EfficiencyOne

IN THE MATTER OF:
The Public Utilities Act

- and -

IN THE MATTER OF:
Nova Scotia Power
2020 Integrated Resource Plan

M08929

EfficiencyOne Comments

FILED
January 20, 2021

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1. BACKGROUND

On November 27, 2020 Nova Scotia Power Inc. ("NS Power") filed its Integrated Resource Plan (IRP) with the Nova Scotia Utility and Review Board ("NSUARB"). The IRP, among other things, sought to:

> "Develop a robust, risk-weighted least-cost long-term electricity strategy ("the Strategy") that delivers energy in a safe and reliable manner, continues provincial decarbonization via non-emitting resources, where appropriate, and maintains affordability for customers across a range of foreseeable future scenarios."[1]

On December 3, 2020, the NSUARB, invited comments from Interested Parties on NS Power's IRP filing. EfficiencyOne ("E1") has had an opportunity to review NS Power's IRP filing as well as comments filed on December 23, 2020 by Synapse Energy Economics Inc. ("Synapse") and Bates White Economic Consulting ("Bates White") and is pleased to provide the following comments.

2. INTRODUCTION AND OBJECTIVES OF COMMENT

Historically the IRP has been an important consideration in the development of Demand Side Management (DSM) Resource Plans in Nova Scotia. The IRP's Reference Plan identifies the least cost (Net Present Value Revenue Requirement or NPVRR) plan for ratepayers. The Reference Plan has also been used historically to generate avoided costs of energy and capacity which are used in several DSM planning activities including DSM Resource Plan development, DSM Potential Studies, and DSM Rate and Bill Impact Analyses (RBIA).

Given the potential importance of the IRP in future DSM planning, E1 is making several recommendations and key findings in its comments which are intended to further inform the conclusions taken away from the IRP, as well as provide consideration for future IRP processes, Action Plan items, and Roadmap items contained within NS Power's Final IRP Report.

[1] M08929, NS Power 2020 Integrated Resource Plan Terms of Reference, page 4 [December 16, 2019]

E1's comments include the following subject areas:

1. IRP Results;
2. Carbon;
3. Risks/Level of Uncertainty;
4. Demand Response;
5. Electrification;
6. Avoided Costs of Energy and Capacity;
7. Evergreen Process; and
8. Data Access & Transparency.

3. IRP RESULTS

A central outcome of the 2020 IRP Process for E1 is to provide clarity on the level of DSM investment that results in the lowest revenue requirement for ratepayers. This outcome is aligned with the first stated purpose of the IRP, namely to "develop a robust, risk-weighted **least-cost** long-term electricity strategy". The historic reliance in Nova Scotia on the IRP's Reference Plan as one of the important considerations for short-term DSM Resource planning makes this determination important in the context of future DSM proceedings.

The final IRP report provides the following contextualization of DSM-related findings, in Key Finding 2e:

> DSM energy efficiency programs and costs in the range of the "Base" profile, per the EfficiencyOne 2019 Potential Study, are shown to be most economic relative to other options evaluated under the primary IRP metric of 25-year NPV of Revenue Requirement (with end effects). A focus on peak demand mitigation is indicated and could be optimized into future DSM planning. Other levels of DSM in resource plan sensitivities show higher NPVRR with end effects, as well as mixed effects on other metrics, when compared to Base DSM; Low DSM levels are shown to reduce relative rate impact, while Mid DSM levels are shown to reduce new capacity requirements and GHG emissions, both at a higher NPVRR. Due to the discrete nature of the DSM profiles modeled in the IRP, future DSM program development

should incorporate the learnings obtained from the full range of sensitivities and metrics considered in the IRP.[2]

3.1 Reference Plan

IRP Report Action Plan item 5 indicates that scenario 2.0C will be used as the Reference Plan for the purposes of generating avoided costs of DSM, alongside of scenario 2.1C (representing Mid Electrification, instead of reference electrification world as in 2.0C).

The selection of 2.0C (including Base DSM) as the reference plan in the Final IRP Report is based on the fact that 2.0C achieves the primary IRP objective of determining the least-cost plan (lowest NPVRR w/end effects) to ratepayers using current assumptions and inputs. Important context to the selection of the Reference Plan 2.0C is included in the discussions of Carbon and Risk below – namely that:

1) Mid DSM investment may form the lowest NPVRR at carbon prices above $50 per tonne, supported by the analysis provided in Synapse's comments filed with the NSUARB on December 23, 2020. Mid DSM investment may also form the lowest NPVRR in scenarios with carbon prices above $38 per tonne, based on an alteration of the economic coal retirement path, as suggested by Synapse, although this requires further study.[3]

2) Levels of DSM investment above Base DSM may provide the lowest NPVRR revenue requirement if risk factors are realized and alter the selection of the IRP Reference Plan.

3.2 Rate Effects

One of the secondary metrics associated with evaluation of IRP results in the 2020 IRP is rate effects. Despite rate effects being a secondary evaluation metric in the IRP, they do not further inform the results of all scenarios in the IRP Final Report. Rate effects results have been used exclusively to

[2] M08929, NS Power 2020 Integrated Resource Plan, page 108-109 [November 27, 2020]

[3] M08929, Synpase Energy Economics, Inc. Analysis of NS Power's 2020 Integrated Resource Plan, page 12 [December 23, 2020]

draw conclusions on how different levels of electrification and DSM can affect rates by only exploring those scenarios with varying levels of DSM and electrification. The rate effects presented in the Final Report therefore do not provide a comprehensive picture of rate effects across all scenarios. Seemingly each IRP case would have its own range of rate effects. Sensitivities around import pricing, energy and capacity contracts, reliability interties, interjurisdictional transmission, and differences between the cases themselves, could have been explored but were not. The analysis is designed to provide only a limited focus of the rate effects, specifically those of DSM and electrification.

In addition to being limited in scope, the methodology used is not aligned with the DSM Rate and Bill Impact Analysis (RBIA) model, the established approach in Nova Scotia for analyzing rate effects of DSM. E1 files a DSM RBIA with the NSUARB annually and as part of DSM Resource Plan Applications. E1's RBIA model has undergone extensive stakeholder review and refinement since 2013 and is subject to a transparent regulatory process. Examining the rate and bill impacts of DSM investment as part of the DSM Resource Plan Application using the RBIA allows impacts to be assessed at the time of current DSM planning and utilizes a methodology that has been extensively reviewed by stakeholders. With this in mind, E1 considers E1's RBIA to be the appropriate mechanism for examining rate impacts of DSM investment.

4. CARBON

The approach to pricing carbon that was used in the IRP does not value incremental carbon emissions reductions below the specified emissions trajectories originally offered to the IRP modelling software (Business-as-Usual, Net-Zero 2050, or Accelerated Net Zero). E1 views carbon emissions reductions to be an important part of DSM valuation, particularly given that E1 is currently working with the DSMAG to include the value of avoided carbon emissions in the Total Resource Cost test at the direction of the NSUARB.

As part of its report, Synapse provided updated NPVRR information relating to DSM sensitivities on the basis of carbon pricing effects.[4] E1 understands that on the basis of a carbon price of $50 per tonne, the difference in NPVRR between the Reference Plan (2.0C scenario) and the sensitivity scenario for 2.0C using Mid-DSM, is significantly reduced by $171 million (excluding end-effects).

E1 agrees that the carbon market should continue to be monitored with the understanding that any material increases in the carbon pricing should be factored into any future assessment of DSM investment levels. In the situation where incremental carbon emissions reductions are valued above $50 per tonne, levels of DSM investment approximating Mid-DSM from the DSM Potential Study (circa $120M in annual investment) become more economic than Base-DSM (circa $55M in annual investment). A cost of carbon above $50 per tonne is a reasonable expectation as signified by *A Healthy Environment and a Healthy Economy,* which indicates that Environment and Climate Change Canada intends to increase the price of carbon to $170 per tonne, in advance of 2030.[5] Levels of carbon pricing well-beyond $50 per tonne that are currently being proposed would presumably further increase the economic favorability of Mid-DSM relative to Base-DSM.

In addition, Synapse notes the following in relation to carbon pricing:

> As seen in Table 2, placing a value on the carbon emission reduction that comes from earlier retirement of the coal fleet (by 2030, instead of by 2040) results in a cumulative incremental value of roughly $374 million (at a price of $24/ton) or $779 million (at a price of $50/ton), if all of the emissions reduction is valued at the price indicated. Table 2 also shows the breakeven point: if all of the incremental CO_2 emission reductions were valued at a price point of $38/ton, the NPVRR of the two scenarios would be equal. In other words, either of the two options results in the same NPVRR to ratepayers over the 25-year horizon.[6]

[4] Ibid, page 10
[5] Environment and Climate Change Canada, A Healthy Environment and a Healthy Economy, page 26 [2020]
[6] Supra note 3, page 7.

E1 notes that including a price for incremental carbon emissions reductions, changes to the price for carbon emissions, and/or changes to thermal plant retirement schedules as contemplated by Synapse, may change the lowest-cost resource mix, including the level of DSM. This offers further justification to continue monitoring the cost of carbon in Nova Scotia through the Evergreen IRP process.

5. RISKS/LEVEL OF UNCERTAINTY

As discussed throughout the IRP process, the IRP Reference Plan has several areas of significant risk relative to other IRP scenarios. These risks include the regional integration strategy in general and natural gas pricing and availability.

The risks outlined represent potential adverse outcomes for ratepayers, in that should any or all of these risks materialize, the current Reference Plan 2.0C may no longer result in the least cost plan for ratepayers. Rather, a level of DSM investment above Base DSM may result in the lowest revenue requirement for ratepayers as well as a different set of avoided costs for DSM.

5.1 Regional Integration Strategy

Risks of the regional integration strategy include:

- risk of market imports' prices which have little room for upward pricing before other scenarios become economical, as in sensitivity 2.1C.PRICES-1;
- risk of lack of access to market priced energy; and
- risk of delay in access to market priced energy (due to delays and ongoing challenges of constructing additional transmission infrastructure).

As demonstrated by examining the IRP sensitivities, regional integration costs can only increase by approximately $750 million before "falling off" the preferred resource path (to 2.0A). In addition to the risks of higher costs, electricity imports pose implementation and timeline risks. As part of NB Power's 2020 Integrated Resource Plan, NB Power examined the possibility of electricity imports from neighboring jurisdictions, particularly for replacement energy and capacity at its Belledune generating station. NB Power provided the following brief analysis:

- electricity imports
    - existing interconnections with neighbouring jurisdictions are not sufficient to replace the energy and capacity that Belledune provides without significant capital investment and lead time to construct transmission infrastructure
    - uncertainty and risk around the availability of energy and the commercial agreements that would be required to replace the energy and capacity provided by Belledune on this infrastructure makes this option unfeasible[7]

It appears that NB Power views dependance on yet-to-be-confirmed market priced energy as possessing excessive uncertainty and risk in the context of the NB IRP. This is notable, given that NB Power is seeking replacement energy for a single fossil plant, and is closer to several key markets including the US Northeast and Quebec.

In addition, there appears to be concern emerging in the province of Quebec relating to the federal government's offer of infrastructure funding regarding the east-west transmission of electricity in Canada, related to free-trade concerns.[8]

Finally, recent experiences in Atlantic Canada with the construction of Muskrat Falls and the transfer of that energy via the Maritime Link, indicate that cost increases and schedule delays are a risk associated with the construction of large regional interconnection projects, and the source resources that drive their economics. For example, first power from Muskrat Falls, through the Maritime Link, was originally anticipated by December 2017, a milestone which was reached 33 months later, in September 2020.

In the case of the regional integration strategy, Bates White offers the following recommendation (among others):

[7] New Brunswick Power Corporation, 2020 Integrated Resource Plan, page 70 [2020]
[8] https://www.theglobeandmail.com/business/article-hydro-quebec-turns-down-subsidies/

> First, in its evergreen process, NSPI should have a circuit breaker built in if progress on regional solutions reach an impasse. This will allow NSPI to pivot away from regional solutions should it become apparent that they will not be developed in a timely, economic manner.[9]

The economics and timelines of any regional integration strategy should be monitored as part of the evergreen IRP Process. Where costs and implementation times exceed projections in the IRP – further economic re-testing should be required. NS Power should not rely on the observation of issues or difficulties associated with regional integration to re-validate project economics, rather the costs should be quantitatively evaluated on a fixed schedule and shared with stakeholders. In addition to monitoring the cost and schedule evolution of any regional integration strategy, NS Power should report to the NSUARB and stakeholders on implementation progress and/or challenges on a regular basis as part of the evergreen IRP Process.

5.2 Natural Gas Pricing and Availability

Risks for natural gas pricing and availability include:

- the high complexity of delivering AECO priced gas sourced from Alberta;
- the access risk of spot LNG for certain peaking uses; and
- certainty in pricing associated with these challenges.

NS Power should continue to monitor the pricing and implementation risks associated with the natural gas strategies as part of the evergreen IRP process and report any updates to the NSUARB and stakeholders.

The monitoring activities suggested above for both the regional integration and natural gas strategies will ensure that IRP stakeholders, and ratepayers at large, have visibility of the ongoing risk profile, and will help ensure planning intentions still reflect a least cost trajectory for ratepayers. In addition

[9] M08929, Bates White Economic Consulting's Comments on Nova Scotia Power, Inc.'s Final Integrated Resource Plan Report, page 18 [December 23, 2020]

to ongoing monitoring and reporting on the risk items, it is necessary to re-evaluate the IRP results to confirm the Reference Plan is still the lowest cost plan for ratepayers.

6. DEMAND RESPONSE

NS Power's IRP Report provides the following action item relating to Demand Response in Nova Scotia:

> Create a Demand Response Strategy targeting 75 MW of capacity, for deployment by 2025. Available resource cost, flexibility, and reliability may inform pursuit of additional Demand Response capability.[10]

The Demand Response Strategy contemplated in the IRP Report has the potential to inform future DSM Resource Plans in the area of demand response. In its Decision on the 2020-2022 DSM Resource Plan, the NSUARB stated "The Board, therefore, confirms that E1 has the flexibility and the mandate to pursue cost-effective demand response".[11] This confirmation necessitates that E1 has a role in the development of any Demand Response strategy. E1's insight, expertise and experience in developing and delivering DSM programs in NS can provide value to the Demand Response strategy development in the following areas:

- Customer communication, education and recruitment.
- Engineering and building science experience and expertise in relation to energy-consuming devices in homes and businesses, their interactions and aggregate performance.
- Managing the installation of customer equipment across the NS building stock.
- Managing a trade network of installers, contractors, and consultants across differing industries.
- Examining delivery approaches such as integrating the delivery of Demand Response with other DSM activities as part of an Integrated DSM approach.

[10] Supra note 2, page 114
[11] M09096, NSUARB Decision, para 48, page 16-17 [August 2, 2019]

- Evaluation of savings impacts and delivery processes.

E1 considers the DSMAG to be the appropriate forum for future discussion and establishment of any Demand Response Strategy in Nova Scotia.

7. ELECTRIFICATION

The future level of electrification of end-uses in Nova Scotia has received considerable attention as part of the IRP. E3's Pathways study assisted in assessing and informing incremental levels of electrification, namely through providing a Mid and High electrification trajectory associated with increasing adoption of heat pump and electric vehicle technology.

NS Power's final report provides an Action Plan that recommends to:

> Initiate an Electrification Strategy to develop options for encouraging beneficial electrification with the goals of maintaining rate stability while decarbonizing the Nova Scotia economy consistent with the Sustainable Development Goals Act. The Electrification Strategy will:
>
> - Incorporate industry best practices such as those identified by the Regulatory Assistance Project as well as other relevant work, for example, electrification programs in other jurisdictions and the details already contained in the Deep Decarbonization Pathways report.
>
> - Develop and propose pilots and/or programs that focus initially on transportation and building electrification as identified in the Deep Decarbonization Pathways report as key sectors for early electrification adoption. These pilots and programs will be subject to NSUARB oversight.[12]

[12] Supra note 2, Action Plan Item #2, page 26

E1 understands that the IRP was indifferent to which parties bore the costs of electrification – and that those costs have not been considered as part of the current IRP analysis. This type of analysis provides a view of electrification as a "market force" outside the bounds of the IRP, as opposed to a programmatic activity.

Although it was indicated throughout the IRP process that ratepayer funds were not contemplated to achieve the levels of electrification examined, the second reference to the Electrification Strategy above includes pilots and programs with NSUARB oversight which appears to indicate that levels of electrification above the current state will require program intervention funded by ratepayers. E1 understands electrification to be a component of DSM as described in the following definition:

> "Demand-side management is the planning, implementation, and monitoring of those utility activities designed to influence customer use of electricity in ways that will produce desired changes in the utility's load shape, that is, changes in the time pattern and magnitude of a utility's load. Utility programs falling under the umbrella of demand-side management include: load management, new uses, strategic conservation, electrification, customer generation, and adjustments in market share." [13]

As a component of DSM it is reasonable to expect that any ratepayer funded electrification will be subject to similar regulatory oversight processes and administration model as traditional energy efficiency activities in Nova Scotia. Given this, E1 considers it critical that a broad stakeholder driven approach be used for the development of any Electrification Strategy produced as part of the IRP Action Plan.

Further, as electrification costs are developed, those costs borne by ratepayers should be included in evergreen IRP updates to re-evaluate the least-cost plan to ratepayers.

[13] Clark Gellings, The Smart Grid: Enabling Energy Efficiency and Demand Response, Fairmont Press, 2009, at page 138.

8. AVOIDED COSTS OF ENERGY AND CAPACITY

Action plan item number 5 states:

> NS Power will calculate Avoided Costs of DSM (capacity and energy) for scenarios 2.0C and 2.1C. 2.0C will be used as the Reference Plan and 2.1C will be available for additional reference.[14]

Per the revised DSMAG Terms of Reference (ToR) filed with the NSUARB on June 30, 2020, the DSMAG is responsible for "developing a methodology and process for ensuring current avoided costs information is regularly updated and available."[15] This effort is currently underway.

9. EVERGREEN PROCESS

As part of its IRP Action Plan, NS Power is proposing an "Evergreen IRP Process". E1 understands the concept of an evergreen process – one rooted in the continuous updating of IRP assumptions and outputs – and is generally supportive of the concept. The notion of an evergreen process which can provide updated IRP information is appropriate given the level of risk and uncertainty in the IRP that has previously been discussed. In addition, more frequent updates to IRP assumptions would be appropriate in the context of increased volatility in the utility sphere of changing loads, carbon pricing, electrification, "smart grid" technologies, and rapid decarbonization.

To support a clear understanding by stakeholders of the IRP evergreen process, NS Power should define the associated parameters – including its mechanics, the parties involved and their roles, the frequency of updates to IRP modelling, and triggers for re-evaluation of the Reference Plan.

[14] Supra note 2, page 27.
[15] M09096, DSMAG Revised Terms of Reference, page 5 [June 30, 2020]

10. DATA ACCESS AND TRANSPARENCY

E1 is appreciative of the stakeholder engagement process conducted by NS Power as part of the 2020 IRP. NS Power offered several opportunities for group discussion, as well as one-on-one discussions with interested stakeholders, including E1. There is an opportunity to achieve future improvements in the IRP process by enhancing the transparency and accessibility to key modelling data, including model inputs such as gas prices and wholesale energy prices.

11. CONCLUSION

In recognizing the outcomes of the IRP that relate to future DSM planning, including consideration of the level of DSM investment that provides for least-cost planning, the generation of avoided costs, and the development of Demand Response and Electrification Strategies, E1 draws the following conclusions:

IRP Results

1. Scenario 2.0C is identified as the Reference Plan because it achieves the primary IRP objective of determining the least-cost plan (lowest NPVRR w/end effects) to ratepayers using current assumptions and inputs. Due to the level of risk identified with the current assumptions, the Reference Plan that is the least cost plan for ratepayers, may have a level of DSM investment closer to Mid-DSM.
2. The rate effects analysis used in the IRP is limited in scope in that it only examines varying levels of DSM and electrification and does not provide a comprehensive picture of rates across all scenarios. The methodology used in the IRP is not aligned with the DSM RBIA and the appropriate mechanism to examine rate impacts of DSM investment is E1's RBIA.

Carbon

3. Synapse's analysis identified that the inclusion of costs for incremental reductions in carbon emissions affects the level of DSM investment that provides the lowest cost plan to ratepayers. At a price above $50 per tonne or $38 per tonne based on alteration of the economic coal retirement path, the Reference Plan may have a level of DSM investment closer to Mid-DSM.

Risk/Level of Uncertainty

4. There is a significant level of risk and uncertainty related to the costs and implementation timelines of the regional integration strategy and the pricing and availability of natural gas

imports. Levels of DSM investment above Base DSM may form the least-cost plan for ratepayers if these risk factors are realized. Variations in these assumptions should be identified and considered at the time of establishing future DSM investment levels.

Demand Response

5. The inclusion of cost-effective demand response in E1's mandate necessitates that E1 has a role in the development of any Demand Response strategy. Further, E1 considers the DSMAG to be the appropriate forum for future discussion and establishment of Demand Response Strategy in Nova Scotia.

Electrification

6. The IRP analysis did not include costs for electrification, however the IRP Final Report indicates that ratepayer funding will be required for electrification pilots and programs subject to NSUARB oversight. As electrification costs are developed, those costs borne by ratepayers should be included in evergreen IRP updates to re-evaluate the least-cost plan to ratepayers.
7. As a component of DSM, it is expected that any ratepayer funded electrification will be subject to similar regulatory oversight and administration model as traditional energy efficiency activities in Nova Scotia. Given this, E1 considers it critical that a broad stakeholder driven approach be used for the development of any Electrification Strategy.

Avoided Costs

8. The DSMAG is responsible for developing the methodology to be used in calculating current avoided costs and establishing the timeline to ensure avoided costs are regularly updated and available.

Evergreen IRP Process

9. NS Power should define the parameters associated with the IRP evergreen process – including its mechanics, the parties involved and their roles, and the frequency of updates to IRP modelling, including triggers for re-evaluation of the Reference Plan.

Data Access and Transparency

10. Data accessibility and transparency, specifically of key modelling data, including model inputs, remain areas of opportunity for future IRP processes in Nova Scotia.

E1 appreciates the opportunity to provide these comments.