			
Unit 1	0	0	0
Unit 2	0	0	0
Unit 3	0	744.0	744.0
Gas Turbines			
Hardwoods	14.3	367.5	381.8
Stephenville	3.1	104	329.3
Holyrood	11.8	0	744.0

⁹ Numbers may not add due to rounding.

5.0 Unit Deratings

Unit 1 at the Holyrood TGS was offline in cold standby until July 9, 2023 as it was not required by the system operator to meet energy supply demands. On July 9, 2023, Unit 1 was taken offline for the planned annual outage, and remained on outage for the rest of the month.

Unit 2 at the Holyrood TGS was offline for the planned annual maintenance outage for the entire month of July 2023.

Unit 3 at the Holyrood TGS was online in synchronous condenser mode for the entire month of July 2023. Outage work on the assets not required for synchronous condenser operation was performed in parallel.

The Hardwoods Gas Turbine was unavailable due to a planned maintenance outage from June 28, 2023 to July 7, 2023 to perform preventive and corrective maintenance. The unit was subsequently derated to 50% capacity due to internal damage of the End B engine being found on a planned internal inspection. The damaged engine was removed from service and Hydro's spare engine was installed in End B to return the unit to full capacity on July 15, 2023. The unit was also unavailable from July 25–31, 2023 due to a planned maintenance outage to Hardwoods Bus 7, in the Hardwoods Terminal Station.

The Holyrood Gas Turbine was available at full capacity for the entire month of July 2023.

The Stephenville Gas Turbine tripped while operating in synchronous condense mode on July 13, 2023 due to high generator vibration. While testing the unit following the vibration trip the unit tripped due to high exciter temperature. Visual inspections of the unit determined that the generator cooling fan on the exciter end of the generator had failed and caused secondary damage to the stator end windings. Hydro is evaluating plans to repair the generator with the original equipment manufacturer. The return to service date of the unit is under review.

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 July 31, 2023.

Appendix B

Production and Purchases



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

	July 2023	YTD July 2023
Hydro Generation (Hydro)		
Bay d'Espoir		
Unit 1	41.3	288.5
Unit 2	40.4	285.4
Unit 3	23.1	180.3
Unit 4	7.5	153.6
Unit 5	8.3	141.8
Unit 6	4.6	163.4
Unit 7	26.4	510.1
Subtotal Bay d'Espoir	151.6	1,723.1
Upper Salmon	0.0	108.9
Granite Canal	15.6	143.7
Hinds Lake	39.0	240.0
Cat Arm		
Unit 1	10.2	205.4
Unit 2	39.5	244.1
Subtotal Cat Arm	49.7	449.5
Paradise River	2.0	17.9
Star Lake	12.7	85.1
Rattle Brook	1.2	9.4
Nalcor Exploits	53.7	379.0
Mini Hydro	0.0	0.0
Total Hydro Generation (Hydro)	325.5	3,156.7
Thermal Generation (Hydro)		
Holyrood TGS		
Unit 1	0.0	150.9
Unit 2	0.0	200.8
Unit 3	0.0	126.2
Subtotal Holyrood TGS Units	0.0	477.9
Holyrood Gas Turbine and Diesels	0.5	14.6
Hardwoods Gas Turbine	0.1	1.6
Stephenville Gas Turbine ²	0.0	1.5
Other Thermal	0.0	0.3
Total Thermal Generation (Hydro)	0.6	496.0
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	2.4	15.9
Co-Generation	3.0	25.2
Subtotal CBPP	5.4	41.1
Wind Purchases	8.6	108.6
Maritime Link Imports ³	0.0	0.2
New World Dairy	0.1	1.4
LIL Imports ⁴	203.6	1,549.8
Maritime Link Exports ^{5,6}	174.3	1,044.5
Net LIL Delivery to IIS ⁷	29.3	505.3
Total Purchases	217.8	1,701.3
Total⁸	543.8	5,354.0

¹ Gross generation.

² Stephenville Gas Turbine generation was approximately 16 MWh for the month of July.

³ Includes energy flows as a result of purchases and inadvertent energy.

⁴ Includes purchases as a result of testing activity as well as deliveries that are then exported over the Maritime Link.

⁵ Totals include the provision of emergency and inadvertent energy to Nova Scotia Power Inc. under the Interconnection Operators Agreement, 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.

⁶ 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.

⁷ 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.

⁸ Actuals reflect rounded values to the nearest tenth of a GWh. Differences between total versus addition of individual components due to rounding.