

NOVA SCOTIA UTILITY AND REVIEW BOARD

IN THE MATTER OF: *The Public Utilities Act*

– and –

IN THE MATTER OF: **NOVA SCOTIA POWER INCORPORATED - 2022 Load Forecast Report**

**INFORMATION REQUESTS**

**To:** Nova Scotia Power Incorporated  
**From:** The Consumer Advocate  
**Responses Due:** July 8, 2022  
**Copies:** 1 electronic copy (PDF searchable)  
**Contact Person:** William L. Mahody, Q.C.  
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1 **Request IR-1:**

2  
3 Reference Report p. 7: “As with any forecast, there is a degree of uncertainty around actual future  
4 outcomes. In electricity forecasting, much of this uncertainty is due to the impact of variations in  
5 weather, energy efficiency program effectiveness, the health of the economy, government policy,  
6 the impact of electrification, changes in large customer loads, the number of electric appliances  
7 and end-use equipment installed, and changes in technology;” and the application of a general  
8 warming trend to annual HDD, CDD and peak period minimum temperature variables (p. 82).

- 9  
10 a. Please confirm that Appendix D includes the only scenario analysis or sensitivity  
11 analysis to these uncertainties performed by NS Power. If not confirmed, provide  
12 workpapers showing the assumptions and results.  
13  
14 b. Please explain why Appendix D does not include any scenario or sensitivity analysis  
15 examining sensitivity to future changes in the general warming trend (i.e., a more  
16 pronounced trend in HDD, CDD and peak period minimum temperature).  
17  
18 c. Please explain why Figure 53 does not identify the general warming trend as one of the  
19 forecast components affecting the difference in energy load between 2022 and 2032.  
20  
21 d. If possible, please provide versions of Figure 53 for both energy and peak demand that  
22 includes the impact of the general warming trend.  
23

24 **Request IR-2:**

25  
26 Reference Report p. 10: “Produced in the winter of 2021-2022 and using information available at  
27 the time, this forecast covers the period of 2022-2032.”  
28

- 29 a. Please clarify when the 2021 load forecasts were finalized.  
30  
31 b. For the major sources of information (economic inputs, load history, etc.) please clarify  
32 the date of the “information available at the time” and used in the forecasts.  
33  
34 c. With respect to economic variable data obtained from the “Conference Board of  
35 Canada’s Economic Outlook,” please provide the most recent available economic data  
36 in electronic form.  
37

38 **Request IR-3:**

39  
40 Reference Report p. 26: “A population weighted approach has been selected ... as geographic load  
41 data was not available.”  
42

- 43 a. Please describe and provide any geographic disaggregation of load data that NS Power  
44 has available, such as by transmission zone or substations.  
45

- 1 b. If NS Power does not have load data by transmission zone, please explain how NS  
2 Power determines load flows in transmission planning.  
3  
4 c. Please discuss NS Power's plan to develop geographic load data (e.g., by feeder) in the  
5 foreseeable future.  
6

7 **Request IR-4:**  
8

9 Reference Report pp. 43-44: "The management of charging in this scenario was based on  
10 minimizing the cost of electricity to charge with the electric rates referenced being the existing  
11 time of use tariffs that are currently in the pilot stage, coupled with vehicle-grid integration to  
12 smooth large spikes in charging that would occur during switches from peak to off-peak periods."  
13

- 14 a. Please explain why E3 expects that managed charging will achieve a reduction of only  
15 0.4 kW/vehicle below the unmanaged charging on-peak demand of 1.3 kW/vehicle. In  
16 your response, please provide all assumptions relied upon by E3 to reach this  
17 conclusion (e.g., system peak time) and confirm that these assumptions are  
18 substantially unchanged based on the updated load forecast and any available class load  
19 shape data or forecasts.  
20  
21 b. Please provide NS Power's current opinion regarding the impact of temperature, cloud  
22 cover, snow cover, precipitation and wind speed on EV loads.  
23  
24 c. Please state whether NS Power has reviewed traffic data related to peak load periods,  
25 for example resulting from business or institutional closures on the day prior to a peak  
26 load event, to determine whether charging demand may be different during peak load  
27 events.  
28

29 **Request IR-5:**  
30

31 Reference Report pp. 57-58 regarding the DSM adjustments, please provide workpapers in  
32 electronic format with working formulas and the source of all data and assumptions fully  
33 documented demonstrating:  
34

- 35 a. Calculation of the DSM adjustment coefficients.  
36  
37 b. Application of the DSM adjustment coefficients as shown in Figure 36.  
38

39 **Request IR-6:**  
40

41 Reference 2022 Load Forecast Report Appendix B Page 6 of 32, "Residential Load – Post  
42 Regression (GWh)" table.  
43

- 44 a. Please confirm that the "DSM captured by end uses" column is the "Total Res DSM"  
45 column, minus the "Res DSM Adjustment" column.  
46

- 1 b. Please list the parameters in the end use computation that could “capture DSM”.
- 2
- 3 c. Please provide a specific example of the manner in which the end use inputs or
- 4 parameters could have captured the 2022 DSM attributed to the end uses. For example,
- 5 how much did the heating variable change due to Efficiency and Shell Integrity from
- 6 the historical period to 2022, and how much does that reduce the regression result for
- 7 2022?
- 8

9 **Request IR-7:**

10

11 Reference Appendix B, p. 32: “Although it was not possible to produce a peak model with an

12 explicit DSM variable ...”

13

- 14 a. Please confirm this refers to the DSM adjustment coefficients (pp. 57-58). If not
- 15 confirmed, please explain.
- 16
- 17 b. Please explain what is meant by “as the associated parameters are insignificant.” In
- 18 your explanation, please provide all supporting analyses with workpapers in excel
- 19 including all calculations, with source data identified and assumptions justified.
- 20
- 21 c. Please explain how the impact on varying levels of DSM is reflected in the peak model,
- 22 if the peak model fit analysis does not require DSM levels as an input variable.
- 23

24 **Request IR-8:**

25

26 Reference Report p. 59: “The non-weather variance in 2021 is mainly related to an increase in

27 people working from home due to the COVID-19 pandemic and a higher number of new customers

28 compared to forecast.” Also p. 60, “new customers will add to sales.”

29

- 30 a. Please provide any analysis or information that NS Power is aware of suggesting that
- 31 the higher number of new customers may relate to pandemic-driven migration patterns.
- 32 Please also elaborate on related discussion found on p. 61.
- 33
- 34 b. Does NS Power have reasons to expect that its residential model may continue to under
- 35 forecast new residential customers for the next several years?
- 36
- 37 c. Please explain how NS Power’s model takes into consideration the likelihood that new
- 38 customers drive up new construction which is more efficient than the average
- 39 residential property.
- 40
- 41 d. Please explain how the forecast increase in population and customers is reflected in the
- 42 commercial (General Service) models.
- 43
- 44
- 45
- 46

1 **Request IR-9:**

2  
3 Reference Report p. 59: “The COVID-19 impact to the Residential forecast is approximately +100  
4 GWh in 2022 ...”

- 5  
6 a. Does “impact” refer to an estimated change in demand determined in an analysis, or to  
7 the magnitude of the COVID-19 variable applied to the forecast?  
8  
9 b. Please provide any quantitative or qualitative analysis of the impact of any factors  
10 closely related to the COVID-19 pandemic on demand for any class or the system as a  
11 whole.  
12  
13 c. Is NS Power conducting or does it plan to conduct any further analyses of the impact  
14 of the COVID-19 pandemic on demand?  
15

16 **Request IR-10:**

17  
18 Reference Report p. 71: “Sales in this class have been flat for the last 10 years and are expected to  
19 grow at 0.7 percent annually over the forecast period due to underlying economic growth.”  
20

- 21 a. Identify the source and date of the economic forecast on which this statement is based.  
22  
23 b. Provide the latest available version of the economic forecast.  
24  
25 c. Please compare historical (flat) sales over the last 10 years to relevant underlying  
26 economic metrics over the same time period.  
27  
28 d. Please explain what economic drivers are resulting in the forecast change from flat load  
29 to growth and why NS Power has confidence that those drivers will not be balanced  
30 out by other factors.  
31  
32 e. Has the Company re-run its load forecasting models since producing this forecast, using  
33 updated economic inputs and any other inputs that can be updated? If so, provide the  
34 updated forecasts.  
35

36 **Request IR-11:**

37  
38 With reference to the Report pp. 73-74: “One customer makes up over [redacted] of sales within  
39 this class, and after a drop in sales in 2019 and 2020 operations started to return to historic levels  
40 in 2021 ...”  
41

- 42 a. Please provide the amount of sales added by this customer in 2021.  
43  
44 b. Please provide a year-over-year comparison for this customer’s sales for January-May  
45 of 2022.  
46

1 **Request IR-12:**

2  
3 Reference report p. 83 regarding the January 2022 peak, please provide monthly energy and peak  
4 demand data for January – May 2022 in spreadsheet format.  
5

6 **Request IR-13:**

7  
8 Reference NS Power's 2021 Rebuttal Evidence (M10109), p. 10, where NS Power acknowledges  
9 the CA's comment that "Data on weather circumstances other than temperature is also available,"  
10 but does not appear to respond to this comment, Exhibit N-2, NS Power response to CA IR-7(c-  
11 5), "Although other weather conditions have been examined in the past, temperature is the only  
12 weather condition used in the forecast as it is the predominant driver of load," and the application  
13 of a general warming trend to annual HDD, CDD, and peak period minimum temperature variables  
14 (p. 82).  
15

- 16 a. Please provide all analyses or studies that support the statement that "temperature is  
17 the only weather condition used in the forecast as it is the predominant driver of load."  
18  
19 b. Please identify what wind speed data variables are available from Environment Canada  
20 and whether NS Power views each of those variables as subjective or objective.  
21  
22 c. Please identify what precipitation data variables are available from Environment  
23 Canada and whether NS Power views each of those variables as subjective or objective.  
24  
25 d. Please identify what cloud cover data variables are available from Environment Canada  
26 and whether NS Power views each of those variables as subjective or objective.  
27  
28 e. Please identify what snow cover data variables are available from Environment Canada  
29 and whether NS Power views each of those variables as subjective or objective.  
30  
31 f. Please provide any other available data regarding general trends in cloud cover, snow  
32 cover, precipitation and wind speed.  
33  
34 g. Please provide NS Power's best estimate (quantitative or qualitative) as to the impact  
35 of cloud cover, snow cover, precipitation, and wind speed on loads, including peak  
36 loads.  
37

38 **Request IR-14:**

39  
40 Reference Report p. 86 Figure 60 "Weather-Normalized Firm Peak." For items a-d below, please  
41 provide responses for the system as a whole and for each class. If both firm and system peak load  
42 data are available, please provide both where requested in items b, c, and e.  
43

- 44 a. Please provide weather-normalized sales and requirements.  
45

- 1 b. Provide documentation of the methodology for calculating weather-normalized sales,  
2 requirements and peak load. If the method is to multiply the difference in actual  
3 temperature vs the design temperature by a peak adjustment of 25 MW/°C, please  
4 explain whether any further adjustments are made in any circumstances.  
5  
6 i. Please provide complete workpapers supporting all calculations (including the  
7 peak adjustment of 25 MW/°C) used to support the weather normalization and  
8 any adjustments.  
9  
10 ii. If NS Power is continuing to apply an adjustment for reduced lighting load in  
11 morning hours relative to the more usual evening peak circumstances, please  
12 explain why it is appropriate to adjust this one end use when other end uses may  
13 also be different in the morning than in the evening.  
14  
15 c. Provide workpapers for the calculation of weather-normalized sales, requirements and  
16 peak load.  
17  
18 d. Provide actual and weather-adjusted sales for 2021.  
19  
20 e. Provide the data used to construct Figure 60.  
21

22 **Request IR-15:**

23  
24 According to Exhibit N-34, Matter No. M10431, Response to CA IR-41, Attachment 1, NS Power  
25 has developed scaled class load shapes for 2019 using its load research sample. The Report  
26 indicates that these data have been updated through 2021 (p. 91). Loss factors used in the Report  
27 appear to be provided in Attachment 4, tab Tables, rows 87-101.  
28

- 29 a. Please provide the most recent scaled class load shapes, including all assumptions,  
30 source data, and methods with formulas in the workpapers intact and working.  
31  
32 b. Please provide NS Power's best estimate of monthly losses by class as estimated by  
33 "comparing the sum of load research sales to system generation." (p. 91).  
34  
35 c. Please explain why NS Power continues to use the loss factors based on the 2013 COSS  
36 rather than the loss factors provided in response to item (b).  
37  
38 d. Please explain whether or not NS Power used the 2019 or later version of its scaled  
39 class load shapes to support models used to generate monthly energy and peak demand  
40 forecasts in the Report and the reasons for that decision.  
41

42 **Request IR-16:**

43  
44 Reference Report p. 77. We understand NS Power's argument to be as follows: Using the demand  
45 change of 25 MW/°C, the 2021 actual system firm peak of 1,875 MW is weather normalized to  
46 2,002 MW, which is 71 MW lower than the 2021 forecast system firm peak of 2,073 MW. This

1 difference is attributed to March 2 not being “a particularly cold day” on which the temperature  
2 dropped rapidly to the daily minimum.

- 3
- 4 a. Please confirm or correct our understanding of the argument presented on p. 77.
- 5
- 6 b. Please explain how the 25 MW/°C demand change estimate is used in the load forecast.
- 7
- 8 c. Please confirm that the 25 MW/°C demand change estimate is developed based on a
- 9 regression that excludes weekend data.
- 10
- 11 d. Please identify each instance in the Report in which the 25 MW/°C demand change
- 12 estimate is used to weather normalize weekend data. Please justify each such instance.
- 13
- 14 e. Please provide any evidence that NS Power has available that the temperature in the
- 15 same hour as the peak is a better measure of the impact of cold weather on peak load
- 16 than the use of a multi-hour average.
- 17

18 **Request IR-17:**

19  
20 Respecting the Board’s direction to “evaluate improvements to the weather normalization estimate  
21 and examine the impact of incremental cold on loads in the temperature ranges where peak loads  
22 occur,” (Report, p. 12), please explain the following:

- 23
- 24 a. Why NS Power has not made even an interim adjustment to its demand change metric
- 25 or method in response to the Board’s direction. As an example (but not limited to this
- 26 potential interim adjustment), relying on observations and findings found in the Wilson
- 27 testimony sponsored by the CA in M10109.
- 28
- 29 b. Please provide a list of tasks that NS Power plans to complete the Board directed
- 30 updates to the load forecast report; for each task, please provide (i) the estimated time
- 31 to complete the task, (ii) identify any prerequisite tasks, and (iii) identify whether the
- 32 task is necessary (e.g., a prerequisite to completing the work) or recommended (e.g.,
- 33 research to increase confidence in the result).
- 34

35 **Request IR-18:**

36  
37 Reference Report p. 82: “This trend (+0.15 degrees C per year) was also incorporated into the  
38 forecast, similar to the trend used in the annual HDD and CDD calculations.”

- 39
- 40 a. Please confirm that this trend is the same as derived in Figure 11.
- 41
- 42 b. Please explain how, if at all, each of these trends are reflected in Table A1. In your
- 43 response, please provide the HDD and CDD values by year.
- 44

- 1 c. If the trend in HDD and CDD values by year was not applied to the energy requirement  
2 forecast in Table A1, please provide the forecast also including the trend in HDD and  
3 CDD values.  
4
- 5 d. Please reconcile this quote with Table A2, which shows the temperature at peak  
6 constant at -13.7 deg C for 2022-2032.  
7
- 8 e. If the +0.15 degrees C per year trend was not applied to the coincident peak demand  
9 forecast in Table A2, please provide the forecast also including a 0.15 degrees C per  
10 year trend.  
11
- 12 f. Please explain whether the referenced trends may have an impact on the performance  
13 of DSM measures, such that the DSM adjustments (pp. 57-58) may need to take into  
14 consideration temperature trends. In your response, please indicate whether the  
15 regression used to calculate the DSM adjustment coefficients considered minimum  
16 temperature, HDD and CDD trends and, if not, why not.  
17
- 18 g. The description of the Peak Forecast (Appendix B, p. 28) indicates that monthly peaks  
19 are a function of HeatVar and CoolVar. These variables are related to peak-day HDD  
20 and CDD, not to the annual evening minimum temperature (Figure 11).  
21
- 22 i. If the annual evening minimum temperature is “incorporated into the forecast,”  
23 please provide a detailed explanation of the method used and how it relates to  
24 the peak forecast method described in Appendix B.  
25
- 26 ii. If the annual evening minimum temperature is not used in the peak forecast,  
27 please explain why not and the significance of the discussion of this metric in  
28 the Report.  
29
- 30 iii. Please provide workpapers demonstrating all steps described in the Peak  
31 Forecast (Appendix B, pp. 28-30).  
32

33 **Request IR-19:**  
34

35 Reference Report pp. 88-94.  
36

- 37 a. Please provide the equivalent of Figure 65 for all other customer classes. For any  
38 classes where these data are not available, please confirm whether or not LRS data  
39 exists and explain why the data are not available.  
40
- 41 b. Please explain why NS Power has not adopted the LRS peak model for the 2022 Report.  
42 In your response, please identify the pros and cons of adopting the LRS peak model  
43 immediately.  
44
- 45 c. Please identify each aspect of the load forecast in which the LRS data could be applied.  
46

- 1 d. Please provide a list of tasks that NS Power would need to complete to utilize the LRS  
2 data in all applicable aspects of the load forecast; for each task, please provide (i) the  
3 estimated time to complete the task, (ii) identify any prerequisite tasks, and (iii) identify  
4 whether the task is necessary (e.g., a prerequisite to completing the work) or  
5 recommended (e.g., research to increase confidence in the application of the LRS).  
6

7 **Request IR-20:**  
8

9 Reference Report p. 96: “Unlike the energy forecast, where DSM dominates the variance, the peak  
10 variance is mainly driven by the variation of weather conditions (both in-month and peak day),  
11 resulting in enough variation that even the DSM scenarios fall mostly within the bands as seen in  
12 Figure 68.” Please explain how Figure 68 illustrates DSM scenarios. If this reference is in error,  
13 please provide evidence demonstrating that DSM scenarios fall mostly within the bands shown in  
14 Figures 66 and 67.  
15

16 **Request IR-21:**  
17

18 Reference Residential SAE Model Fit, Appendix B, p. 5.  
19

- 20 a. Please explain whether the “predicted” data utilize actual or modeled temperatures.  
21  
22 b. If the “predicted” data utilize actual temperatures, please provide the graph also  
23 including modeled temperatures (e.g., backcasting with the same temperature model  
24 used in the forecast).  
25

26 **Request IR-22:**  
27

28 Reference 2022 Load Forecast Report Appendix B Page 3 of 32.  
29

- 30 a. Please explain what factors might account for the consistent binary adders in each of  
31 January, August, September and October.  
32  
33 b. Has NS Power identified any drivers (e.g., time spent at home) that would account for  
34 any of these variations from the general function of heating, cooling, other appliances  
35 and EE savings?  
36

37 **Request IR-23:**  
38

39 Reference Figures C1, C2 and C3.  
40

- 41 a. Please explain why after three load forecasts that predicted a declining trend in the  
42 energy requirement, NS Power is now issuing a load forecast that predicts an increasing  
43 trend in the energy requirement.  
44

- 1
  - 2
  - 3
  - 4
- b. Please explain why after three load forecasts that predicted a flat trend in the system and peak demands, NS Power is now issuing a load forecast that predicts an increasing trend in the system and firm peak demands.