Q. **Reference: Long-Term Supply for Southern Labrador – Phase 1, pages 4–5 (pp. 16–17 pdf)**

Citation 1:

> In order to meet firm capacity requirements for the southern Labrador system, Hydro has considered alternatives to provide firm capacity using diesel generation, small-scale hydro generation, or interconnection to the bulk electrical system, as detailed in Section 4.0. While there is a need for non-renewable sources to meet the system firm capacity requirements, these alternatives do not preclude Hydro from availing of the integration of renewable resources for the provision of energy in the future. The alternatives under consideration by Hydro will include provisions for future infrastructure required to integrate renewable sources. Alternatives involving the interconnection of multiple isolated systems are expected to further facilitate the integration of renewable energy as such systems are better suited to absorb fluctuations in supply that are commonly experienced from renewable generation, allowing for a greater penetration of renewable energy on the system. (underlining added)

a. Please describe the provisions for future infrastructure required to integrate renewable sources that are included in the recommended alternative.

b. Does the statement that integrated systems are better suited to absorb fluctuations in supply from renewable generation take into account the distance between such generation and the diesel plant providing load following services? More specifically, please describe the challenges, if any, that would arise in integrating a large wind farm near the edge of the integrated system, i.e. in Charlottetown, St. Lewis or Mary's Harbour.

A. a. Newfoundland and Labrador Hydro's recommended alternative includes provisions for physical space for equipment required to integrate renewable sources. The proposed building includes space allocated for a renewable control panel and switchgear, as well as space for a grid operator station. The proposed design also includes provision of space in the substation to allow for potential connection of renewable sources to the interconnected system. The cost of allocating space for such equipment is not material, as it has a negligible impact on the overall building and substation footprint.

In addition to provisions for physical space, the use of multiple genset sizes in the proposed alternative would allow optimization of the generation profile to maximize the penetration of renewable energy on the system. With the smallest unit sized at 1,000 kW, the minimum diesel generation would be approximately 400 kW, potentially allowing for the remaining load to be served by renewable energy sources.

b. The statement that integrated systems are better suited to absorb fluctuations in supply from renewable generation does take into account the distance between such generation and the diesel plant providing load following services.

If large renewable energy systems are installed near the edges of the interconnected system and are sized to match the load of the community they are next to (as would be the case if the systems remained isolated), then there will be a reduction in total system losses as less power will be required to travel the long distance from the centralized diesel plant to the larger load centers. In the event where the renewable energy systems are large enough to cause significant net energy flow from the edge of the system to the center, then voltage drop may become a concern. However, these concerns can be mitigated using voltage regulating equipment such as voltage regulators to maintain adequate voltage throughout the system.