EfficiencyOne Information Requests to Nova Scotia Power, Inc. (NS Power)
In the Matter of Nova Scotia Power Incorporated's 2022 Load Forecast Report (M10569)

IN THE MATTER OF: **THE PUBLIC UTILITIES ACT**

- and -

IN THE MATTER OF: Nova Scotia Power Incorporated's 2022 Load Forecast Report (M10569)

NON-CONFIDENTIAL INFORMATION REQUESTS TO NS POWER

To: **Nova Scotia Power Inc.**
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From: **EfficiencyOne**
c/o The Breton Law Group

Responses Due: **July 08, 2022**

Copies: **1 electronic copy (PDF searchable)**

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Issued at Halifax, Nova Scotia, this 16th day of June, 2022.

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ELECTRIFICATION

Request IR-01:

Reference: NS Power 2022 Load Forecast, page 15, lines 3-8.

"As part of the 2020 IRP Action Plan, NS Power has worked with third party consultant E3 to develop forecasts for space heating and EV uptake that will allow the province to meet stated emissions goals and EV sales targets over the next 20 years. This work uses stock rollover models to assess uptake required under scenarios that meet these goals, without assuming any specific change to regulations or incentives, though both are possible in the timeframe of the current 10-year load forecast."

(a) Please provide all inputs and outputs of E3's stock rollover models in their original form.

(b) Please provide final copies of all E3 deliverables provided to NS Power related to the electrification work with all formulae intact. This may include but is not limited to E3's stock rollover model, model inputs and outputs, reports and presentations.

Request IR-02:

(a) Please describe all electrification research/pilots/programs NS Power is currently planning and/or carrying out.

(b) Please provide all applicable project schedules, studies and/or reports that have been developed for activities listed in response to part (a) of this IR.

Request IR-03:

(a) Is it NS Power's position that cost-effectiveness testing is appropriate to apply to all ratepayer funded electrification pilots and programs? Please provide the basis for your position.

Request IR-04:

Reference: NS Power 2022 Load Forecast, page 15, lines 3-8.

"As part of the 2020 IRP Action Plan, NS Power has worked with third party consultant E3 to develop forecasts for space heating and EV uptake that will allow the province to meet stated emissions goals and EV sales targets over the next 20 years. This work uses stock rollover models to assess uptake required under scenarios that meet these goals, without assuming any specific changes to regulator or incentives, though both are possible in the timeframe of the current 10-year load forecast."

(a) Is it NS Power's position that the Nova Scotia energy market is fully aligned with the Federal Zero-Emission Vehicle (ZEV) mandate for 2030 as proposed, as well as the Province of Nova Scotia *Environmental Goals and Climate Change Reduction Act*?

(b) Does NS Power anticipate the market is likely to follow the trajectories as modelled by E3[1] without any additional interventions?

(c) If the answer to (a) is no; is there a significant risk that electrification will not follow the modelled trajectory? If yes, please provide specific details on how NS Power intends to mitigate this risk.

(d) If additional market interventions are viewed as necessary, what process will NS Power follow to determine:

(i) the level of ratepayer intervention required; and

(ii) whether such intervention is beneficial to ratepayers?

Request IR-05:

Reference: NS Power 2022 Load Forecast, page 36, Figure 20.

[1] M10569, 2022 NS Power Load Forecast – Redacted, Appendix E at pages 4 and 8.

(a) Please confirm whether there are heating options other than heat pumps which also provide an electrification trajectory in Nova Scotia. If no, please explain. If yes, please provide details of these options including provision of all data and analysis supporting this position.

(b) What factors are responsible for the decreasing share of wood and electric resistance shares, as modelled by E3 as part of this analysis? Are these changes expected to be fully market driven?

(c) What role will other heating systems technologies have in meeting net zero objectives? Please list all that apply as well as their anticipated impact.

Request IR-06:

Reference: NS Power 2022 Load Forecast, page 36, Figure 20.

Please provide the current shares of residential heat pump stocks by the following categories:

(i) Ductless Heat Pumps;

(ii) Central Air-to-Air;

(iii) Central Air-to-Water; and

(iv) Ground Source.

Request IR-07:

Reference: NS Power 2022 Load Forecast, page 80, lines 27-30

"DR forecasts continue to use an effective load carrying capacity (ELCC) of 48 percent to account for the fact that the full nameplate capacity will not be available at all times, and this value will be reassessed as more information is gathered through the implementation of DR programs".

(a) Is the load forecast intended to estimate how much demand response (DR) capacity is available during the system peak (highest single hourly average demand in a year)? If no, please explain the reason for such limitations.

(b) E1's proposed 2023-2025 DSM Plan DR program considers the average available capacity during system peak (modelled as 5-8 pm, December through February), and has considered factors such as the intermittency of resources (load factors), opt-out rates, and the limited nature of demand response resources. By applying an ELCC of 48% has NS Power underrepresented the value of demand response resources? If no, please explain.

(c) Please describe how NS Power determines when to use an ELCC factor.

(d) Please describe in what contexts it is appropriate to apply an ELCC factor to DR, and when is it not appropriate.

(e) If NS Power believes it is appropriate to apply an ELCC to DR in the load forecast, should an ELCC be applied to other time limited demand-side resources such as the large industrial interruptible rider and EV managed charging? If not, please explain.

Request IR-08:

Reference: NS Power 2022 Load Forecast, page 37, lines 4-6 and page 38, Figure 22.

"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 as shown in Figure 22, resulting in a slightly lower trajectory."

Figure 22 indicates that NS Power's model estimates commercial electric heating share in 2021 to be ~52%, while E3's model estimates the share to be ~27%. This is a significant variance, particularly in the near-term.

(a) Please describe the specific assumptions and/or modelling approaches that are causing this significant difference in results.

(b) What is the best estimate of current commercial electric heating share? Please provide this estimate by the following type of heat pump:

(i) Ductless Heat Pumps

(ii) Central Air-to-Air

(iii) Central Air-to-Water

(iv) Ground Source

(c) Why have the models not been calibrated to produce similar results?

Request IR-09:

Reference: NS Power 2022 Load Forecast, page 39, lines 4-14.

"The capacity of heat pumps in the model is also assumed to decline as a function of COP which causes greater reliance upon backup electric resistance heating with lower efficiency during coldest hours increasing peak impacts."

(a) Please elaborate on the modelled performance of systems as Outside Air Temperatures decrease below – 15 °C.

(i) Are all types of heat pumps expected to have the same low-temperature behavior? If no, please describe any differences including design differences and specific limitations.

(ii) Is any contribution from heat pumps (as opposed to back-up) expected below -15 °C?

(iii) At what temperature(s) are heat pump coefficients of performance expected to reach 1.0?

(b) Please elaborate on any coincidence factor associated with the electric backup of heat pumps. Is any coincidence factor assumed for electric backup heating in the RESHAPE analysis?

(c) What penetration of electric resistance heating is assumed for backup of heat pumps in 2050?

(d) If the answer to (c) is less than 100%, what other types of back-up heating are expected to be in place for heat pumps in 2050, and what percent of the market are they expected to serve?

(e) Does NS Power view Electric Thermal Storage systems as effective backup to Air-Source Heat Pump systems? Please explain.

(f) Does NS Power view any other systems as creating effective backups? If so, please outline these systems.

(g) Does the RESHAPE modelling analysis include any changes to heating degree days or cooling degree days associated with climate change as part of the analysis of peak demand effects?

(h) Does the model consider the impact on heat pump efficiency due to the expected transition to low-Global Warming Potential (GWP) refrigerants in North America over the coming decade? If no, should it be considered? If yes, what low-GWP heat pump technologies have been modelled and when will they be assumed to be required in Nova Scotia?

Request IR-10:

Reference: NS Power 2022 Load Forecast, page 43, lines 12-13

"The peak impact assumes that 70 percent of charging is managed by NS Power (including smoothing through vehicle-grid integration) and 30 percent of charging is unmanaged."

(a) As part of its 2023-2025 DSM Plan, E1 has included EV managed charging in its demand response program. Does NS Power consider this as a possible way to achieve managed EV charging? Why or why not.

(b) Does NS Power consider a Critical Peak Pricing (CPP) rate structure as a possible way to achieve managed EV charging? Why or why not.

(c) How will NS Power ensure capacity savings from E1's EV charging offer is not double counted through both the managed charging inherent in the EV forecast, and the demand response programs that are subtracted from system peak?

Request IR-11:

Reference: NS Power 2022 Load Forecast, page 80, lines 19-21

"DR savings amounts are based on the demand reduction amounts included in the 2020 Integrated Resource Plan (IRP), which evaluated an aggregation of DR programs."

E1 has proposed a demand response program as part of the 2023-2025 DSM Plan. Has this updated demand response been incorporated into the 2022 Load Forecast in the same manner as energy efficiency from the 2023-2025 DSM Settlement Plan? If not, please explain why.

Request IR-12:

Reference: NS Power 2022 Load Forecast, Appendix E, page 3 of 8.

"Measures are lower cost and commercially available to support economy-wide decarbonization"

a) What are the electrification measures that NS Power is using for the quoted comparison above?

b) What decarbonization measures are the electrification measures being compared to?

c) Has NS Power analysed the costs and benefits of both the electrification and other decarbonization measures? If yes, please provide the values and sources for this information. If no, why not?

d) Please provide an expanded description of the comparison being made by the quoted statement above.