

1 Q. In the discussion of CTs (RAP Appendix C, page 40 of 163, section 4.4.2.1.2), Hydro indicates
2 significant need for and benefits of Synchronous Condensers in terms of transient stability,
3 voltage regulation and frequency regulation. If these capabilities are included with the CT,
4 would it mitigate mitigating the limitation represented by the Technical Conference #3
5 presentation slide 47, and if so, by how much?

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8 A. The proposed on-Avalon Combustion Turbine (“CT”) operating as a synchronous condenser
9 would provide inertia, which contributes to transient stability of the system by slowing down
10 the rate of change of frequency immediately after an event such as a Labrador-Island Link (“LIL”)
11 bipole trip.¹ Simulations were performed to determine the impact on system frequency
12 response following a LIL bipole trip with and without the added inertia from the CT when
13 operating as a synchronous condenser. An example of simulated results from a LIL bipole trip is
14 presented in Figure 1.

15 The simulations show no significant difference in frequency response with (green plot) or
16 without (blue plot) the added inertia from the on-Avalon CT. This is explained by the fact that
17 the minimum frequency of the system following the loss of supply is highly dependent on the
18 resulting capacity deficit as opposed to total system inertia. On this basis, the loss of supply is
19 most effectively counteracted by under frequency load shedding, runbacks, or the sudden
20 injection of real power. The additional inertia serves to slightly slow down the rate of frequency
21 decay. However, the extra time for governor action is insufficient to make an appreciable
22 difference in frequency recovery.

¹ Inertia refers to the energy stored in rotating equipment, such as generators, motors, and synchronous condensers, which provides frequency stability during changing power system conditions.

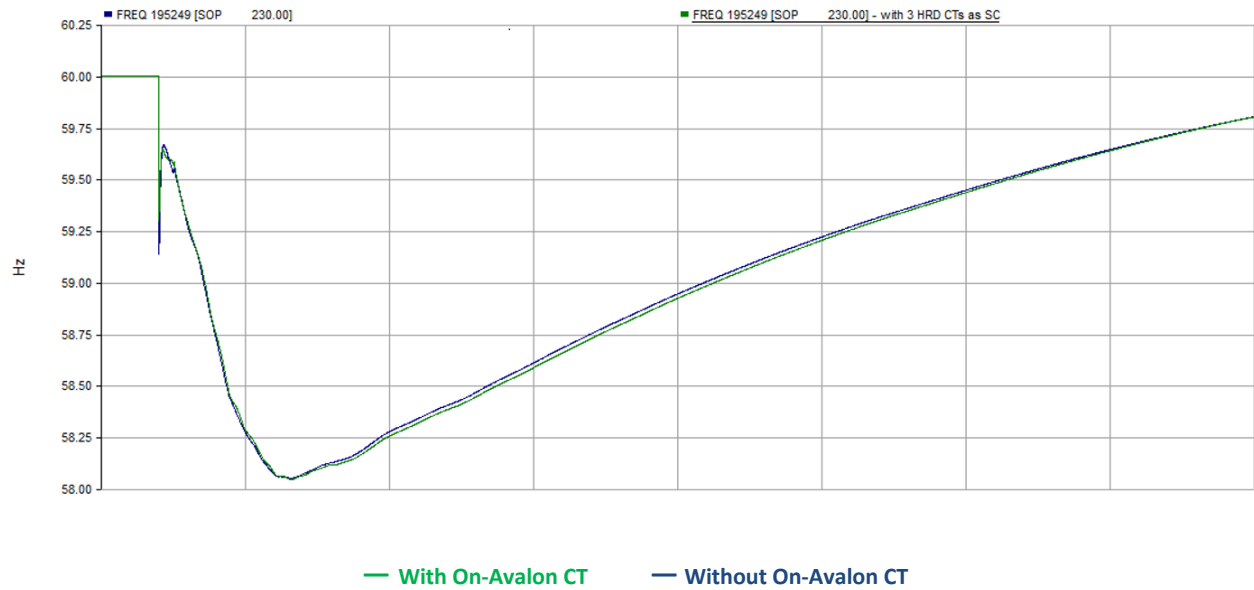


Figure 1: System Frequency Response