

1 Q. **Reference: Response to Request for Information PUB-NLH-001, Attachment 1, Page 3 of 10,**  
2 **Lines 1 - 8**

3 If multiple diesel generating stations were interconnected at the distribution level, for each of  
4 the following considerations, please separately indicate if sharing available spare capacity:

- 5 ● could reduce or eliminate the need for the mobile generation;
- 6 ● could potentially address the capacity constraints of each individual diesel generating  
7 station;
- 8 ● could improve diesel generating station operating efficiency;
- 9 ● could provide additional ability to add renewable generation; and
- 10 ● could provide future options to reduce future generating station replacement costs;  
11 and/or reduce the total number of diesel units on the system?

12 In the response please provide details on each of these potential impacts.

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15 A. **Reduce or Eliminate the Need for the Mobile Generation**

16 Newfoundland and Labrador Hydro (“Hydro”) does not expect to be able to reduce or eliminate  
17 the need for mobile generation if the diesel generating stations in southern Labrador were  
18 connected together. As per Table 1, if mobile generation was excluded from the calculation of  
19 each diesel generating station’s firm capacity, than the total firm capacity of the region would  
20 become 2,655 kW. This is unacceptable as it means Hydro would not have enough firm capacity  
21 to meet the forecasted peak load of 3,602 kW in 2024. Even if Hydro maximized the amount of  
22 generation in St. Lewis by installing four 500 kW diesel generating units to fully utilize its  
23 2,000 kW design capacity, then the total firm capacity of the region would become 3,590 kW  
24 which is still less than the forecasted peak load in 2024.

**Table 1: Southern Labrador Diesel Generating Capacity**

Diesel Unit Position	CHT <sup>1</sup>	MSH <sup>2</sup>	PHS <sup>3</sup>	Capacity (KW)		Total (Existing)	Total (Max SLE)
				SLE <sup>4</sup> (current)	SLE (Max)		
G1	910	545	545	200	500		
G2	910	545	725	365	500		
G3	725	725	455	455	500		
G4		725			500		
Installed Capacity	2,545	2,540	1,725	1,020	2,000	7,830	8,810
Firm Capacity	1,635	1,815	1,000	565	1,500	5,015	5,950
Firm without Mobile Generator	0	1,090	1,000	565	1,500	2,655	3,590

1           **Potential to Address the Capacity Constraints of Each Individual Diesel Generating Station**

2           Given that at least some amount of mobile generation would still be required to maintain  
 3           adequate amount of firm capacity, then the capacity constraints in the southern Labrador region  
 4           would not be addressed. If no additional capacity were added to St. Lewis, then one less mobile  
 5           generator would be required. If the mobile generating unit from Mary’s Harbour was removed,  
 6           then the capacity constraints in Mary’s Harbour could be considered addressed but there would  
 7           still be a need for mobile generation elsewhere on the southern Labrador interconnected  
 8           system. If these four systems are interconnected while maintaining diesel generating stations in  
 9           each community then it is irrelevant to consider capacity constraints of individual systems.  
 10          Instead, the regional capacity would be most relevant.

11          **Improved Diesel Generating Station Operating Efficiency**

12          In theory, there could be an increase in diesel generating station operating efficiency if multiple  
 13          diesel generating stations were interconnected at the distribution level compared to the existing  
 14          configuration, as the increased number of units could allow generation to be managed in such a  
 15          way that optimizes individual unit efficiency. However, under this circumstance Hydro would not  
 16          be purchasing new units which would otherwise provide the opportunity to evaluate vendors  
 17          and models based on fuel efficiency, Hydro would not be optimizing generation size by selecting

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<sup>1</sup> Charlottetown (“CHT”).  
<sup>2</sup> Mary’s Harbour (“MSH”).  
<sup>3</sup> Port Hope Simpson (“PHS”).  
<sup>4</sup> St. Lewis (“SLE”).

1 new diesel generation sizes, and Hydro would still be constrained to installing units that fit in  
2 existing diesel generating stations, or mobile generators, which would limit possible future  
3 arrangements that could further optimize diesel generating station efficiency. Hydro's proposed  
4 alternative (phased interconnection with a regional diesel generating station) would allow Hydro  
5 to purchase new units and evaluate specific models and vendors based on fuel efficiency,  
6 optimize diesel generation sizes by completing diesel generating station simulations to ensure  
7 appropriate unit sizes are considered, and consider a greater variety of unit sizes due to larger  
8 engine bays. All these activities are expected to lead to increased generation unit efficiency.

9 **Additional Ability to Add Renewable Generation**

10 If multiple diesel generating stations were interconnected at the distribution level there would  
11 be an increased ability to add renewable generation when compared to the existing  
12 configuration. The interconnection distribution lines themselves would cover a broader area  
13 allowing renewable energy systems to be more economically constructed across a larger region,  
14 which could include areas with better wind resources or better topography to construct  
15 photovoltaic arrays. The potential for a larger amount of load served by one system would allow  
16 fewer larger renewable energy systems, and could potentially be constructed for a lower  
17 levelized cost of energy. The greater variety of engine units would provide greater flexibility in  
18 managing diesel generating unit minimum load constraints.

19 **Future Options to Reduce Future Generating Station Replacement Cost**

20 Hydro does not expect to be able to materially reduce the future generating station cost if the  
21 existing diesel generating station configuration in southern Labrador were connected together.  
22 This form of an interconnection would not change the expected diesel generating replacement  
23 schedule as the factors which dictated the replacement schedule (diesel generating station  
24 service life, condition, and regional capacity constraints) would not change. It is possible that the  
25 cost of the future generating station could decrease as the new diesel generating stations may  
26 require less capacity. However, the potential cost savings associated with a minor decrease in  
27 capacity are minimal if a new building is being constructed. For example, in Hydro's response to  
28 PUB-NLH-030 of this proceeding, Hydro included a high-level estimate of the reduction in capital  
29 costs to move from an N-2 to N-1 redundancy requirement for the proposed regional diesel  
30 generating station of \$2.5 million. This cost includes the saving associated with one less engine

1 along with the reduction in electrical, building, and protection control and communication costs.  
2 Hydro would expect that any minor decreases in capacity requirement for future community-  
3 based diesel generating stations would be significantly less than this \$2.5 million cost as the  
4 impact would more likely mean a reduction in unit size instead of the elimination of a full unit  
5 including building space and auxiliary equipment. As identified in Hydro’s sensitivity analysis  
6 included in the “Long-Term Supply Study for Southern Labrador: Economic & Technical  
7 Assessment,”<sup>5</sup> a decrease in diesel generating station replacements costs of \$2.5 million  
8 (equivalent to 12%<sup>6</sup>–18%<sup>7</sup>) of the diesel generating station replacement capital cost) is  
9 significantly less than the 80% required to alter the results of the cumulative present worth  
10 analysis.

### 11 **Reduce the Total Number of Diesel Units on the System**

12 Depending on the amount of additional capacity added to the St. Lewis Diesel Generating  
13 Station, there could be potential to reduce the total number of diesel generating units by one.

14 If no additional capacity were added to the St. Lewis Diesel Generating Station, then one mobile  
15 generator<sup>8</sup> could be removed. This would result in a system firm capacity of 4,290 kW compared  
16 to a peak load of 3,602 kW expected in 2024. Under this scenario, if a second mobile generator  
17 were removed, the system firm capacity would become 3,565 kW which would be less than the  
18 expected 2024 peak load which is unacceptable.

19 If the four 500 kW units were installed in St. Lewis to maximize the amount of capacity by  
20 matching the diesel generating station’s design capacity, then two mobile generating units could  
21 be removed (e.g., MSH G4 and CHT G3), resulting in an overall decrease of one diesel unit. If the  
22 two smallest mobile diesel generating units are removed then the firm capacity would become

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<sup>5</sup> “Long-Term Supply for Southern Labrador – Phase 1,” Newfoundland and Labrador Hydro, July 16, 2021, sch. 1, att. 1, sec. 6.1, at p. 41, Table 15.

<sup>6</sup> The capital cost to replace the Charlottetown Diesel Generating Station (the most expensive diesel generating station replacement) based on Table 7 of the “Long-Term Supply Study for Southern Labrador: Economic & Technical Assessment” is \$21.4 million. \$2.5 million is approximately 12% of \$21.4 million.

<sup>7</sup> The capital cost to replace the St. Lewis Diesel Generating Station (the least expensive diesel generating station replacement) based on Table 7 of the “Long-Term Supply Study for Southern Labrador: Economic & Technical Assessment” is \$14.2 million. \$2.5 million is approximately 18% of \$14.2 million.

<sup>8</sup> If Hydro had the option to reduce the number of diesel units in the southern Labrador region, it would prioritize removing the mobile generators due to the concerns associated with mobile generation identified in Section 3.2 of the “Long-Term Supply Study for Southern Labrador: Economic & Technical Assessment” .

1 4,500 kW. Under this scenario, if a third mobile generator was removed, the system firm  
2 capacity would become 3,590 kW which is less than the expected 2024 peak load. The  
3 operational savings associated with reducing the number of diesel units from 13 to 12 would be  
4 minimal and insignificant compared to the savings associated with the proposed alternative  
5 which involves the reduction in the number of diesel units from 13 to 5.