

NOVA SCOTIA UTILITY AND REVIEW BOARD

IN THE MATTER OF: THE PUBLIC UTILITIES ACT

- and -

IN THE MATTER OF: NOVA SCOTIA POWER INCORPORATED (NS Power)
10 - Year Energy and Demand Forecast
(2022 Load Forecast Report)

NON-CONFIDENTIAL INFORMATION REQUESTS

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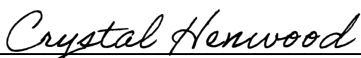
From: **Nova Scotia Utility and Review Board**
Board Staff

Responses Due: **Friday, July 8, 2022**

Copies: 1 electronic copy (PDF searchable)

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Crystal Henwood, Regulatory Affairs Officer/Clerk

Request IR-1:

With reference to the 2020 Load Forecast Decision Letter (M09707), dated October 20, 2020, the Board directed NS Power to consider the near-term and long-term effects of COVID-19 on future electricity sales. On pages 59-60 of 98 of the application, NS Power states:

The COVID-19 variable that was added in 2020 continues to be used, and is reduced in both March and October, 2022 as the work from home impact is expected to further decrease. ... The long-term impact of the COVID-19 pandemic on working habits in Nova Scotia is still unknown, but the assumption in this forecast is that there will be a certain amount of continued work-from-home load, likely through hybrid work models.

- a) Page 2 of 31 of Appendix B to the application indicates that the COVID-19 variable has been modified. Please confirm if the table below is correct and that NS Power does not intend to apply the COVID-19 variable in future forecasts.

2021 Load Forecast	2020	2021	2022	2023-2031
COVID-19 variable	1	0.75	0.38	0.38
2022 Load Forecast	July 2020	October 2020	March 2022	September 2022
COVID-19 variable	1	0.5	0.33	0.16

Request IR-2:

With reference to the 2020 Load Forecast Decision Letter, dated October 20, 2020 (M09707), the Board directed NS Power to incorporate additional sources for electric vehicle forecasts for 2021 to improve the breadth of information relied upon. NS Power indicates on page 17 of its application in matter M10109 that "In June 2020 Dunskey Energy Consulting prepared a study of EV adoption in Nova Scotia for the Ecology Action Centre". In response to Board IR-1(c) (M10109), NS Power indicates that two forecasts were evaluated and that the Dunskey report was used because it was the most recent.

- a) Please identify how the 2020 Dunskey Energy Consulting forecast for EV use compares to E3's forecast for EV use. Please specify the input variables used in each forecast, identifying Nova Scotian or Canadian specific data, and provide a side-by-side comparison of the two forecasts.

Request IR-3:

With reference to Section 4.3 Economic Information, page 29 of 98. The application notes that “Economic and other provincial statistics used in the load forecast are from the Conference Board of Canada’s 20-year forecast”.

- a) Please provide a copy of the data tables from the Conference Board of Canada’s 20-year Outlook used in the 2022 Load Forecast.
- b) Please describe where any adjustments have been made to the Conference Board’s data.
- c) Please confirm that the Conference Board of Canada’s forecast has been compared against the major Canadian Banks’ provincial economic outlooks for significant discrepancies in short-term projections.
- d) Please define “Household Compensation” as used in Figure 17: Residential Economic Drivers.
 - i. Please elaborate on the composition of the Household Compensation metric. Does it represent a total per household, or a total of all households receiving income from all sources (including labour earnings and government transfers) or something else?
 - ii. Please explain why median household income/compensation, which tempers the impact of outliers, has not been considered?

Request IR-4:

With reference to Section 4.3 Economic Information, page 30 of 98, the application finds that housing completions are highly correlated with residential customer counts and that it will be used in the near term.

- a) Please confirm that the data provided in Figure 17: Residential Economic Drivers, under the column heading “New Construction (number)” represents Nova Scotia housing completions.
- b) Please confirm if housing starts are considered in the model when there is a trend from historic activity that will impact future completions.
 - i. Has the appropriateness of incorporating housing starts been examined for estimating medium and long-term housing completions and/or new residential customers?

Request IR-5:

With reference to Section 4.3 Economic Information, page 31 of 98, the application states that GDP and employment data are used in the non-residential models.

- 1 a) Please cite the sources for the GDP estimates used in the forecast model.
- 2 b) Please confirm the year that the values are chained to.
- 3 i. Please confirm that the data has been updated to adjust for updates made by
- 4 Statistics Canada.
- 5 1. Please review the values for the years 2019, 2020, and 2021 as they do not
- 6 align with the values from Statistics Canada Table 36-10-0402-01 Gross
- 7 domestic product (GDP) at basic prices, by industry, provinces and territories
- 8 (x 1,000,000), chained (2012) dollars.
- 9 c) Attachment 02 - Small General Intensities, and Attachment 03 -General Intensities contain
- 10 a worksheet labelled "EmploymentData" which cites the year 2013. Why are employment
- 11 numbers not updated to reflect the current environment?
- 12

13 **Request IR-6:**

14 With reference to Section 4.4 End-Use Intensity Trends, page 35 of 98, the application indicates

15 that the SAE model uses end-use data from the US Energy Information Agency (EIA) which is

16 "calibrated to fit existing Nova Scotia data". Please provide worksheets with the EIA data used in

17 this forecast, showing how the inputs are calibrated and the resulting data outputs used, with

18 formulas intact.

19

20 **Request IR-7:**

21 With reference to Section 4.4 End-Use Intensity Trends, page 36 of 98, the application states,

22 "E3 provided a forecast for heat pump adoption that would be required to achieve carbon

23 reduction targets of net zero by 2050." Please explain why NS Power considers this modeled

24 scenario realistic?

25

26 **Request IR-8:**

27 In matter M10109, Section 4.4 End-Use Intensity Trends, page 32 of 89, the application indicates

28 that NS Power expects heat pump saturation to increase to 55 percent by 2031. Whereas, on

29 page 36 of 98 in the current application, the anticipated saturation is 66 percent by 2032.

- 30 a) Please provide the evidence used to predict the level of market saturation and explain the
- 31 difference in findings between the forecast provided in matter M10109 and the current
- 32 forecast.
- 33

Request IR-9:

With reference to Section 4.4 End-Use Intensity Trends, page 37 of 98, the application states that “E3 saturation estimates had a lower starting point than the NS Power models, so the NS Power series was adjusted to meet the E3 series by around 2040”. Please explain why E3 used a lower starting point and why that was not adjusted to meet NS Power’s starting point.

Request IR-10:

With reference to Section 4.4 End-Use Intensity Trends, page 38 of 98, the application states “the peak impact predicted by E3 using building stock modelling produces a higher peak impact than the existing SAE peak model”. In response to this discrepancy between NS Power’s model and E3’s model, NS Power estimated the peak impact over that predicted by its SAE model and added it into the Load Forecast.

- a) Please explain why NS Power adjusted its SAE model to meet E3’s forecast.
- b) According to Figure 23: Heat Pump Energy and Peak Comparison, the differences between NS Power’s and E3’s heat pump energy are significant. Please advise whether NS Power made downward revisions to the Load Forecast to meet E3’s estimates?

Request IR-11:

With reference to Figure 24: Heat Pump Forecast, page 40 of 98, the total cumulative new installs for 2022 is 16,000 and the Overall Heating Intensity (kWh/house) is 1,214 and the Overall Cooling Intensity (kWh/house) is 185.

- a) Please explain why the overall percentage saturation for heating and for cooling has decreased from the 2021 forecast provided in Figure 13 of NS Power’s application in matter M10109.
- b) Please explain why the heating intensity and cooling intensity has increased from the 2021 forecast provided in Figure 13 of NS Power’s application in matter M10109.

Request IR-12:

With reference to Figure 24: Heat Pump Forecast, page 40 of 98, the Overall Heating Intensity (kWh/house) and Overall Cooling Intensity (kWh/house) are forecast to increase over time. Please explain why NS Power expects that the energy usage per house will increase over this period? Please expand this table with the actual data for the years 2016 to 2021 included.

Request IR-13:

With reference to Section 4.4 End-Use Intensity Trends, page 41 of 98, Figure 25: Water Heater Forecast:

- a) Please provide actuals for the years 2016 to 2021.
- b) The application states that “Growth is expected to remain steady, with saturation increasing to 82 percent by 2032”. Figure 25: Water Heater Forecast, provides the forecast overall percentage saturation and overall intensity (kWh/household) by year for the period 2022-2032. Please explain the differences between this forecast and the water heater forecast provided on page 34 of 89 of the application in M10109, given that growth is expected to remain steady.

Request IR-14:

With reference to Section 4.4 Electric Vehicles, page 42 of 98, the application states, “It is estimated that there were approximately 950 EVs in the province as of the end of 2021”. Please provide the source of the data used in determining this estimate.

Request IR-15:

With reference to Section 4.4 Electric Vehicles, page 42 of 98, NS Power indicates that a new EV forecast model has been adopted using stock rollover.

- a) Please identify the source of the stock rollover data used in this model to forecast EV sales in Nova Scotia.
- b) Please provide a table of the current sales to stock in Nova Scotia for the forecast period.

Request IR-16:

With reference to Section 4.4 Electric Vehicles, page 42 of 98, the application notes the difference between the current forecast of 75,000 EVs on the road in Nova Scotia by 2031, and the previous forecast of 58,000 EVs in the 2021 Load Forecast. Please provide a table with the data that was used in each model.

Request IR-17:

With reference to Section 4.4 Electric Vehicles, page 43 of 98, the application states, “E3’s tool simulates driving and charging electric vehicles in Nova Scotia, based on a bottom-up modeling approach that simulates driving and charging of thousands of EV drivers...”.

- a) Please identify if the basis for simulating driving habits uses Nova Scotia data, Canadian data, American data, or other.

i. Please provide a copy of the data used in the model and the source for driving habits.

b) If residential sales are expected to be elevated due to increased work-from-home arrangements, has the amount of driving for commutes been reduced?

Request IR-18:

With reference to Section 4.4 End-Use Intensity Trends, page 47 of 98, Figure 29: PV Impact to Energy (cumulative), please expand this table to include the years 2019, 2020, and 2021 for actual new installs and load reductions.

Request IR-19:

With reference to Section 4.4 End-Use Intensity Trends, page 53 of 98, Figure 34: Commercial and Industrial Electrification Forecasts (cumulative), please expand this table to include actuals for the years 2019, 2020, and 2021.

Request IR-20:

With reference to Section 4.5 Price Data, page 55 of 98, the application states that “The SAE models are estimated using a -0.15 price elasticity.” The application further explains that the elasticity was established using studies and elasticity that other utilities use in load forecasting.

a) Please explain why the Load Forecast does not use Canadian price elasticities that are publicly available.

Request IR-21:

With reference to Section 4.6 Demand Side Management, Figure 36: Annual Forecast DSM Savings (incremental), page 58 of 98, please explain the cause of the significant decline in forecast Commercial and Industrial DSM savings and DSM captured by Comm/Ind end use forecast in the years 2023, 2026, 2029, and 2031.

Request IR-22:

With reference to Section 5.0 Residential Sector, page 59 of 98, the application states, “The residential average use model is specified using a SAE model structure and the customer count forecast is based on forecast housing starts”. Please confirm whether the residential forecast uses housing starts as stated on page 59, or completions as stated on page 30.

Request IR-23:

With reference to Section 5.0 Residential Sector, the application discusses the model used to determine the residential sales forecast.

a) Please provide the rationale for excluding the price of substitutes for electricity, in particular the price of home heating oil.

b) Please explain why multi-unit housing is predicted to decline given the Provincial Government's commitment to invest in affordable housing.

Request IR-24:

With reference to Section 5.0 Residential Sector, page 59 of 98, Figure 37 Comparison of Forecast to Actuals:

a) Please explain the weather-adjusted sales metric and elaborate as to why weather-adjusted sales are higher than both forecast and actual sales.

Request IR-25:

With reference to Section 5.0 Residential Sector, page 59 of 98, the application states, "The COVID-19 impact to the Residential forecast is approximately +100 GWh in 2022 and +54 GWh for 2023 and beyond". Given that the impact of COVID-19 on 2021 sales was +42 GWh when restrictions were much greater and in place for the entire year, why is the forecasted impact of COVID-19 higher for 2022 and beyond?

Request IR-26:

With reference to Section 5.0 Residential Sector, page 60 of 98, the application identifies that the long-term trend is for higher than previously forecast residential sales due to several factors, including EV penetration rates. Please confirm whether these rates are for the provincial market, and if they have been adjusted to reflect the current shortage of vehicles available for sale in Nova Scotia. If not, please explain.

Request IR-27:

With reference to Section 5.0 Residential Sector, page 61 of 98, the application states, "Analysis of billing data showed that new single-family homes use approximately 16,000 kWh per year on average, while multi-unit homes use 4,860 kWh per year on average". Is this billing data used in this analysis gathered from the AMI meters in Nova Scotia?

Request IR-28:

With reference to Section 5.0 Residential Sector, page 61 of 98, the application states, "While efficiency is expected to increase, house size is also expected to continue increasing, albeit at a slower rate than in previous years". Is this assumption based on results from the EIA forecast for New England? If so, please provide support for the assumption that continued growth in house size in New England is in keeping with trends in Nova Scotia?

Request IR-29:

With reference to Section 6.0 Commercial Sales, page 66 of 98, Figure 42: Commercial Class Sales reflects an anticipated decline in sales during the period 2027 to 2032. Please explain the reason for the anticipated decrease in commercial sales from 2027 to 2032.

Request IR-30:

With reference to Section 6.1 Small General Service, page 67 of 98, the application states, "Small General service load shows an average annual increase of 0.5 percent compared to an increase of 1.1 percent per year in the 2021 Load Forecast". Please explain what has caused the growth rate to change.

Request IR-31:

With reference to Section 6.3 Large General Service, page 70 of 98, the application indicates that sales growth in this class is expected to be driven by expansions at several hospital sites in the province that contribute more than half of the 50 GWh increase by 2032. Has this estimate adjusted for the potential of the redevelopments incorporating photovoltaic and other green/renewable energy production elements?

Request IR-32:

With reference to Section 7.1 Small Industrial, page 71 of 98, the application indicates that "sales in this class have been flat for the last 10 years and are expected to grow by 0.7 percent annually" because of economic growth.

- a) Please explain in detail, the economic growth that is anticipated to lead to increased sales given the flat performance over the previous 10 years.
- b) Please explain why anticipated growth for this class is estimated at 0.7 percent annually over the forecast period, given the 2021 Load Forecast had estimated growth of 0.6 percent annually over this period, and yet sales growth has been flat since 2011.

Request IR-33:

With reference to Section 7.2 Medium Industrial, page 72 of 98, the application indicates that the load in this class has been flat since 2014 and that 2020 experienced an increase in sales due to increased production at several new facilities. NS Power indicates that sales are anticipated to continue to grow at an average increase of 0.1 percent annually due to economic activity.

a) Please cite the source and explain in detail the economic activity that is expected to drive sales growth for this class.

b) Please explain why growth for this class is estimated at 0.1 percent, given the 2021 Load Forecast estimated 0.2 percent, yet load has been flat since 2014.

Request IR-34:

With reference to Section 10.0 Peak Demand, page 85 of 98, Figure 58: Peak Contribution Components (MW), please expand the table to include actuals for the years 2017, 2018, 2019, 2020, and 2021.

Request IR-35:

With reference to Appendix B, the Residential Input Variables table on page 7 of 31, the row Change to load has a positive value in the columns Wash/Dry and Misc. Given the expectation of enhanced energy efficiency of washers and dryers and other electronics, please elaborate as to why these intensities have positive values.

Request IR-36:

With reference to Appendix C, Figures C1 Total Nova Scotia Energy Requirement (NSR), Figures C2 System Peak Demand and Figure C3 Firm Peak Demand, all graphs display significant growth after 2022. Please elaborate on the factors causing this result which were not considered in previous load forecasts.