Q. **Reference: Application, 2023 Capital Budget Overview**

Regarding the Holyrood plant:

a) Please provide the total capital expenditures associated with Holyrood for each of 2023 and 2024, with a breakdown, e.g., previously approved expenditure, expenditure requested in the 2023 CBA, supplemental expenditure requests, and anticipated requests in the 2024 CBA.

b) If all of these expenditures are undertaken, how many more years could Holyrood operate as a generating plant without requiring as much or more capital expenditures?

c) What is the current marginal cost of production at Holyrood TGS? What price per barrel of oil and what production efficiency is used in this calculation?

d) What is the probability that Holyrood will be needed to operate in generation mode in the upcoming winter of 2022/23 and the subsequent winter of 2023/24?

e) On page 26 Hydro states that it will maintain Holyrood as a generating facility to March 31, 2024.

i. What is the minimum level at which its generators would operate if the LIL were to be commissioned prior to the coming winter and assuming LIL and synchronous condensers at Soldiers Pond performed without any substantive difficulty?

ii. At what level would its generators operate if the LIL were not available for the coming winter?

iii. At what level would its generators operate if the LIL were available at 60% of intended?

iv. When does Hydro expect the LIL to be commissioned and what minimum performance standards must be met for that commissioning to occur? If it were to be commissioned and did operate at those minimum standards for its first few years of operation then what would be Holyrood's role in Hydro's system.

v. Based on its current state of knowledge, at what level of operation does Hydro believe would be most appropriate and prudent for the Holyrood thermal plant for the coming winter, 2022/23?

A. **a)** Table 1 provides a summary of the proposed 2023 and 2024 capital expenditures for the Holyrood Thermal Generating Station ("Holyrood TGS"). It is noted that the estimates listed below are for 2023 and 2024 expenditures only and are not total proposal spend.

Table 1: Proposed 2023 and 2024 Capital Expenditures for the Holyrood TGS ($000) [1]

	Budget Estimate	
Project Title	**2003**	**2004**
Approved as Part of the 2022 CBA		
Replace Underground Fire Water Distribution System - Holyrood	1,578.0	-
Unit 3 Generator Components Condition Assessment and Miscellaneous Upgrades	338.8	-
Subtotal	**1,916.8**	**-**
Projects Approved as 2022 Supplemental Applications		
Refurbishment of Tank 2	4,563.3	-
Holyrood Thermal Generating Station Unit 1 and Unit 2 Turbine Last Stage Blades	1,559.5	-
Replacement of Tank Farm Underground Firewater Distribution System	1,330.5	-
Refurbishment of Day Tank	707.8	-
Upgrade Turbine Controls Unit 2	490.1	-
Subtotal	**8,651.2**	**-**
Proposed in the 2023 CBA		
Overhaul Unit 2 Turbine and Valves (2023) - Holyrood	9,701.8	-
Boiler Condition Assessment and Miscellaneous Upgrades	2,926.6	-
Thermal In-Service Failures	3,300.0	-
Overhaul Pumps	742.4	-
Refurbish BioGreen Sewage System (2023) - Holyrood	256.6	-
Refurbish Workshop Roof (2023) - Holyrood	243.7	-
Purchase Tools and Equipment Less than $50,000 – Thermal Plant	55.1	-
Subtotal	**17,226.2**	**-**
Planned for 2024 in the 2023 CBA Five-Year Plan[2]		
Thermal In-Service Failures (2024)	-	3,374.0
Upgrade Water Treatment Plant and Waste Water Treatment Plant (2024) - Holyrood	-	1,000.0
Replace Electrical Distribution System (2024-2026) - Holyrood	-	1,000.0
Refurbish Stage II Cooling Water Pumphouse (2024) - Holyrood	-	670.0
Install Plant Heating (2024-2025) - Holyrood	-	519.1
Outbuilding and Powerhouse Upgrades Including Main Warehouse and Training Centre (2024–2025) - Holyrood	-	350.0
Install New Oil Systems Unit 3 (2024-2025) - Holyrood	-	255.0
Upgrade Black Start Diesel Cables (2024) - Holyrood	-	150.0
Upgrade Ambient Monitoring Stations (2024-2025) - Holyrood	-	150.0
Inspect Fuel Storage Tanks (2024-2025) - Holyrood Gas Turbine	-	100.0
Install Energy Efficient High Bay and Exterior Lighting (2024-2025) - Holyrood	-	15.9
Subtotal	**-**	**7,584.0**
Total	**27,794.2**	**7,584.0**

[1] Numbers may not add due to rounding

[2] Includes investment related to synchronous condenser operation only. Newfoundland and Labrador Hydro ("Hydro") is completing an update to its Reliability and Resource Adequacy Study, which will inform the future requirements for the Holyrood TGS beyond March 2024, including associated capital investment. This filing will be submitted to the Board of Commissioners of Public Utilities in September 2022. The timing of the expenditures for 2024 investment is dependant on these outcomes.

b) All the expenditures outlined in part a) to this response are required to maintain the Holyrood TGS as a generating facility until March 31, 2024. Further capital investment would be required to extend generation beyond 2024.

c) Table 2 provides the marginal cost of production at Holyrood TGS as of July 31, 2022, the price per barrel of oil, and the production efficiency used in calculating the marginal cost.

Table 2: Incremental Energy Cost of Production at the Holyrood TGS

Price ($/bbl)[3]		150.16
Production Efficiency (kWh/bbl)[4]	÷	583
Incremental Energy Cost (dollars/kWh)		0.2576

d) As a risk mitigation measure, Hydro had previously committed to the Board that it would provide a two-year period of standby operation of the Holyrood TGS during the early operation of the Muskrat Falls Project assets. As the Labrador-Island Link ("LIL") has not been fully commissioned to date, the Holyrood TGS will maintain the ability to safely and reliably operate in generation mode for the upcoming winter of 2022–2023 and the subsequent winter of 2023-2024. The amount of generation that will be required is dependent upon LIL operating levels during those winter periods.

e) Responses to the above-mentioned questions are as follows:

i. As a risk mitigation measure, Hydro had previously committed to the Board that it would provide a two-year period of standby operation of the Holyrood TGS during the early operation of the Muskrat Falls Project assets. Should the LIL be commissioned prior to winter 2022–2023, the Holyrood TGS will maintain the ability to safely and reliably operate in generation mode. The amount of generation that will be required is dependent upon LIL operating levels during the winter period.

ii. If the LIL were not available in any capacity during the coming winter, Hydro expects that all three units at the Holyrood TGS would be online at minimum loading; increasing off minimum as necessary to support load.

[3] Average inventory cost.
[4] 2019 Test Year efficiency factor.

iii. If the LIL were available at 60% capacity during the coming winter, Hydro expects one to two units at the Holyrood TGS would be online at minimum loading; however, this is dependent on the demonstrable reliable performance of the LIL. LIL energy minus the Nova Scotia Block and Supplemental Energy commitments would be used to offset thermal generation above minimum and/or the requirement for the second or third unit.

iv. Commissioning of the LIL involves three stages; GE is required to meet the technical requirements at each stage of testing before advancing to the next stage—each step is a prerequisite for the next.

1. Factory Acceptance Testing ("FAT") of the software to confirm that all issues preventing dynamic commissioning are closed and the software is ready for site testing, or dynamic commissioning.
2. During dynamic commissioning, pre-defined tests are undertaken to verify both equipment operation and performance, as well as the functionality of the software under live conditions. Once all tests are performed successfully at available power levels, GE is then permitted to enter into Trial Operations.
3. Trial Operations is deemed successful after 30 days of continuous operation without a trip attributed to the HVdc system.

In the Labrador-Island Link Monthly Update for August 2022,[5] Hydro noted that Factory Acceptance Testing was completed in August 2022 and Dynamic Commissioning tests concluded in early September 2022 and were to confirm the performance of the LIL at higher power levels. The LIL schedule is dependent on the successful completion of a 30-day Trial Operations period based on the outcome of Dynamic Commissioning testing.

The LIL will be considered commissioned after successful testing at power levels greater than 675 MW, which will require cold weather and elevated loads. It is anticipated that the grid conditions required to perform these tests will occur in the fall (October–November).

[5] "Reliability and Resource Adequacy Study Review – Labrador-Island Link Monthly Update – August 2022," Newfoundland and Labrador Hydro, September 8, 2022

For information on Hydro's commitment to the operation of the Holyrood TGS during the early operation of the Muskrat Falls Project assets, please refer to part d) of this response.

v. As noted in part d) of this response, the amount of generation that will be required is dependent upon LIL operating levels during the winter period.