Request IR-1:

Please provide workpapers, with formula intact, in Excel format, for all Figures/Charts presented in the load forecast report.

Response IR-1:

Please refer to Synapse IR-01.

Request IR-2:

(a) Other than residential EV charging and batteries, what other assets from the Smart Grid Nova Scotia (SGNS) Project were used in the load forecast Report?

(b) Please provide workpapers showing the impact of SGNS asset classes (other than residential EV charging and batteries) that were used in load forecast on peak demand and energy, by year, for the forecast period.

(c) Please provide rationale for excluding the SGNS asset classes that were not used in load forecast.

Response IR-2:

(a) Learnings from SGNS are used to help inform or compare some of the inputs in the forecast (EV charging, solar and batteries), but they are not direct inputs to the forecast.

(b) SGNS specific assets are not explicitly included in the forecast.

(c) SGNS is a pilot project used to evaluate specific scenarios related to grid control and is not a direct input to the forecast.

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Request IR-3:

(a) Please clarify if a probabilistic analysis of DER penetration/adaptation under different scenarios (i.e., low, medium, and high penetration rate) has been performed for the forecast period.

(b) If so, please provide results and workpapers; if not please explain why such analysis was not completed.

Response IR-3:

(a) A probabilistic analysis of DER penetration/adaption has not been performed for the forecast period, but a High Distributed Energy Resources (HDER) sensitivity was modelled during the 2022 Evergreen IRP (scenarios CE1-E1-R1 HDER and CE1-E1-R2 HDER). This sensitivity assumed a higher level of rooftop solar penetration (approximately 1500 MW by 2050).

(b) Results and workpapers from the 2022 Evergreen IRP can be found at https://www.nspower.ca/irp/document-library.

Request IR-4:

(a) Please confirm if the impact of energy efficiency under different DER penetration scenarios (low, medium, and high penetration) has been studied.

(b) If so, please provide results and workpapers; if not please explain why such analysis was not completed.

Response IR-4:

(a) Varying energy efficiency and DER penetration scenarios were studied as part of the 2022 Evergreen IRP. Three levels of DSM programing were modelled during the IRP:

1. Base DSM – Starts at DSM levels corresponding to the E1's 2023 to 2025 DSM resource plan. Beyond 2025, DSM amounts are based on the base case scenario from E1's 2019 DSM potential study.
2. Modified Mid DSM – An adjusted DSM scenario, which starts at DSM levels corresponding to the E1's 2023 to 2025 DSM resource plan and gradual increases to the Mid DSM profile from E1's 2019 DSM potential study.
3. Base+ DSM – scenario between Base and Modified Mid.

In addition to varying levels of DSM a High Distributed Energy Resources (HDER) sensitivity was modelled. This sensitivity assumed a higher level of rooftop solar penetration (reaching approximately 1500 MW by 2050).

(b) Results and workpapers from the 2022 Evergreen IRP can be found at https://www.nspower.ca/irp/document-library.

Request IR-5:

(a) Please clarify if the impact of reactive power on load has been studied.

(b) If so, please provide results and workpapers; if not please explain why such analysis was not completed.

Response IR-5:

(a) No, the reactive power impact on load has not been studied.

(b) The load forecast focuses on energy sales (in GWh) and peak load (in MW). Although reactive power is important from a system planning and operations perspective, it is beyond the scope of the load forecast.

Request IR-6:

(a) Please clarify if the impact of net-zero energy-ready (NZER) code on load and demand has been studied.

(b) If so, please provide results and workpapers; if not please explain why such analysis was not completed.

Response IR-6:

(a) NS Power is not aware of any NZER code that has been implement or will be implemented in the near term.

(b) There is no indication that a NZER code will be implemented in a timeframe that would materially impact the load forecast.

Request IR-7:

Refer to page 8, Figure 2. Historical and Predicted Annual System Peak. While system peak load has been flat for the period 2014-2021, there have been substantial spikes in peak demand in 2022 and 2023.

(a) Please describe the main drivers of the significant increases in 2022 and 2023 peak demands, broken down by the contribution of each factor.

(b) Please quantify the impact of the factors that drove peak demand substantially higher in 2022 and 2023, compared to previous years, on near-term and long-term peak demand forecasts.

Response IR-7:

(a) The variations in historical peak values are related to the weather conditions at peak times over the past few years, in particular temperature. Appendix A, Table A2 provides a summary of the conditions at peak times. 2021 temperature was warmer than normal, 2022 was close to normal conditions causing an increase over 2021, and 2023 temperature was colder than normal, causing an increase over 2022.

(b) The factors are mainly related to the weather conditions at peak. Variances comparing forecast to actual are provided in Figure 62 in the report for the 2023 peak, and a similar table was produced for the 2022 peak in the 2023 report (Figure 66). Both are provided here in the tables below. As discussed in Section 10 and shown in Figure 63, updates to the model have reduced the unexplained variance in the predicted peak values.

1

	MW
2023 Forecast Peak	**2,256**
Interruptible	-88
Weather (-22.8°C 12hr lag avg)	+250
Wind (28.4 km/h daily avg)	+26
Weekend	-30
Lighting (estimated)	-150
Unexplained	+191
2023 Feb Peak	**2,455**

2

	MW
2022 Forecast Peak	**2,165**
Interruptible	+11
Weather (-13.9°C 12hr lag avg)	0
Wind (16.5 km/h daily avg)	+6
Unexplained	+34
2022 Actual Peak	**2,216**

3

Request IR-8:

Refer to page 33, Figure 20: Heat Pump Energy and Peak Comparison. Please describe the main drivers of the substantial differences between NS power and E3 estimations.

Response IR-8:

E3 used its in-house building electrification model, RESHAPE, to simulate diversified system-level heat pump, current resistance and hybrid customer load shapes. RESHAPE considers several features of heat pump operations (such as equipment efficiency and building characteristics) that could contribute to the different peak load estimates than the existing SAE peak model.

Request IR-9:

Refer to page 34, Figure 21: Heat Pump Forecast. Please describe the methodology used and provide workpapers for forecasts shown in Figure 21.

Response IR-9:

Please refer to Synapse IR-7 part (i).

Request IR-10:

Refer to page 40, Figure 26: EV Impact to Energy and Peak Forecasts (cumulative). Please clarify whether the load and peak at 0.9 kW/vehicle forecast is based on E3 estimations or the results of Smart Grid Nova Scotia (SGNS) Project.

Response IR-10:

The peak load of 0.9kW/vehicle is based on E3 estimates.