Q. **Reference: Newfoundland and Labrador Hydro - Long-Term Load Forecast Report**

Please refer to the EV Adoption and Impacts Study. At page 12, please explain:

a) How was the maximum theoretical potential for deployment, including market size and composition and model availability determined.

b) What was the basis for calculating the unconstrained economic potential uptake in particular the incremental purchase cost of PHEV/BEV over ICE vehicles.

c) How were the NL-specific barriers and constraints to EV adoption incorporated, in particular how they are expected to change over time and what drives the change.

d) How the EVA Model approaches solving the non-trivial issue of jointly modelling the factors that induce diffusion and the factors that might favor adoption considering the available EV alternatives.

A. *This response is provided in consultation with Dunsky Energy + Climate Advisors ("Dunsky").*

a) The maximum theoretical potential for deployment was based on Newfoundland and Labrador-specific data. The market size was based on a review of the current stock of registered vehicles in Newfoundland and Labrador, and the composition was broken out into vehicle classes (i.e., cars, trucks, buses etc.).[1,2] The model availability was based on Dunsky's internal knowledge and research, including research developed by Dunsky on behalf of Transport Canada.[3]

b) The model uses a bottom-up cost estimate for vehicle costs based on the specific costs including i) baseline vehicle costs; ii) internal combustion engine ("ICE") powertrain costs; iii)

[1] Natural Resources Canada. Transportation Sector – Newfoundland and Labrador, <https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive/trends_tran_nf.cfm>.
[2] Statistics Canada. Table 23-10-0308-01 Vehicle registrations, by type of vehicle and fuel type, <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2310030801>.
[3] "Zero Emission Vehicle Availability," Dunsky Energy + Climate Advisors, <https://dunsky.com/wp-content/uploads/Zero-Emission-Vehicle-Availability-2022-Update.pdf>.

electric powertrain costs; and, iv) the battery costs for the plug-in hybrid electric vehicle ("PHEV") or battery electric vehicle ("BEV"). While all costs are considered, the major input that has the largest impact is the cost of batteries for the PHEV/BEV vehicles. These battery costs are based on Bloomberg New Energy Finance and United States Energy Information Administration forecasts. The reduction of the forecasted cost of batteries over time is the major driver in the economic potential of the adoption of PHEV/BEV over ICE vehicles. As battery costs decline, the cost benefit of purchasing and operating a PHEV/BEV improves.

c) The constraints are based on assumptions that apply to Newfoundland and Labrador, including public charging, PHEV/BEV availability, home charging constraints, and range anxiety. Infrastructure for public charging is a constraint that is based on the current public charging infrastructure available in Newfoundland and Labrador while also considering the approved plan for additional chargers to be installed by Newfoundland Power Inc. and Newfoundland and Labrador Hydro. The model then considers alternate assumptions for future expansion in the different scenarios: low growth includes limited expansion of public charging; moderate growth includes expansion in line with historical trends; and, high growth increases the investment in public charging deployment.

The availability of PHEV/BEV is based on Dunsky's in-house research and knowledge as discussed in part a) of this response. The availability of electric vehicles ("EV") for sale in Newfoundland and Labrador is expected to improve over time as car manufacturers introduce new models and increase EV production. The sensitivities to the scenarios use a range of EV model availability assumptions, including low sensitivity (i.e., limited availability), base case (i.e., moderate availability) and high sensitivity (i.e., high availability).

While home charging access is an input into the model, in Newfoundland and Labrador this constraint has limited impact on the results and is a minor constraint based on the housing types in Newfoundland and Labrador which include a significant amount of single-family homes.

Range anxiety or range requirements capture the portion of the market constrained by the limited range of BEV (range anxiety does not apply to PHEVs). This constraint reduces over time as customers overcome the anxiety as the technology in PHEV/BEV improves, with the

increase of public infrastructure and as more customers gain information and knowledge of vehicle charging.

d) The model first incorporates market dynamics and non-quantifiable market constraints as discussed in response to parts a) through c) of this response; results are then calibrated using diffusion theory on the market adoption of new technology based on Newfoundland and Labrador's historic adoption of PHEV/BEV vehicles.