Synapse
Energy Economics, Inc.

November 30, 2016

Doreen Friis
Regulatory Affairs Officer/Clerk of the Board
Nova Scotia Utility and Review Board
3rd Floor
1601 Lower Water Street
Halifax, Nova Scotia B3J 3S3

RE: M07730 - EfficiencyOne - Application for Approval of its Rate and Bill Impact Analysis Report (E-ENSC-R-16)

Dear Ms. Friis:

As expert consultant to Board Counsel of the Nova Scotia Utility and Review Board, Synapse Energy Economics (Synapse) respectfully submits the following comments in regards to the 2016 Rate and Bill Impact Analysis (R&BIA) filed by EfficiencyOne (E1) on October 31, 2016. Synapse developed these comments based on our experience with R&BIA as it has historically been conducted in Nova Scotia and the modification thereof, our knowledge of R&BIA best practices in the United States and Canada, and our review of the following:

- E1's 2016 R&BIA report and workbook
- E1's presentation regarding the R&BIA to Synapse and Multeese Consulting on November 17, 2016
- Nova Scotia Power's (NSPI) overview of methodology used to calculate avoided transmission and distribution (T&D) costs (Attachment A)
- A follow up email from Mark Robertson of E1 on November 25, 2016 regarding the variability in the rate impacts from year to year, especially in the outer years of the analysis (Attachment B)

In the following sections we provide our comments and questions on the R&BIA. The first section, Comments, recommends areas for further improvements to the analysis. The next section, Questions, identifies questions we have about the analysis. We summarize our conclusions and recommendations in the final section.

Comments

Avoided Costs

There were three important updates to avoided costs in this year's analysis, including (1) use of levelized avoided costs versus annual avoided costs the year before, (2) application of two different sets of avoided cost values in different years, one set from the 2014 IRP applied to 2015-2030 and another set from the 2009 IRP applied to 2011-2014, and (3) addition of values for transmission and distribution avoided costs.

We are pleased by the progress E1, working with NSPI and stakeholders, made over the past year with regard to the methodology and key inputs. The avoided cost methodology and inputs have varied greatly from year to year. For transparency and to facilitate comparisons across report years going forward, we request that E1 include a table of the avoided cost values used in its analysis in future reports, along with the source for each value.

In October 2016, NSPI also provided E1 with estimates of T&D avoided costs, as well as a brief overview of the methodology NSPI used to calculate those values. In turn, E1 provided NSPI's overview to Synapse on November 17. This overview is provided as Attachment A to these comments. NSPI's overview describes, in general terms, the types of investments that were considered in the analysis, but does not provide any accounting of individual investments. The results of NSPI's calculations are provided in terms of levelized average dollars per MW, separately for transmission and distribution.

Synapse appreciates NSPI's efforts to quantify T&D avoided costs, along with other avoided costs. However, many details are lacking in NSPI's description of T&D avoided costs, including but not limited to which items were included, their costs, location, and year incurred or to be incurred; whether the costs have been discounted, and at what rate; and how NSPI determined that an investment is load-related. We find the description of the avoided energy and capacity costs to be similarly lacking.

For all avoided cost inputs, NSPI should clarify the year dollars, annual stream of values, escalation rate, discount rate, and other assumptions. Also, NSPI should confirm that the costs of new resources are amortized over the lifetime of the resource.

Especially in light of the lack of detail provided by NSPI, review of these avoided costs should be conducted prior to E1's 2017 R&BIA. Further, the DSMAG should discuss and select an appropriate discount rate for the purpose of levelization.

Lost Base Revenues

We appreciate the progress E1, along with other stakeholders, made over the past year to define the methodology and incorporate calculations of lost base revenues into the modeling.

We feel that the magnitude of the avoided costs and lost base revenues are an important output of this analysis. By showing only the net of the avoided costs and lost base revenues, both values are obscured

in the graphs in the report. We request that E1 show both the avoided costs and lost base revenues in the graphs labeled "Change in [sector] Rates as a Result of DSM" in Appendix B of the analysis.

Also, on page 11, rows 1-3, the filing states "This is based on the assumption that all lost NS Power revenues due to DSM savings must be recovered by NS Power except for those revenues used to cover variable costs related to the generation, transmission and distribution of energy." Last year, there was much discussion of ways to account only for fixed costs in lost base revenue recovery calculations, but we do not see written confirmation of how E1 addressed this in its analysis. We request that E1's analysis explicitly describe how the modeling of lost base revenues addresses this issue.

Participation Estimates

We acknowledge the work E1 has done to make reasonable initial estimates of participation for the purpose of this analysis.

We also note that the estimate of current cumulative participation is 100 percent for many programs within the Commercial and Industrial rate classes, including: three of seven programs offered to the General Class; three of seven programs offered to the Small General Class; four of seven programs offered to the Small Industrial Class; four of the seven programs offered to the Medium Industrial Class; three of seven programs offered to the Large Industrial Class; and many programs offered to the Municipal Utility Class.

We feel the participation estimates represent a good starting point but should continue to be improved over time. We are looking forward to the results of the BER-IR participation rate assessment for the Small General, General and Small Industrial classes. We note that the participation estimates for the Municipal Utility Class can be misleading when compared to other classes and wonder if better data are available. We also continue to recommend a third party program evaluator conduct a more comprehensive participation study to get a more accurate picture of participation for program design purposes. We recommend a broader scope for this study, to also inform program design and future assessments of potential. Survey questions regarding re-participation and cross-participation rates should be a component of this study.

Variability in Rate Impacts

There appears to be significant variability in the rate impacts from year to year, especially in the outer years of the analysis. Specifically, we see dips in the rate impacts for all rate classes in 2021 and again in 2023 and 2024. Mark Robertson's email on November 25, 2016, provided as Attachment B to these comments, explains the drivers of this variability. We do not have specific comments on this issue at this time, but want to be included in any follow up discussions with stakeholders.

Questions

The following are our further questions on the results of the analysis:

1. Page 21, rows 7 through 10 states, "Energy Savings Actions (the Home Energy Report) began in 2013. In 2014 and 2015, the pilot program continued with the same group of participants, so no new participants were counted. Roughly 7% of HER participants left the program in 2014 and another 7% in 2015, which is reflected in the annual participant counts." How do you define a participant in this program? What proportion of each class is being offered this program? Do cumulative participant counts reflect participants that left the program? When you say that participants left the program, do you mean they opted out?

2. We note that the escalation rate factor of 2.7 percent applied to the energy and demand rates in years where NSPI did not provide a specific forecast was used for this analysis, as well as several past versions, of this analysis. What is the source of this factor and when will this factor next be updated?

3. On page 8, rows 22 through 26, E1's R&BIA filing notes that all six Municipal Electric Utilities (MEUs) are treated as customers and that each MEU is assumed to be a participant when any customer on its system participates in an E1 program. This is not detailed enough to be particularly useful for understanding participation in territories operated by Municipal entities. Is it is possible to obtain more detailed information on participation for this rate code? If not, why not?

Conclusions

Immediate actions

- NSPI should clarify inputs and assumptions regarding the calculation of avoided costs, including but not limited to the year dollars, annual stream of values, escalation rate, discount rate, and other assumptions as described in the body of these comments. Also, NSPI should confirm that the costs of new resources are amortized over the lifetime of the resource.

- E1 should add some description to its analysis of how and the extent to which the methodology estimates lost revenue recovery of fixed costs.

- E1 should clarify participation assumptions regarding the HER program and the escalation factor, per the first and second questions above.

Actions to be taken prior to the 2017 R&BIA

- Parties should review the assumptions and methodologies for calculating avoided costs to be used as inputs into the 2017 R&BIA.

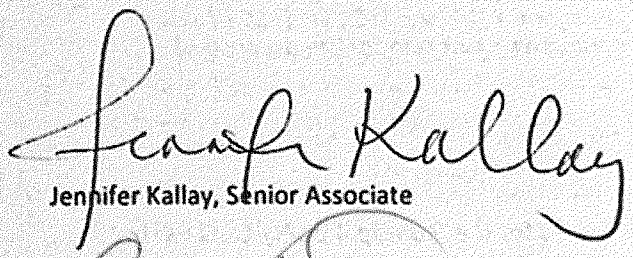
- The DSMAG should discuss and select an appropriate discount rate for the purpose of levelization.
- Parties should have the opportunity to review the results of the BER-IR participation rate assessment for the Small General, General and Small Industrial classes and E1 should implement changes to the participation assumptions used for these rate classes, if needed.
- E1 should investigate whether participation estimates for the Municipal Utility Class can be improved, to show participation of customers of each MEU.
- E1 and the DSMAG should continue to discuss the significant variability in the rate impacts from year to year, especially in the outer years of the analysis.

Recommendations for future analyses

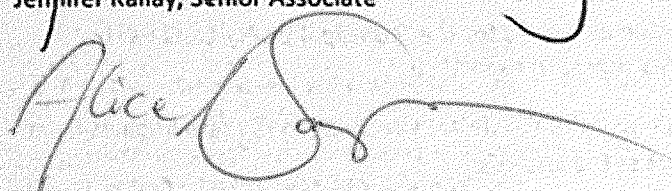
- E1 should include a table of the avoided cost values used in its analysis in future reports, along with the source for each value.
- E1 should show both the avoided costs and lost base revenues in the graphs labeled "Change in [sector] Rates as a Result of DSM" in Appendix B of the analysis.
- As described in the body of these comments, a third party program evaluator should conduct a more comprehensive participation study to get a more accurate picture of participation for program design purposes.

We thank the Board for the opportunity to provide these comments.

Sincerely,



Jennifer Kallay, Senior Associate



Alice Napoleon, Senior Associate

Attachment A

Overview of Methodology Used to Calculate Avoided Transmission and Distribution Costs

Initial Estimate of T&D Avoided Costs

ACE Plans[1] and associated Board decisions for the past eight years were utilized to determine which Transmission and Distribution (T&D) capital investments were related to load growth, as opposed to sustaining and maintenance work.

Load growth related investments include reconductoring, voltage conversions, substation construction, distribution system expansion, and other related activities. In the instance that an investment was carried over into a subsequent year, the amount of carry-over was subtracted from the preceding year's investments. Additionally, items that were not approved or indicated as being deferred were removed from any calculations.

The completed analysis included;

- Review of available ACE plan data for the period from 2008 - 2015
- Identification of load growth related items
- Confirmation of project approval status
- Identification of transmission or distribution status
- Attributing of project costs to the appropriate year, taking carry over into account
- Comparison of growth related costs to total transmission / distribution spend

Historic system peak information used in the analysis was obtained from Figure 2 of the 2016 10 Year System Outlook[2] Report (Coincidental Peak Demand with Future DSM Program Effects). The forecasted values were not utilized for this analysis.

Initial estimates of T&D Load Growth are as follows:

- Transmission $8,365.06 /MW
- Distribution $3,524.35 /MW

[1] https://nsuarb.novascotia.ca/sites/default/files/nsuarb-225787-v1-communications_plan_-_ace_plan_faq_-_final_version_-_j_2.pdf
[2] http://oasis.nspower.ca/site/media/oasis/20160630%20NSPI%20to%20UARB%2010%20Year%20System%20Outlook%20Report.pdf

Attachment B

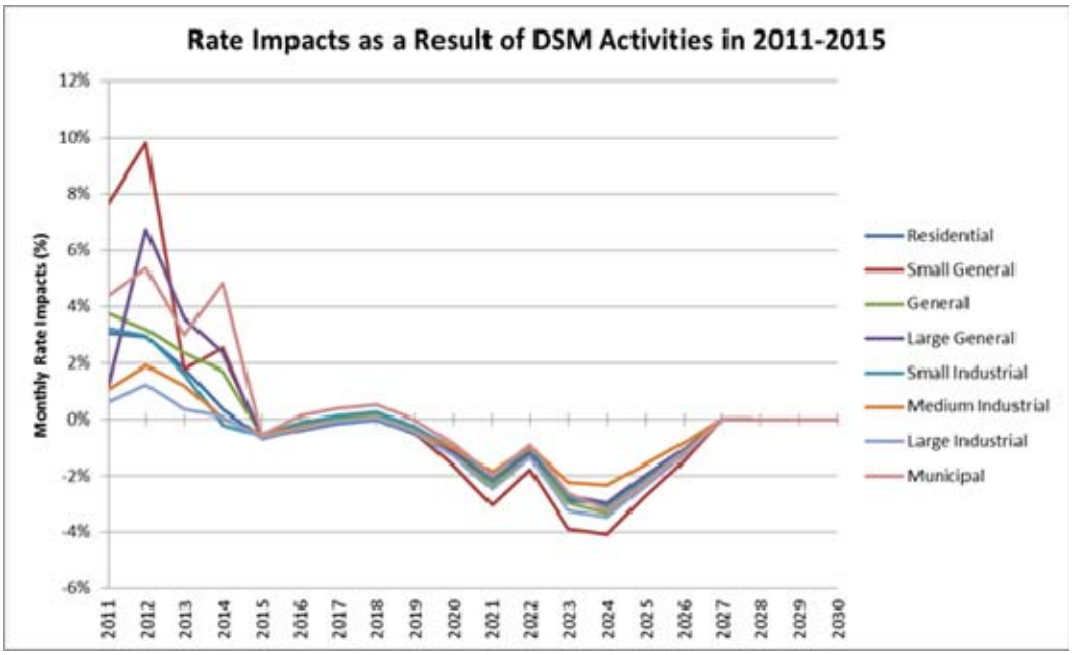
E1 Email on Variability of Rate Impacts

Alice Napoleon

From: Mark Robertson <MRobertson@efficiencyns.ca>
Sent: Friday, November 25, 2016 8:33 AM
To: Voytek Grus (Voytek.Grus@nspower.ca); Nicole Cadek (Nicole.Cadek@nspower.ca); Jennifer Parker (Jennifer.Parker@nspower.ca); Peter T Craig (Peter.T.Craig@novascotia.ca); Nancy Rondeaux (Nancy.Rondeaux@novascotia.ca); Melissa MacAdam (mmacadam@blackburnlaw.ca); 'John Merrick'; 'William Mahody'; 'Nelson Blackburn'; Melissa Whitten (mwhitten@daymarkea.com); 'John Athas'; 'Mel Whalen'; Alice Napoleon; Tim Woolf; Jennifer Kallay; Nancy G Rubin (nrubin@stewartmckelvey.com); Mark Drazen (mmd@drazen.com); Albert Dominie (aedominie@hotmail.com); Stephen Thomas (stephen@ecologyaction.ca); Brian Gifford (brian.gifford@eastlink.ca); Adam Hayter (haytera@halifax.ca); Emma Norton (efficiency@ecologyaction.ca); George Foote (gfoote@ns.sympatico.ca); Paul Chernick (pchernick@resourceinsight.com); Jim Gogan (jim@bretonlawgroup.com); Emily Mason; Matthew Davidson; John Aguinaga; 'Tim Wood'
Subject: E1 2016 Rate and Bill Impact Analysis - additional info
Attachments: 2016 Rate and Bill Impact Analysis Report.pdf

Good morning,

EfficiencyOne received a few questions on the 2016 Rate and Bill Impact Analysis results, regarding rate impacts in specific years. We took a closer look in the model and I can provide some further explanation of what's driving these modeled rate effects. This may help inform your comments to the Board, due Nov. 30. Please see Figure 3 from the report to follow along, pasted below.



2015
There are no program costs in this year, causing a sharp drop; I think this part was clear to everyone.

2016-2018
There is a slight rise over this period, owing to the fact that No-DSM rates rise year-over-year during this period. This means DSM rates also rise (no-DSM rates +/- adjustments due to DSM). Since we estimate the fixed cost component by

subtracting avoided costs (which are the same in every year) from rates (which increase slightly) the estimate of fixed costs to be recovered grows a bit in each year, pushing rate effects relative to the No-DSM case gradually upward.

2019

The trend reverses in 2019 and rates begin to fall. It is important to recognize here that the avoided costs are driven by *portfolio-level* savings, for which we have an estimate of average measure life at the portfolio level (all rate classes combined, plus Unmetered). Lost revenues are driven by *rate class-level* savings, for which we have an estimate of average measure life at the rate class level. In 2019, the measure life for 2011 programs in the Residential class expires, meaning that year's programs no longer contribute to lost revenues; however, the 2011 programs at the portfolio level are intact, as the average measure life at the portfolio level for 2011 programs has not yet expired. So from 2018 to 2019, the total avoided costs stay the same, but lost revenues decrease, creating a net downward effect on rate effects relative to the No-DSM case.

2022

In this year, the portfolio-level average measure life for 2011 programs expires, so there is a large component of avoided costs that disappears, pushing rate effects relative to the No-DSM case up.

2023

At the portfolio level, the average measure life for 2011 is 11 years (drops off in 2022) and for 2012 is 12 years (drops off in 2024). This means the Avoided Costs are the same in 2022 and 2023. However, in 2023, we do see some savings disappear at the rate class level, which drives lost revenues. Since some lost revenues disappear but Avoided Costs stay the same, the net effect is a downward effect on rates compared to 2022.

2024-2027

In reality, the load reductions will probably persist indefinitely (i.e. customers won't switch BACK to inefficient equipment). The modeled effects end in 2027 because this is the period for which ENS can claim influence over those savings.

If we keep doing (roughly the same amount of) DSM every year, the cumulative avoided costs will continue to rise to 2-3 times what they are in 2015 as we approach the 'steady-state' of DSM, to the point where total annual energy savings are relatively constant in every year. This means that by the time 2011 program savings actually disappear, the rate effect will be tempered by much larger avoided costs. While customers may not actually see that blip around 2022-2023 in their rates (since it will include DSM effects from programs delivered after 2015), it still factors into the average rate impacts presented in this year's analysis.

This discussion brings a few things to light – avoided costs are driven by total savings (sum of all modeled classes + Unmetered), which they should be, as all these savings do drive avoided costs. Lost revenues are calculated by rate class, but without an estimate of lost revenues from the Unmetered class (which is impossible to calculate using our method of estimating the fixed cost portion from rates, since there are no $/kWh rates for Unmetered).

On a separate note – a few stakeholders suggested that, in the historical analysis, we should always include any approved DSM (e.g. 2016-2018 Plan) in addition to completed DSM. On our end, it would mean making some participation estimates for future years, but it could be done. We are happy to provide whatever analysis is most useful to stakeholders, so if you'd prefer to see approved DSM years included, please make sure in include that request in your comments to the Board.

Please contact me if you want to discuss. If you want to look any deeper at these effects in the model, see the 'Attribution', 'Lost Revenue' and 'Avoided Costs' tabs of the Excel file (on the Board's website under M07730)
Thank you,
Mark

Mark Robertson, P.Eng
Regulatory Technical Lead

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