

1 Q. **Reference: Long-term Supply Plan for Southern Labrador – Revision 2, Schedule 2, page 5,**
2 **lines 7 to 9.**

3 The Midgard IRP highlighted several benefits of interconnecting the Southern
4 Labrador Communities to a regional generating station, including operational
5 savings due to reduced fuel consumption, improved system reliability, reduced
6 capital costs, and greater potential for renewable penetration.

7 Would the benefits noted above be realized in any alternative that includes interconnection of
8 any or all diesel plants in Southern Labrador? For example, would the interconnection of
9 existing diesel plants result in reduced fuel consumption, improved system reliability, or reduced
10 capital costs?

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13 A. *This response has been provided by Midgard Consulting Inc. (“Midgard”).*

14 Some of the benefits noted in the Midgard IRP will be realized in alternatives that include the
15 interconnection of existing diesel generating stations, while other benefits will not.

16 **Renewable Penetration**

17 While a detailed analysis was not performed on the specifics to interconnect renewable energy
18 sources, there are issues with minimum load levels on gensets, which become larger issues on
19 smaller loads (as would be seen with Islanded diesel generating stations) versus aggregated
20 loads (as provided by a regional diesel generating station or other interconnected system). In
21 addition, one of the major costs for renewable generation is interconnection costs, largely
22 driven by proximity to an existing power line. Interconnecting the southern Labrador system will
23 provide a much larger area for renewable projects to be located in close proximity to a power
24 line. As such, building transmission, whether through a regional diesel generating station or
25 interconnection of existing facilities, will increase the potential for renewable resources.

1 **System Reliability**

2 Construction of a regional diesel generating station will concentrate the generation assets in a
3 single location; aggregation of all loads onto one system will reduce the peak generation
4 capacity that must be maintained on the system. Based on the analysis of the 15-minute data
5 covering all of the gensets through 2019, all southern Labrador communities could be powered
6 on a single genset for 90% of the year. While the frequency of generation-related outages is
7 more affected by the redundancy configuration (N-1 vs N-2), it is anticipated that the
8 construction of a regional diesel generating station may reduce the number of hours of outages
9 on the system, which is another measure of system reliability. This reduction may be offset by
10 additional powerline length, which introduces vulnerability to powerline-related outages. The
11 analysis of system reliability, included in the “Southern Labrador Communities – Integrated
12 Resource Plan” (“Midgard IRP”),¹ filed with the Board of Commissioners of Public Utilities on
13 March 31, 2023² suggests that the net effect on reliability is positive with the use of a regional
14 diesel generating station. Depending on the configuration of the generators provided, an
15 interconnection of existing diesel generating stations could also increase reliability; however,
16 the current number and sizes of diesel generating stations will result in a high level of
17 complexity. The coordination and synchronization of multiple diesel generating stations in
18 different locations may be problematic as a result. The full reliability implications of such a
19 configuration are currently unknown; however, this configuration is unlikely to be more reliable
20 than a regional diesel generating station.

21 **Reduced Capital Costs**

22 The major cost savings associated with the interconnection of southern Labrador with a regional
23 diesel generating station are realized by having a single diesel generating station building and
24 fewer, larger gensets. The cost of a single diesel generating station capable of housing five or six
25 large generators will be much less expensive than the cost of two or three diesel generating
26 stations each holding three gensets. Genset costs are also non-linear, so a large genset is
27 generally significantly less expensive than two gensets half the size. As a result, multiple smaller

¹ “Southern Labrador Communities – Integrated Resource Plan,” Midgard Consulting Inc., March 28, 2023.

² “Long-Term Supply for Southern Labrador – Phase 1 – Midgard Consulting Inc. Report,” Newfoundland and Labrador Hydro, March 31, 2023, att. 1.

1 diesel generating stations will not be able to provide capital cost savings over a single,
2 centralized diesel generating station.

3 **Reduced Fuel Consumption**

4 Generation technologies are generally more efficient at larger sizes and there are certain sizes at
5 which a “breakpoint” is reached where a change in technology is warranted. In general, larger
6 diesel gensets are more efficient than smaller diesel gensets. The largest existing genset is
7 725 kW, while the smallest genset currently proposed for the regional diesel generating station
8 is 910 kW, which is more fuel efficient than the existing 725 kW gensets. Comparing the two
9 scenarios:

- 10 ● **Interconnection with Existing Plants:** Reviewing the 2019 generation data shows that
11 the aggregate load on the system averages 1,725 kW, which is greater than each of the
12 two largest, most efficient gensets (725 kW), which would be available on the combined
13 system using existing diesel generating stations. Aggregate load is less than the
14 combined 1,450 kW output of these two gensets 34% of the year, so the load would
15 need to be at least partially covered by the other smaller, less efficient gensets.
- 16 ● **Regional Plant:** The regional diesel generating station would be able to run the
17 aggregate load in the most efficient range (70%–100% load) of a single genset (1,833 kW
18 or 2,220 kW) 79% of the time and will always generate at a higher efficiency than any
19 existing currently installed gensets.³

20 In a scenario interconnecting the existing plants, the largest unit is 725 kW;⁴ therefore, the
21 greatest achievable efficiency would be limited to the efficiency of this unit. There is limited
22 ability with the existing diesel generating stations to add a larger, more efficient genset without
23 building a new diesel generating station. Doing this will effectively be recreating the “regional
24 diesel generating station” configuration at whichever diesel generating station this upgrade is
25 required.

³ Generation is below the “peak efficiency” range of the smallest genset in the regional diesel generating station (910 kW). The data set demonstrates that generation is above the peak efficiency range of the smallest genset in the regional diesel generating station for all but 87, 15-minute load data records (21.75 hours) and all of these events appear to be a result of data system errors rather than actual load reductions.

⁴ Please refer to “Southern Labrador Communities – Integrated Resource Plan,” Midgard Consulting Inc., March 28, 2023, p. 39, Table 11.