Q. **Reference: Economic and Technical Assessment, p. 2, Table 1 (p. 35 pdf)**

Citation 1:

Table 1: Diesel Generating Station Capacities

Ratings	CHT[4,5]	MSH[6]	PHS[7,8]	SLE[9]
Installed Capacity (kW)	2,545	2,540	1,725	1,020
Design Plant Capacity (kW)	N/A[10]	1,500	1,500	2,000
Firm Capacity (kW)	1,635	1,815	1,000	565

Citation 2 (p. 18, p. 52 pdf):

> The timing of a diesel generating station replacement depends heavily on the existing condition and design capacity of the facility. Hydro has established a replacement schedule (Table 4) for the diesel generating stations in southern Labrador based on service life, plant capacity, and condition. The diesel generating stations in Mary's Harbour and Port Hope Simpson have both exceeded their design plant capacity and any future generation expansion would likely require a new plant or extension. (underlining added)

Table 4: Diesel Generating Station Replacement Schedule

Location	In-Service Year	Replacement Year (Projected)
Mary's Harbour	1994	2030
Port Hope Simpson	1995	2035
St. Lewis	2006	2045

a. Please confirm that the proposed project would replace the existing Port Hope Simpson generating station in 2024, even though it is not due for replacement until 2035.

b. Please confirm that the firm capacity in each of the communities is substantially greater than the forecast peak loads for each community in 2039.

c. Please confirm that, according to Hydro's load forecasts, future generation expansion is expected to be minimal.

d. Does Hydro generally replace gensets promptly when their scheduled Replacement Year arrives? How many gensets are currently in service that are past their projected replacement date? Please provide a table listing all such gensets, their in-service year, and the projected replacement year.

e. Please explain why the Installed Capacity in MSH is so much greater than the Design Plant Capacity.

f. Please explain the significance of the fact that the diesel generating stations in Mary's Harbour and Port Hope Simpson have both exceeded their design plant capacity. What are its implications regarding the cost and reliability of the service provided?

A. a. It is confirmed that the proposed project would replace the existing Port Hope Simpson diesel generating station in 2024, even though it is not due for replacement until 2035. This project is justified on the basis that it will provide reliable and least-cost power for the southern Labrador region as a whole and is not based solely on the replacement of any single diesel generating station. The location of the proposed regional diesel generating station is in Port Hope Simpson as it is the most centralized community in the area. Early in the development of alternatives for this project, Newfoundland and Labrador Hydro ("Hydro") considered continuing to supply Port Hope Simpson with the existing diesel generating station until 2035 and interconnecting it to the regional diesel generating station at that time. This was screened out in preliminary economic analysis as there is considerable unneeded expenditure associated with operating two generating stations in the same community (i.e., the regional diesel generating station in Port Hope Simpson supplying Charlottetown and the existing Port Hope Simpson Diesel Generating Station supplying Port Hope Simpson).

b. It is confirmed that the firm capacity in each of the communities is greater than the forecasted peak load for each community in 2039. Although this project is not justified on the basis that there is inadequate firm capacity in the southern Labrador area, it will provide

better flexibility in terms of supplying sudden unexpected load growth[1] which occurs from time to time in Hydro's isolated systems.

c. While Hydro's Load forecast, included in Table 2 of the "Long-Term Supply Study for Southern Labrador: Economic & Technical Assessment,"[2] shows relatively consistent load level over the duration of the forecast, it is possible or even likely that there will be new large services request not included in the forecast that Hydro will be required to serve. Hydro does not know this for certain and cannot accurately predict when and where these services will be required but, historically, from time to time Hydro receives large unexpected requests for electrical service. For example, Hydro recently received a large service request for a new customer in Mary's Harbour that trigged the need for Hydro to upgrade its distribution system and plant service conductor.[3] This customer was not included in Hydro's forecast in advance of Hydro receiving a new service request.

d. Hydro's genset replacement criteria is to replace an 1,800 rpm genset when it is due for its fifth overhaul, ideally when it reaches 100,000 operating hours as overhauls are done at 20,000 hour intervals. 1,200 rpm gensets units are replaced at the fourth overhaul, ideally at 120,000 operating hours as overhauls are done every 30,000 operating hours. With exception of extenuating circumstances, Hydro replaces these units when they are scheduled as running past this date comes with a heightened reliability risk.

There is currently only one genset in Hydro's fleet that is past its projected replacement date—Unit 3033 in Makkovik, installed in 1992. Due to the timing of upgrades at the Makkovik Diesel Generating Station, Unit 3033 received its fifth overhaul at 97,000 hours and is expected to remain in service until it approaches 117,000 hours. Hydro has determined that operation of this unit beyond 100,000 hours presents low risk to reliability

[1] Unexpected load growth occurs when new large customers are connected to Hydro system without formally requesting service in advance of facility construction. This happens from time to time with large community funded infrastructure such as arenas, schools, and fire heat-tracing systems, or facilities associated with the fishing industry.
[2] "Long-Term Supply for Southern Labrador," Newfoundland and Labrador Hydro, July 16, 2021, sch. 1, att. 1, table 2.
[3] For additional information, see "2022 Capital Budget Application," Newfoundland and Labrador Hydro, August 4, 2021, vol. 2, sch 7, p. 66–86, and sch. 8, tab 16.

based on the recent overhaul and the age and condition of the other units in that diesel generating station.

e. This is due to the presence of a mobile generator located outside of the engine hall.[4]

f. When sudden significant load growth occurs or is expected to occur and there is no longer enough space in a diesel generating station engine hall to install larger or additional diesel generation units, Hydro installs mobile generation to supply load until an extension or replacement can occur. Mobile generators may increase the generation capacity above the diesel generating station design capacity, as mobile generators are installed outside the diesel generating station and therefore may bypass bottlenecks that limit the capacity of the diesel generating station itself, as is the case in Mary's Harbour. The use of mobile generation as an interim solution while a plan for the long-term supply for southern Labrador was in development. In the case of Port Hope Simpson, Hydro was able to fit a 725 kW diesel genset in an engine bay designed for 500 kW unit. While typically this is not possible, Hydro does review the specific unit footprints and engine hall dimensions when recommending the size of replacement diesel units.

Mobile generation is not considered an appropriate long-term solution for firm generation due to: safety concerns such as limited physical space and arc-flash hazards; environmental concerns such as low fuel efficiency and higher probability of fuel spills; and reliability concerns such as limited protection and control, and lack of condition monitoring. On summer peaking systems such as the Mary's Harbour system, the reliability risks associated with mobile generation may be partially mitigated, as reliability concerns are exacerbated due to mobile generators not being designed for use in harsh northern climates. However, additional concerns regarding mobile generation are further outlined in Section 3.2 of the Long-Term Supply Study for Southern Labrador: Economic & Technical Assessment. [5]

[4] "Long-Term Supply for Southern Labrador," Newfoundland and Labrador Hydro, July 16, 2021, sch. 1, att. 1, p. 2/9–11.
[5] "Long-Term Supply for Southern Labrador," Newfoundland and Labrador Hydro, July 16, 2021, sch. 1, att. 1.