Newfoundland and Labrador Hydro
Hydro Place. 500 Columbus Drive
P.O. Box 12400. St. John's. NL
Canada A1B 4K7
t. 709.737.1400 I f. 709.737.1800
nlhydro.com

January 17, 2024

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 December 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

Shirley A. Walsh
Senior Legal Counsel, Regulatory
SAW/nk.kd

Encl.

ecc:

Board of Commissioners of Public Utilities
Jacqui H. Glynn
Cheryl Blundon
PUB Official Email

Consumer Advocate
Dennis M. Browne, KC, Browne Fitzgerald Morgan & Avis
Stephen F. Fitzgerald, Browne Fitzgerald Morgan & Avis
Sarah G. Fitzgerald, Browne Fitzgerald Morgan & Avis
Bernice Bailey, Browne Fitzgerald Morgan & Avis

Linde Canada Inc.
Sheryl E. Nisenbaum
Peter Strong

Newfoundland Power Inc.
Dominic J. Foley
Lindsay S.A. Hollett
Regulatory Email

Teck Resources Limited
Shawn Kinsella

Island Industrial Customer Group
Paul L. Coxworthy, Stewart McKelvey
Denis J. Fleming, Cox & Palmer
Dean A. Porter, Poole Althouse

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

January 17, 2024

A report to the Board of Commissioners of Public Utilities

newfoundland labrador hydro

Contents

List of Appendices

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;

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 December 2023.[1]

2.0 System Hydrology

Reservoir inflows in December 2023 were 114% 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-Dec-2023	2,406	2,095	1,973	957	2,452	98

The aggregate reservoir storage level on December 31, 2023 was 2,406 GWh, which is 2% below the seasonal maximum operating level and 151% above the minimum storage limit.[3] Inflows across the Island system continued to be above the long-term historical average in December 2023. Inflows to the

[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 hour ["GWh"]).

[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.

reservoirs of the Bay d'Espoir system were 201% of average during the month, while inflows to the Hinds Lake Reservoir were 192% of average and inflows to the Cat Arm Reservoir were 278% of average. These inflows were the result of a significant weather event which took place across central and western Newfoundland from December 19 to 22, 2023 that brought very high amounts of rain to the region. Approximately 240 mm of rain was recorded at Burnt Dam in the Bay d'Espoir system during this period. Because of this event, the Bay d'Espoir system monthly inflows for December 2023 were the third highest on the historical record for the month, the Cat Arm monthly inflows were the second highest on the historical record, and the Hinds Lake monthly inflows were the fourth highest on the historical record.

The Upper Salmon Hydroelectric Generating Station ("Upper Salmon Station") continued its previously ongoing outage at the start of December 2023, with the unit returning to service on December 12, 2023. A brief planned outage occurred at the Paradise River Hydroelectric Generating Station on December 19, 2023, with the unit returning to service the same day. The Hinds Lake Hydroelectric Generating Station Unit was unavailable starting on December 27, 2023 due to accumulation of frazil ice at the plant's intake. The unit was returned to service on December 29, 2023. The Granite Canal Hydroelectric Generating Station Unit was also taken offline briefly on December 29, 2023 due to frazil ice at the plant's intake. The unit was returned to service later the same day. Finally, a brief outage occurred on the Cat Arm Hydroelectric Generating Station Unit 1 on December 31, 2023. The unit was returned to service on January 1, 2024.

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

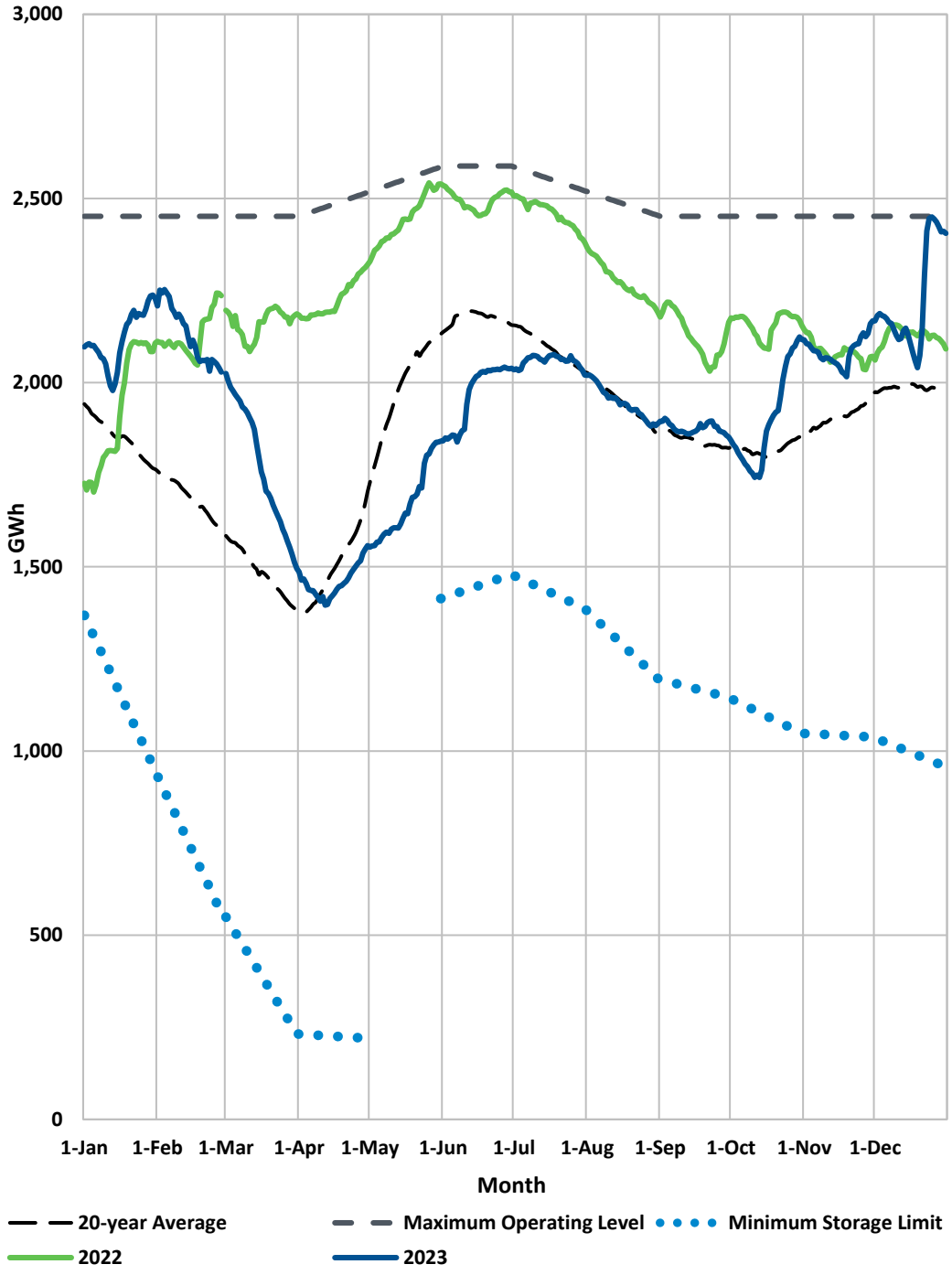

Figure 1: Total System Energy Storage[4]

[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.

2.1 Ponding

In Order No. P.U. 49(2018),[5] the Board approved Hydro's application for approval of a Pilot Agreement for the Optimization of Hydraulic Resources ("Pilot Agreement").[6] 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 information regarding imported and exported energy transactions under the Pilot Agreement during the month; however, no ponding imports or exports occurred in December 2023.

2.2 Spill Activity

Bypass flows at North Salmon Spillway continued throughout December 2023. Bypass at this location continued at the start of the month due to the ongoing Upper Salmon Station outage, but then continued through the rest of the month due to high storage levels in the Meelpaeg Reservoir as well as high inflows as a result of the significant rain event from December 19 to 22, 2023.

Spill also occurred at Burnt Dam Spillway, the Granite Canal Bypass, Granite Lake Overflow Spillway, and the Cat Arm Spillway in December 2023 due to high water levels and inflows from the December 19 to 22, 2023 rain event. Spill began at Burnt Dam on December 20, 2023, and concluded on December 30, 2023. Bypass at Granite Canal began on December 21, 2023, and concluded on December 30, 2023. Overflow spill at Granite Lake began on December 22, 2023, and concluded on December 26, 2023. Finally, spill began at Cat Arm on December 22, 2023, and concluded on December 28, 2023. A summary of the amount spilled or bypassed in both MCM[7] and GWh for December 2023 as well as year-to-date ("YTD") totals are provided in Table 2. The high inflows and water levels associated with the rain event led to record spill volumes for December at multiple locations across the system. Releases from Burnt Dam Spillway, Granite Lake Overflow Spillway, and Upper Salmon Bypass were the highest on record for December. Releases at the Granite Canal Bypass structure were the fourth highest on record for the month. Appendix A provides information regarding

[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, 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.
[7] Million cubic metres ("MCM").

spill-avoidance export transactions undertaken during the month.[8] While energy exports to mitigate spill were permitted, there were no opportunities available for spill exports due to system conditions.

Table 2: Spill Activity[9]

	Burnt Dam Spillway		Granite Canal Bypass		Granite Overflow Spillway		Upper Salmon Bypass		Cat Arm Spillway	
	MCM	**GWh**	**MCM**	**GWh**	**MCM**	**GWh**	**MCM**	**GWh**	**MCM**	**GWh**
31-Dec-2023	194.7	128.3	30.2	2.9	24.8	16.3	375.5	49.0	4.4	3.9
YTD Total	**317.4**	**209.1**	**50.0**	**4.8**	**24.8**	**16.3**	**4007.7[10]**	**522.6[11]**	**45.1**	**40.5**

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 December 2023. There was no energy repaid from Corner Brook Pulp and Paper Limited ("CBPP") to Energy Marketing under the Temporary Energy Exchange Agreement in December 2023. 43 MWh[12] of emergency energy was also supplied to Nova Scotia over the Maritime Link during December 2023.

4.0 Thermal Production

Two Holyrood Thermal Generating Station ("Holyrood TGS") units were online for system generation requirements during December 2023. Total energy production from the Holyrood TGS was 95.2 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.

[8] 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.
[9] Numbers may not add due to rounding.
[10] The MCM Upper Salmon Bypass value included in the November 2023 Monthly Energy Supply Report was incorrect. The reported value was 423.1 but the correct value is 425.6. The YTD total MCM value for Upper Salmon Bypass in this report includes the correct November 2023 value, and not what was reported at that time. Hydro regrets the error.
[11] The GWh Upper Salmon Bypass value included in the November 2023 Monthly Energy Supply was incorrect. The reported value was 55.2 but the correct value is 55.5. The YTD total GWh value for Upper Salmon Bypass in this report includes the correct November 2023 value, and not what was reported at that time. Hydro regrets the error.
[12] Megawatt hour ("MWh"). Measured at Bottom Brook Converter Station.

Table 3: Holyrood TGS and Gas Turbines Operating Hours

	Operating Hours	Synch Condense Hours	Available Hours
Holyrood TGS			
Unit 1	550.5	0	550.5
Unit 2	0	0	0
Unit 3	744.0	0	744.0
Gas Turbines			
Hardwoods	11.4	732.6	744.0
Stephenville	0	0	0
Holyrood	49.9	0	719.4

5.0 Unit Deratings

At the beginning of December 2023, Holyrood TGS Unit 1 was derated to 140 MW due to an issue with turbine control valves. On December 11, 2023, the unit was taken offline to correct this issue. Two failed control valves were removed and replaced and the unit was returned to service on December 20, 2023 and load tested to 160 MW. The residual derate on the unit is related to a boiler issue. Troubleshooting did not determine the cause of the deration and the unit remained available at 160 MW for the remainder of December 2023. To assist in the resolution of the residual derate, Hydro intends to bring in a boiler controls expert to perform tuning on the unit later this month, depending on contractor availability.

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

Unit 3 at the Holyrood TGS was operating with full capability from November 29, 2023 until December 16, 2023 when a boiler leak was identified. The leak was assessed by site personnel and, given the location and nature of the leak, it was agreed that the unit could remain online at a reduced output of 70 MW with close monitoring by Operations provided that no significant change in the leak developed. The unit remained online and derated to 70 MW for the remainder of December 2023 with no observed change in the leak. An outage began on January 9, 2024 to correct the leak and return the unit to full capability.

The Hardwoods Gas Turbine was available for the full month of December 2023.

The Holyrood Gas Turbine was available at full capacity for the entire month of December 2023 with the exception of an unplanned outage from December 6 to 7, 2023 due to two failed control system communication cards. These cards were replaced and the unit was returned to service.

The Stephenville Gas Turbine remained unavailable during the full month of December 2023 due to damage to the generator resulting from the failure of a generator cooling fan. The onsite work to disassemble and repair the generator stator were completed in December 2023. The rotor was undergoing inspection and testing at the original equipment manufacturers facility in the USA throughout December 2023. Due to the results of the tests and inspections, additional repairs were identified and are being completed in January 2024. The rotor is now expected to be returned to site in early February 2024 and the unit is expected return to service in mid-March 2024.

Appendix A

Ponding and Spill Transactions

Table A-1: Ponding Transactions[1]

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 Ponded Energy (MWh)
Opening Balance						-
Total[2]	-	-	-	-	-	

Table A-2: Avoided Spill Energy[1]

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 December 31, 2023.

Appendix B

Production and Purchases

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

	December 2023	YTD December 2023
Hydro Generation (Hydro)		
Bay d'Espoir		
Unit 1	43.2	450.5
Unit 2	43.0	457.7
Unit 3	42.1	351.0
Unit 4	28.4	267.2
Unit 5	30.6	243.8
Unit 6	29.3	239.1
Unit 7	91.9	797.9
Subtotal Bay d'Espoir	308.4	2,807.2
Upper Salmon	36.5	145.3
Granite Canal	26.2	256.6
Hinds Lake	34.0	393.3
Cat Arm		
Unit 1	32.2	369.6
Unit 2	33.3	400.9
Subtotal Cat Arm	65.5	770.5
Paradise River	4.0	33.0
Star Lake	5.4	112.8
Rattle Brook	1.5	16.7
Nalcor Exploits	58.7	632.1
Mini Hydro	0.0	0.0
Total Hydro Generation (Hydro)	**540.3**	**5,167.6**
Thermal Generation (Hydro)		
Holyrood TGS		
Unit 1	42.5	275.5
Unit 2	0.0	200.8
Unit 3	52.7	222.3
Subtotal Holyrood TGS Units	95.2	698.6
Holyrood Gas Turbine and Diesels	3.0	18.1
Hardwoods Gas Turbine	0.1	1.8
Stephenville Gas Turbine	0.0	1.5
Other Thermal	0.0	0.5
Total Thermal Generation (Hydro)	**98.4**	**720.5**
Purchases		
Requested Newfoundland Power and Vale	0.0	0.1
CBPP		
Capacity Assistance	0.0	0.0
Secondary	4.2	33.2
Co-Generation	10.3	51.2
Subtotal CBPP	14.5	84.4
Wind Purchases	16.3	172.3
Maritime Link Imports[2]	0.0	0.2
New World Dairy	0.1	1.9
LIL Imports[3]	273.3	2,764.9
Maritime Link Exports[4,5]	197.0	1,967.5
Net LIL Delivery to IIS[6]	76.3	797.4
Total Purchases	**304.2**	**3,023.8**
Total[7]	**942.9**	**8,912.0**

[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.