

EfficiencyOne

IN THE MATTER OF *The Public Utilities Act*, R.S.N.S. 1989, c.380, as amended.

- and -

IN THE MATTER OF An Application by EfficiencyOne for Approval of Supply Agreement for Electricity Efficiency and Conservation Activities between E1 and Nova Scotia Power Inc. (NS Power), the establishment of a final agreement between the parties, and approval of a 2020-2022 Demand Side Management (DSM) Resource Plan.

M09096

EfficiencyOne Performance Alignment Study

FILED
April 21, 2020



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ATTACHMENTS

Attachment A: EfficiencyOne’s Performance Alignment Study conducted by KPMG

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1 **1. INTRODUCTION**

2 EfficiencyOne, as the holder of the Efficiency Nova Scotia franchise, is responsible for the
3 development of Demand Side Management Resource Plans (“Plans”) and their implementation.
4 EfficiencyOne recognizes the importance of developing Plans that deliver the greatest benefit to
5 ratepayers and prudently managing their implementation to ensure robust stewardship of
6 ratepayer funds.

7
8 Since 2012, EfficiencyOne has met or overachieved performance targets, established by the Nova
9 Scotia Utility and Review Board (“NSUARB”) in approved Plans, for both first year energy savings
10 and peak demand savings within the NSUARB approved investment level. The organization takes
11 considerable pride in these accomplishments. EfficiencyOne’s past performance of spending
12 within the NSUARB approved budget and generating a surplus for the return to ratepayers
13 demonstrates the organization’s effective stewardship of ratepayer funds. Comprehensive cost
14 management strategies and internal controls have been implemented to proactively manage
15 approved DSM investment amounts throughout the Plan delivery to ensure performance targets
16 are achieved in the absence of overspending.

17
18 **2. BACKGROUND**

19 EfficiencyOne is providing to the Nova Scotia Utility and Review Board EfficiencyOne’s
20 Performance Alignment Study conducted by KPMG as Attachment A. During the 2020-2022 DSM
21 Resource Plan regulatory process, Intervenor discussion emerged on EfficiencyOne’s historical
22 underspending of approved DSM investment amounts and overachievement of electrical energy
23 savings. As a result, the Board’s Order stated:

1 E1 is directed to file terms of reference for the investigation of overestimation of costs by
2 October 31, 2019, and to conclude the investigation and file a report with the Board by
3 March 31, 2020.¹
4

5 In accordance with the Board's Order, EfficiencyOne developed a Scope of Work for the study in
6 October 2019. This Scope of Work was shared with the DSM Advisory Group (DSMAG) for
7 comments prior to filing with the NSUARB. A request for proposals (RFP) procurement process
8 was initiated in September 2019. Final RFP submissions were received on September 12, 2019,
9 and KPMG was selected as the successful proponent on September 18, 2019.
10

11 KPMG's approach was consistent with EfficiencyOne's Scope of Work, and included the following
12 major activities:

- 13 1. A review of cost assumptions used in the development of DSM Resource Plans.
- 14 2. A variance analysis of actual costs and energy savings compared to DSM Plan approved
15 amounts for 2015, and 2016-2018.
- 16 3. A review of factors identified in the variance analysis for their continued existence.
- 17 4. A jurisdictional scan of comparable organizations based on legislative, regulatory and
18 corporate considerations.
19

20 **3. SUMMARY OF KPMG'S FINDINGS**

21 KPMG's key findings of their report indicate:

- 22 1. No evidence of an upward bias in EfficiencyOne's estimate of resource costs;
- 23 2. EfficiencyOne's resource cost development for DSM Resource Plans is well aligned with
24 the surveyed jurisdictions;

¹ M09096, NSUARB Order, September 16, 2019.

3. EfficiencyOne's resource cost development of DSM Plans has demonstrably improved with the organization's maturity;
4. Enhancements to documentation of linkage between supporting rationale and measure level assumptions may provide insights related to future Plan development; and
5. Enhancements within the current reporting to include additional information to support the expected results and how this differs from Plan, as a result of changes in market upon implementation, may provide more insight as implementation of the Plan progresses.

4. EFFICIENCYONE'S RESPONSE TO KPMG'S FINDINGS

4.1 Enhancements to Documentation

EfficiencyOne employs a bottom-up measure level modelling approach for the development of three-year DSM Plans. A key activity of this approach is the development of the measure level input data used for modelling purposes. The input data is documented for each measure, inclusive of all measure characterizations. Although all input assumptions are documented and available for stakeholder review as part of the current DSM planning process and regulatory proceeding, EfficiencyOne agrees with KPMG's finding that there are opportunities to enhance the documentation of rationale used to develop the measure level input data specifically where these assumptions may differ from historical data. However, EfficiencyOne notes that how best to implement this will be dependent upon various factors including the number of measures and associated characterizations or assumptions contained within the DSM model. Specifically, KPMG found that there is an opportunity to document the direct linkage between measure level assumptions used in the development of DSM resource costs and energy savings and the specific reports, studies or data used to inform the assumptions. While EfficiencyOne agrees that this level of documentation may provide insights related to future plan development, including a more confirmable rationale behind measure level assumptions, any adoption of enhanced citation documentation would come with increased costs and therefore should meet the test of providing greater value to ratepayers than its associated cost of production. While enhanced documentation may provide longer term benefits to the planning process, it is not clear that it

1 will result in improved accuracy and precision of cost estimates. EfficiencyOne remains
2 committed to continuous improvement of the DSM Planning process inclusive of documentation.

3 4 **4.2 Enhancements to Current Reporting**

5 EfficiencyOne agrees that including additional forecast information in current reporting may
6 provide the NSUARB and stakeholders with additional insight and greater understanding on how
7 DSM Plan implementation is progressing mid term. While enhanced reporting, in and of itself will
8 not eliminate variances between the DSM Plan approved investment levels and energy savings
9 compared to actual results, EfficiencyOne believes such reporting may contribute to the ability
10 of stakeholders to focus on any variances that do occur on a timely basis.

11
12 To this end EfficiencyOne proposes to provide annual forecast information for savings targets
13 and spending in the quarterly and annual progress reports. EfficiencyOne would also provide
14 DSM Plan period forecast information (in the case of three-year DSM Plans) in the Annual
15 Progress Reports.

16
17 Subject to any specific NSUARB direction, EfficiencyOne proposes to incorporate the enhanced
18 forecast information beginning in the 2020 Q3 DSM Report and the 2020 Annual Progress Report.

19 20 **4.3 Jurisdictional Scan**

21 Included with KPMG's study was a jurisdictional scan on comparable organizations. To assist
22 KPMG in determining comparable organizations, EfficiencyOne provided KPMG with a list of DSM
23 administrators and further identified those organizations that were comparable on a legislative,
24 regulatory and corporate structure. Notably there were no Canadian jurisdictions that met the
25 criteria. Only Efficiency Vermont, Efficiency Maine Trust and Energy Trust of Oregon were
26 determined to have met the "comparable jurisdictions" criteria. Ultimately Efficiency Vermont
27 and Efficiency Maine Trust participated in the one-hour interview. Although the jurisdictional
28 scan that was conducted as part of the KPMG study was not undertaken as a leading practice

review of DSM planning and resource cost development, EfficiencyOne did obtain some high-level insights from the scan.

Similarities in operations between these organizations and EfficiencyOne included:

- DSM Plans for both organizations currently span three years.
- A measure level modelling approach is used for DSM Plan development, with similar cost categories such as incentive costs and admin costs.
- In-house developed models are used by the surveyed organizations rather than a third-party consultant.
- DSM resource costs are developed using historical performance data, evaluation insights, market research and staff expertise.
- DSM resource costs are comprised of model outputs and estimates for Enabling Strategies which are calculated outside of the model.
- Implementation progress is reported on at the program and/or market sector levels through annual and quarterly reporting.

One difference identified was related to the annual underspend which can be carried over to the following year upon annual approval by the governing body. It was also identified that for each organization there is inherent motivations for underspending (e.g. performance award for meeting targets and financial penalty for overspending or if targets are not achieved).

5. CONCLUSION

Subject to any specific direction from the NSUARB, based upon the completed Performance Alignment Study, EfficiencyOne proposes to undertake the following measures:

- Continue with ongoing improvement of the DSM Planning process inclusive of enhanced documentation where it is determined to be a cost-effective use of ratepayer funds; and
- Commencing in Q3 of 2020, provide enhanced annual forecast information for savings targets and spending in its quarterly and annual progress reports to the NSUARB.



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KPMG LLP

April 21, 2020



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Restrictions and Disclaimer

This report is intended solely to assist EfficiencyOne with conducting the study to assess the factors that resulted in its historic underspending of planned Demand Side Management (DSM) budgets and historic exceeding of energy saving targets and identify if the contributing factors continue to be present in EfficiencyOne's current operating environment. The comments and observations in our report are not intended, nor should they be interpreted, to be legal advice or legal opinion.

KPMG's report is confidential and is intended solely for EfficiencyOne's internal use in this matter. This report is not intended for general use, circulation or publication and any use of KPMG's report for any purpose other than circulation within EfficiencyOne without KPMG's prior written permission in each specific instance is prohibited. The sole exception is that EfficiencyOne may file the report or substantive components of the report with the Nova Scotia Utility and Review Board (NSUARB) for its regulatory purposes. KPMG assumes no responsibility or liability for any costs, damages, losses, liability or expenses incurred by anyone as a result of the circulation, reproduction or use of or reliance upon KPMG's reports, contrary to this paragraph.

We had access to information up to March 12, 2020 in order to arrive at our observations but, should additional documentation or other information become available which impacts upon the observations reached in our report, we will reserve the right, if we consider it necessary, to amend our report accordingly. This report and the observations and recommendations expressed herein are valid only in the context of the whole report. Selected observations and recommendations should not be examined outside of the context of the report in its entirety.

Our review was limited to, and our recommendations are based on, the procedures conducted. The scope of our engagement was, by design, limited to the three NSUARB questions, and therefore the observations and recommendations should be considered in the context of the procedures performed. In this capacity, we are not acting as external auditors nor value for money auditors and, accordingly, our work does not constitute an audit, examination, value for money, attestation, or specified procedures engagement in the nature of that conducted by external auditors on financial statements or other information and does not result in the expression of an opinion on any financial information.

We did not consult with or interview any third-parties engaged by EfficiencyOne, including the third-party modeller, engaged by EfficiencyOne in the preparation of its DSM Resource Plans. We did not audit, review or assess the work of any of these third-parties.

This report has been prepared by KPMG at the request of EfficiencyOne in our capacity as advisors in accordance with the terms and limitations set out in our engagement contract. The information presented in this report has been prepared by KPMG from information provided by EfficiencyOne. KPMG has relied upon the accuracy and completeness of this information, and has not independently verified it, except to the extent specified in this report. KPMG may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement this report.



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1 **Executive summary**

EfficiencyOne was directed by the Nova Scotia Utility and Review Board (NSUARB) to conduct a performance alignment study. The study included a review of EfficiencyOne's historic underspending of planned Demand Side Management (DSM) budgets and historic exceeding of energy saving targets to identify whether the factors that led to the overestimation continue to exist in its current operating environment.

EfficiencyOne engaged KPMG to conduct the performance alignment study (or "study") of its DSM Resource Plans from the period of 2013 through to 2020-2022.

Overview of DSM Resource Planning

As per the *Public Utilities Act*, Nova Scotia Power Inc. (NSPI) is required to undertake cost-effective electricity efficiency and conservation activities that are reasonably available in an effort to reduce costs for its customers, purchased from the franchise (i.e., from Efficiency Nova Scotia, operated by EfficiencyOne). As the *Public Utilities Act* does not identify the associated DSM savings targets and investment levels, these are to be established through the development and approval of DSM Resource Plans (the "Plans" or "Plan").

The Plan development process is consultative in nature. EfficiencyOne holds meetings with DSM stakeholders during the planning process to gather feedback and make adjustments to inform the Plan. EfficiencyOne also relies on external consultants to support the DSM planning process. Once EfficiencyOne files its DSM Resource Plan with the NSUARB, the NSUARB sets out a regulatory process for review of this Plan. The NSUARB must approve all funding amounts and associated Plan details.

The Plan is developed using information available at the time of development. DSM Resource Plans are prepared between one and four years prior to implementation. Therefore, given the time lag between Plan development and implementation, actual performance may differ from Plan. The flexibility outlined in the Plans implementation allows EfficiencyOne to make adjustments throughout the period of Plan execution. Flexibility includes adjusting the allocation of funding amongst programs and program components while operating within the funding envelope approved by the NSUARB.

The approved investment from the NSUARB informs the Supply Agreement between NSPI and EfficiencyOne and is the source of funding within which EfficiencyOne can fund its DSM operations. Any funding not spent is returned to electricity ratepayers via NSPI as per the terms of the agreement.

EfficiencyOne's underspend for 2015 was approximately \$4.66 million or 12% of the approved investment, while its underspend for 2016-2018 was approximately \$6.99 million or 7% of the approved investment. The percentage underspend on DSM has decreased from the 2015 to the 2016-2018 Resource Plans for a total underspend of approximately 8% of the total approved investment since the franchise was formed in 2015. We understand from EfficiencyOne that the organization did not have an over or underspend in 2019, based on its 2019 Annual Progress Report filed on March 31, 2020.

EfficiencyOne's DSM Resource Plan development process has evolved over time as the organization has matured. The organization is now in its tenth year of operations. Through the course of our work, we noted improvements in the process for estimation of DSM total resource cost. For example, we noted that EfficiencyOne was more involved in the estimate of customer participation in 2020-2022. We also noted that EfficiencyOne had enhanced its documentation related to the updates to admin



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cost rates, outlining the rationale for the estimate adjustments. However, further opportunities for improvement exist.

Focus of Study

As part of this study, we answered the following questions posed by the NSUARB:

1. Whether there is an upward bias in EfficiencyOne's estimate of resource costs;
2. What are the factors that led to a historic overestimation; and
3. Whether the factors that led to the overestimation continue to be present in EfficiencyOne's current operating environment.

To respond to the three NSUARB questions noted above, the focus of our work was on how EfficiencyOne developed the resource cost estimates included in the Plan.

We provide our summarized responses to these three questions below. The remainder of this report provides our detailed responses to each question along with our approach to conduct the study. The language used in this report is consistent with the language used by the NSUARB in the three questions posed.

Much of the information in our report was obtained from previous information submissions to the NSUARB that are publicly-available. We also conducted a jurisdictional review with Efficiency Vermont and Efficiency Maine Trust. The results of the review were limited to one-hour interviews. A summary of these interviews can be found in Section 6.

NSUARB Question 1: Whether there is an upward bias in EfficiencyOne's estimate of resource costs

We did not see evidence of an upward bias in EfficiencyOne's estimate of resource costs.

To answer the question of whether there was an upward bias, we sought to understand how assumptions related to resource costs were supported. In our planning work in the course of this study, we identified that the planned resource costs in the DSM Plans are similar in many respects to Future Oriented Financial Information ("FOFI") as defined in the CPA Canada Handbook – Accounting ("the Handbook"). FOFI definition in the Handbook encompasses information about prospective results of operations, based on assumptions about future economic conditions and courses of action. FOFI guidance could be considered similar to the principles in developing cost estimates for a DSM Plan. Accordingly, FOFI guidance may provide useful direction on the nature of support that could be provided for any assumptions made in EfficiencyOne's Plans.

In answering the question of whether there is an upward bias, we first set out, as noted above, to understand how cost estimate assumptions were supported. Potential sources of support for any assumptions are:

- Information on EfficiencyOne's past performance
- The performance of other organizations engaged in similar DSM activities
- Studies on program or product feasibility
- Marketing or customer studies
- Any other forms of supporting analysis or market data.



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In undertaking our review, we appreciated that the extent of detailed information supporting each assumption can vary according to the type and nature of the resource cost. The depth of support will also be influenced by factors such as the significance of the cost and the availability and quality of the supporting information.

In our review, we noted that EfficiencyOne's cost estimates and assumptions at the measure level were often based on past performance. EfficiencyOne identified that past performance is adjusted and updated for the upcoming period through internal reviews and discussions. However, we did not see supporting documentation for some of these estimates and assumptions, such as documentation of the rationale for updates relating to key estimates that were based on past results and how this rationale linked to supporting studies, evaluations, etc. Documentation of the basis of changes would be particularly useful for estimates of participation rates and customers' choice of measure.

We further note that significant assumptions require the careful exercise of judgment by management. We understand that the exercise of this judgment may not always be well documented. However, it would have been useful to see supporting documentation for how various Plan assumptions at the measure level were derived and the linkages to the marketing studies, customer studies and other data that were leveraged. In 2016-2018, EfficiencyOne relied on its third-party modeller for many inputs and customer participation was an output of the third-party model. In 2020-2022, we saw that customer participation was an input to the model and was based on 2017 actual participation. This is evidence of greater management involvement over time and greater tailoring to reflect actual experience. In the 2020-2020 process, however, we did not see documentation of the rationale for updates to the historical information that was used as the starting point in the development of final estimates.

Additionally, for cost estimates, the starting assumption was historical performance. While in some instances there was supporting documentation for updates to historical information to arrive at the Plan cost estimates (e.g., many of the updates to admin cost in 2020-2022 had supporting calculations), we did not see documented rationale for the updates to historical information for some measure level incentive and admin costs.

Overall, while we did not consistently see supporting documentation, this does not mean that the assumptions made were unsupported or did not reflect management's best judgment at the time. Assumptions may have been supported by good analysis and by good input data. In the absence of full supporting documentation, however, it is difficult to make a complete assessment of the robustness of the supporting process. Details of the process may have been lost with the passage of time. Accordingly, we recommend that, moving forward, EfficiencyOne enhance its documentation of measure level input assumptions made by including the linkage of measure level assumptions, to the rationale and justification to supporting studies, evaluations, etc. This may help to demonstrate the supportability of assumptions and the rationale for updates.

We appreciate that the degree of uncertainty increases with the length of the future period covered, as may be the case with a three-year DSM Plan. There are uncertainties inherent in predicting future resource costs and with longer-term plans there is more likelihood that future conditions, the market, and customer behaviour may vary from Plan. The DSM Plan is based on information and assumptions at an effective date. With the passage of time, actual experience and new/updated market and measure information may impact the precision of the cost estimates.

We did see the Plans filed with the NSUARB from 2015 onward, as well as supporting documentation, such as evaluation reports. As a result, we reviewed available documentation to respond to the question. Discussions with EfficiencyOne were held to gather additional insights for those cases where we did see and did not see documentation. In answering the question of whether there was an



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upward bias in the estimation process, we set out to understand how cost estimates were informed and the information upon which cost estimates were based. In this process, we took into account guidance provided by the Handbook, noted earlier, on the development of Future Oriented Financial Information.

We saw that total resource costs within the Plans comprise incentive costs, admin costs and Enabling Strategies. Measure-level incentive costs and admin costs are inputs into the model. For three-year Plans, we saw that the measure level costs are generated within the model based on measure-level cost inputs and estimated customer participation levels. For one-year Plans, program component-level costs and Enabling Strategies are estimated by the organization without modelling.

We saw evidence that EfficiencyOne's consultant (Navigant) conducted modelling to inform the costs in the 2016-2018 and 2020-2022 Plans. EfficiencyOne explained that both incentive costs and admin costs are initially based on historical costs and then updated based on external factors, such as changes in market conditions, changes in technologies or program delivery changes.

We did see documentation in the form of workbooks for incentive costs and admin costs. These workbooks contained such things as the calculation of admin costs rates for 2016-2018 and 2020-2022 and incentive costs and customer participation estimates for 2020-2022. We also saw evidence in the form of the workbooks used to estimate the costs included in the Continuation Plans in 2015 and 2019, as well as the costs included the Plans filed with the NSUARB.

Notwithstanding the evidence noted above, EfficiencyOne did have an overestimation of costs in 2015 of \$4.66 million, or 12% of total budget. It had an overestimation of costs in 2016-2018 of \$6.99 million, or 7% of total budget. There was thus a decline in the second Plan period in the percentage overestimation. While we did not see evidence of an upward bias, we did identify factors that appeared to contribute to the overestimation in 2015 and 2016-2018. These factors are discussed in our response to Question 2.

NSUARB Question 2: What are the factors that led to a historic overestimation?

In consideration of Question 2, we noted the following circumstances related to 2015 and 2016-2018:

- EfficiencyOne identified that it relied heavily on a third-party modeller (Navigant) in the development of the 2016-2018 Plan. This work informed the DSM plan that EfficiencyOne filed with the NSUARB for approval. As the organization has become more mature, it appears that EfficiencyOne has built additional internal capability and this may reduce its reliance on third-parties.
- In conducting the jurisdictional review, EfficiencyOne explained that comparable organizations were limited, particularly in Canada. The list of possible organizations for the jurisdictional scan was considered based on corporate, regulatory and legislative comparability with EfficiencyOne. As a result of these three factors, our jurisdictional interviews were limited to Efficiency Vermont and Efficiency Maine for comparability. There were no Canadian organizations that met the criteria as determined by EfficiencyOne. In earlier years, when developing the Plans for 2015 through 2018, EfficiencyOne was maturing in its ability to tap into other jurisdictional information. During that time, the organization may not have had the knowledge, relationships and experience it has today in obtaining information to inform its approach.
- While there was an underspend in each of the years 2016, 2017 and 2018, it should be noted that the estimates for each of these years are contained within a single Plan (the 2016-2018 Plan) and are thus the outcome of a single planning process. In 2016-2018 the NSUARB directed



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EfficiencyOne to reduce its planned costs by 14%, 15% and 18%, respectively. In this instance, EfficiencyOne chose not to remodel the plan on a measure by measure basis, but rather to make adjustments on a program component level to maintain the NSUARB approved investment level.

- The underspend has declined from 2015 to 2016-2018, for an overall underspend over the four years of approximately \$12 million or 8% of total budget. When developing a DSM plan with future cost information, the costs are based on assumptions of future program components occurring, participation rates, customer choice, measure costs, and market factors based on EfficiencyOne's management's judgement as to the most probable set of future market and economic conditions. Actual experience can differ from plan given actual market and economic conditions may vary. As with any future-oriented financial information, FOFI guidance suggests that variations could be material.

To respond to the NSUARB's question, we conducted a detailed variance analysis of Plan to actual cost and energy savings in 2015 to 2016-2018 at the program component level. The purpose of conducting this variance analysis was to identify specific factors that occurred in 2015 and 2016-2018 that led to the overestimation of costs in 2015 and 2016-2018. We did not conduct any analysis for 2019, as at the time of our fieldwork, this information was not available.

Based on the results of our analysis, we identified specific factors in 2015 and 2016-2018 that contributed to the overestimation. These factors can be categorized as follows:

1. **Inherent in the maturity of the organization:** Factors specific to the organization and its maturity level in regard to the estimation of DSM total resource costs. EfficiencyOne has some control in regard to these factors.
2. **Inherent in the operating environment:** Factors specific to the environment in which the organization operates. EfficiencyOne has limited control in regard to these factors.
3. **Inherent in the regulatory environment as defined by external factors:** Factors specific to the regulatory environment in which the organization operates. EfficiencyOne has limited control in regard to these factors.
4. **Result of management decision:** Factors specific to the decisions that EfficiencyOne makes as an organization. EfficiencyOne has inherently more control with respect to these factors compared to those noted above.

The following outlines the contributing factors to the overestimation of costs in 2015 and 2016-2018.

Factors of overestimation – Inherent in the maturity of the organization

The maturity of EfficiencyOne – Actual Results and Experience. EfficiencyOne has been operating for 10 years, and has been operating as the franchise holder of Efficiency Nova Scotia since 2015. As a relatively new organization in the development of earlier Plans, EfficiencyOne would have had limited data on past performance, as well as limited experience in developing and implementing DSM Resource Plans. Time was necessary to build experience and collect information based on performance. This may have impacted EfficiencyOne's accuracy and precision of cost estimates in its 2015 and 2016-2018 Plans.

Through the course of our study, we reviewed documentation and held discussions with EfficiencyOne regarding the supporting documentation for the cost estimates included in the 2015 and 2016-2018 Plans. We did not see consistent documentation of the rationale for updates from initial cost estimates to final measure-level costs (e.g., incentive cost) estimates included in the Plan. We did observe differing levels of documentation related to the cost estimates for the Plans. The most



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recent Plan (i.e., 2020-2022), had the most supporting documentation for its cost estimates, which appears to be indicative of a maturing organization. Traceability of rationale and justification for updates made through the process for cost estimations can support the internal review process and provide staff with additional context to consider and refine estimates, which may contribute to increased precision and accuracy. EfficiencyOne has opportunities to continue increasing the maturity of its DSM planning process in the future, as it relates to clearly indicating its rationale and justification of estimates for key inputs and cost drivers at the measure level.

Factors of overestimation – Inherent in the operating environment

Challenges that are present with the estimation of participation. We appreciate that it is challenging to estimate customer uptake of measures within program components. Predicting customer behaviour is inherently challenging, as it is dependent on customer choice and available opportunities. As such, some instances of overestimation may not be unexpected.

Lower energy savings were realized in the program components Residential Direct Install (RDI) and Rental Properties and Condos as a result of customers favouring lighting measures, resulting in lower costs paid to delivery agents. For RDI and Rental Properties and Condos, EfficiencyOne underestimated overall program component participation in terms of number of measures installed (i.e., actual total units installed were 157% and 104% compared to the Plan, respectively). However, customers in these two program components appear to have chosen more lighting measures than anticipated by EfficiencyOne in its Plan. Relative to Plan, lighting measures installed were 21% and 54% higher than plan for RDI and Rental Properties and Condos, respectively.

In 2016-2018, as a result of installing more lighting measures than anticipated, EfficiencyOne had lower energy savings than planned for RDI and Rental Properties and Condos. This reflects the fact that lighting measures have lower energy savings per measure than other offerings. As a result of achieving lower energy savings, however, EfficiencyOne also incurred lower costs. This follows from the fact that the RDI and Rental Properties and Condos program components are delivered by delivery agents. Delivery agents are paid by EfficiencyOne on a per kWh basis, not on a per measure basis. Lower energy savings thus translate to lower costs for delivery agents. Additionally, per EfficiencyOne, the organization issued a Request for Proposal for these services after the 2016-2018 Plan was filed, resulting in lower costs than had been anticipated, which also impacted underspend.

External factors impacting Home Energy Assessment resulted in lower than estimated customer participation. Home Energy Assessment (HEA) is a higher cost program component. EfficiencyOne overestimated customer participation in this program component, only achieving 46% of Plan estimated customer participation. EfficiencyOne had expected customer participation to increase; however, this did not materialize. In 2015, provincial funding for HEA ended. Participation was lower in 2016 as a result, as participation was limited to homes that were primarily electrically heated.¹ In 2018, there was also a lower-than-anticipated number of HEA projects completed. Funding for non-electrically headed homes was re-introduced in 2018, leading to capacity issues with service organizations due to an increased demand for home assessments in 2018. EfficiencyOne and service organizations worked to increase its number of Energy Advisors to address the increased demand.²

¹ 2016 DSM Evaluation Reports

² 2018 DSM Annual Progress Report



Factors of overestimation – Inherent in the regulatory environment as defined by external factors

The length of time between the development and implementation of the DSM Resource Plan. Because the DSM Resource Plan is for a three-year period, cost estimates are developed well in advance of actual plan implementation. Since actual performance can differ from estimates – particularly if estimates are prepared in advance – our analysis found variances between the key estimates. This included variances between actual and planned actual performance, per program component, given market conditions and customer uptake.

Factors of overestimation – Result of management decision

EfficiencyOne overestimated customer participation in Custom. Custom Retrofit, as a program component, is the highest cost program offered by EfficiencyOne. The 2016-2018 planned budget for Custom Retrofit was \$19.8 million. EfficiencyOne overestimated uptake in the Custom program. As a result of lower participation than expected, EfficiencyOne realized lower costs than planned. We recognize that there are challenges in estimating uptake in participation in the Custom program. We understand from EfficiencyOne that, as this program consists of a small number of large projects, any changes such as delays related to expertise, equipment, etc., can have significant impacts on cost.

The 2015 Continuation Plan costs were based on historic performance/actuals with adjustments at the program component level, rather than a detailed measure level bottom-up approach. In 2015, as a result of legislation, EfficiencyOne developed the 2015 DSM Resource Plan as a Continuation Plan. As this Plan was developed within a compressed time period and for one year only, EfficiencyOne determined that, for a one-year Plan, it was not beneficial from a cost perspective to initiate a full modelling process at the measure level. Per EfficiencyOne, conducting modelling at the measure level is a lengthy and costly process. Rather than modelling a one-year Plan, EfficiencyOne identified it relied on historical information from 2013 on a program component level adjusting for future expectations for each of these programs as informed by the third-party evaluator reports. EfficiencyOne outlined that the same approach to developing the 2015 Plan was taken for 2019. We did not conduct any variance analysis on the 2019 cost estimates to actual.

Based on this approach, cost estimates were made at the program component level, which may not be as precise and accurate as more detailed measure level cost estimates. The Continuation Plan was built to the approved investment amount within legislation.

NSUARB Question 3: Whether the factors that led to the overestimation continue to be present in EfficiencyOne's current operating environment

Many of the factors that led to the overestimation continue to be present in EfficiencyOne's current operating environment. These factors can be categorized as follows:

1. **Inherent in the operating environment:** Factors specific to the environment in which the organization operates. EfficiencyOne has limited control in regard to these factors.
2. **Inherent in the regulatory environment as defined by external factors:** Factors specific to the regulatory environment in which the organization operates. EfficiencyOne has limited control in regard to these factors.
3. **Result of management decision:** Factors specific to the decisions EfficiencyOne makes as an organization. EfficiencyOne has inherently more control with respect to these factors compared to those noted above.



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EfficiencyOne's planning process has evolved and has become more mature since its inception. Per EfficiencyOne, the organization continues to rely on third-party experts in the development of its Plans and is leveraging the experience from the past 10 years to better inform cost estimation. The degree of supporting documentation for Plan cost estimates and associated cost adjustments has improved. Additionally, the NSUARB has approved a new Standardized Filing Framework, which outlines the required content of all future DSM Resource Plans. This took effect with the 2020-2022 Plan. EfficiencyOne now also has access to a larger quantity of historical information, which it can leverage to better inform future cost estimates.

Factors of overestimation – Inherent in the environment

The success of programs and program components is dependent on market uptake. Variances between Plan estimates and actual performance may occur, since customer participation in EfficiencyOne program components depends on the market's reaction to these offerings.

Additionally, each program component has a variety of measures. Each measure has its own cost and energy savings. Some measures are more costly and produce more energy savings than others. Customers decide which measures they avail of, which impacts the measure mix realized by EfficiencyOne. EfficiencyOne estimates a measure mix when developing a Plan. Actual measure mix is a result of customer behaviour, customer choice, and changes in the market.

Uptake by customers impacts the costs, energy savings and ultimate measure mix realized by EfficiencyOne. While variances in costs and energy savings will likely continue as a result of changes in market uptake, EfficiencyOne can continue to conduct marketing efforts to influence actual market response.

Incentive costs may change from those included in the Plan by the time the Plan is implemented. Per EfficiencyOne, the incentive costs of individual measures can change between the time of Plan development and the time of implementation. This can be a result of market transformation, change in industry capacity/competition, market price changes, new delivery methods and/or evaluation results.

Factors of overestimation – Inherent in the regulatory environment as defined by external factors

The length of time between the development and implementation of the DSM Resource Plans. DSM Resource Plans and modelling inputs are developed by EfficiencyOne one to four years before Plans are implemented. During this time, a number of external factors can change, including market demand, availability of efficiency technologies, incentive costs, industry capacity/competition and evaluation results for Plan measures. These changes naturally impact the implementation of Plans and inputs.

EfficiencyOne develops its Plan based on the most recent evaluation results from the third-party evaluator, which is the most current information available at the time of development. Per EfficiencyOne, these evaluation results support the measure mix on which the Plan is built. EfficiencyOne undergoes a third-party evaluation of its program components each year. As a result of these evaluation results, there may be changes to measures, incentive costs, energy savings, etc., which ultimately can lead to the implementation of a different measure mix than planned. This can result in variances between Plan and actual.

If Plans continue to be developed one to four years in advance of implementation, there is a high likelihood that variances between Plan and actual will continue.



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Current reporting does not provide sufficient information to adequately address overestimation when it occurs. EfficiencyOne, as the DSM administrator, has the flexibility to re-allocate funding among years, programs, and program components during implementation of the DSM Plan in response to current conditions, as long as performance targets are met at the end of three years. Currently, EfficiencyOne provides the NSUARB with the following reporting:

1. Mid-course adjustment – We understand from EfficiencyOne that the mid-course adjustment allows EfficiencyOne to re-allocate the approved investment and energy savings targets among programs and program components to account for any changes that may be needed as a result of the annual evaluation process and to inform NSUARB of these changes. The mid-course adjusted targets become the annual targets against which actual performance is reported in the DSM quarterly and annual progress reports.
2. Quarterly progress reports – We understand that EfficiencyOne submits a quarterly progress report to the NSUARB that outlines actual quarterly and year-to-date results for budget and energy savings. Currently, EfficiencyOne includes a table that presents a ‘stop light’ approach to signal the expected energy savings at the end of the year compared to the annual targets. Additionally, a qualitative summary of activity for each program component is provided.
3. Annual progress reports – We understand that EfficiencyOne submits an annual progress report each year that provides a qualitative summary of the activity in each program component, as well as a comparison of spending and energy savings results against Plan and mid-course adjustment.

While EfficiencyOne provides the progress information in the above reporting, it does not appear to provide detailed forecast data on energy savings and spending for the year or for the Plan period as a whole in the case of a three-year Plan. Additionally, while the quarterly reports do provide the ‘stop light’ indication of expected energy savings compared to annual targets, there is limited additional insight shared by EfficiencyOne regarding where it expects actual results will be over the remainder of the year or over the Plan period as a whole. Currently, the ‘stop light’ in the quarterly report does not provide insight on spending. There is an opportunity for enhancements within the current reporting to include additional information to support the expected results and how these results differ from Plan as a result of changes in market conditions and customer choice trends as the Plan is implemented. This more detailed information may provide the NSUARB with a common understanding with EfficiencyOne on trends and on the re-forecasting of the expected actual results against the Plan.

Enhancements to reporting would provide further robust information to address overestimation when it occurs including enabling EfficiencyOne to:

- Address the quantum and degree of overestimation
- Provide an understanding and meaningful information to users of the reports regarding areas of estimation, trends to date, re-allocation of costs, and forecasted results within the Plan period.

For comparative purposes, we obtained information from Efficiency Vermont and Efficiency Maine Trust on their approach for overestimation. Both Efficiency Vermont and Efficiency Maine Trust operate within a different regulatory environment. Efficiency Vermont and Efficiency Maine Trust have thresholds against which, when surpassed, they obtain approval from their regulator to carry forward underspend above these thresholds on an annual basis. EfficiencyOne’s Supply Agreement outlines that any underspend is addressed at the end of the three-year Plan period.



Factors of overestimation – Result of management decision

Precision and accuracy of customer participation estimates. There were significant differences between the planned and actual customer participation rates in 2016-2018. There were overestimations of customer participation by EfficiencyOne in higher cost program components and measures. When these estimated customer participation levels were not realized, underspends occurred. This was discussed under our response to Question 2.

When considering whether this could occur in the future, we reviewed EfficiencyOne's approach to estimate customer participation in 2020-2022. While we understand from EfficiencyOne that staff considered items such as evaluations, high-level marketing strategies and market research, there was no documented linkage between these items and the rationale and justification for updates EfficiencyOne made to its customer participation estimates at the measure level.

We do recognize that variances between estimate and actual customer participation will occur as a result of market factors. However, to minimize significant variances in the future, EfficiencyOne will, to the extent possible, need to increase the accuracy of its estimates of customer participation rates by program component and measure to minimize the variance between Plan and actual to the extent possible. Traceability of rationale and justification for updates made through the process for estimating customer participation can support the internal review process and provide staff with additional context to consider and discuss when refining estimates. Collectively, these steps may contribute to increased precision and accuracy through the internal vetting process. Additionally, having this information documented can provide EfficiencyOne with considerations for future estimates, as the organization will have the ability to reflect on what may or may not have occurred.

Continuation Plan costs estimated based on historic performance/actuals with adjustments at the component program level, rather than a detailed measure level bottom-up approach. In 2015, as a result of legislation, EfficiencyOne developed the 2015 DSM Resource Plan as a Continuation Plan. As this Plan was developed within a compressed time period and for one year only, EfficiencyOne determined, for a one-year Plan, it was not beneficial from a cost perspective to initiate a full modelling process at the measure level. Per EfficiencyOne, conducting modelling at the measure level is a lengthy and costly process. Alternatively, EfficiencyOne identified it relied on historical information from 2013 on a program component level adjusting for future expectations for each of these programs as informed by the third-party evaluator reports. EfficiencyOne outlined that the same approach was taken for 2019. We did not conduct any variance analysis on the 2019 cost estimates to actual.

Based on this approach, cost estimates were made at the program component level, which may not be as precise and accurate as more detailed measure level cost estimates. The Continuation Plan was built to the approved investment amount within legislation.

However, if Continuation Plans occur in the future, the approach of basing a plan on higher level estimates rather than a bottom-up approach, may increase the risk of cost overestimation.



2 Introduction

EfficiencyOne was directed by the Nova Scotia Utility and Review Board (NSUARB) to “investigate historic underspending of planned budgets and historic exceeding of energy savings to determine the factors that lead to the overestimation. E1 is to file terms of reference by October 31, 2019, and the investigation is to be concluded and filed with the Board by March 31, 2020”.³ This is referred to as the performance alignment study.

EfficiencyOne engaged KPMG to conduct the performance alignment study (or “study”) for the 2013 to 2020-2022 DSM Resource Plans. **Appendix A** contains details on the scope and approach for the study.

The questions answered in the course of this study and the approach and procedures undertaken to address these questions are as follows:

1. *Whether there is an upward bias in EfficiencyOne’s estimate of resource costs*

To address this question, KPMG worked with EfficiencyOne to understand the processes for developing the 2015 to 2020-2022 DSM Resource Plans (or “Plans”), including understanding the inputs and key assumptions in the development of the costs included in the Plans.

2. *What are the factors that led to a historic overestimation?*

To address this question, KPMG worked with EfficiencyOne to understand the variances of actual to DSM Resource Plan costs and energy savings in 2015 and 2016-2018. Once calculated, KPMG worked with EfficiencyOne to understand the reason for these variances. This was completed at the program component level. From here, we identified factors that led to the overestimation in 2015 and 2016-2018. We did not conduct any analysis for 2019 as, at the time of our fieldwork, this information was not available.

3. *Whether the factors that led to the overestimation continue to be present in EfficiencyOne’s current operating environment*

KPMG worked with EfficiencyOne to assess whether the factors that resulted in variances in the past, as identified through our analysis for Question 2, continue to be present in the period covered by the 2020-2022 DSM Resource Plan and beyond.

EfficiencyOne has matured and gained experience with DSM planning since filing its first Plan in 2015 as the first franchise holder. Consideration was also given to improvements that have been made in the most recent Plan.

The three NSUARB questions focused on 2015 onwards, after the franchise model was implemented for EfficiencyOne. However, we also recognize the importance of providing context for the 2013-2015 DSM Resource Plan, which was prepared under Efficiency Nova Scotia Corporation (ENSC). The NSUARB approved 2013 and 2014 only for this Plan. The approach taken by ENSC for the 2013-2015 Plan, as well as the variances between this Plan and its actual outcomes, are therefore outlined in a separate section of this report (Section 3).

Additionally, to inform our analysis and to help us respond to the three questions, we conducted a jurisdictional review, which involved conducting a one-hour interview with representatives from Efficiency Vermont (run by Vermont Energy Investment Corporation – VEIC) and Efficiency Maine Trust to understand their DSM planning processes. The results of this jurisdictional review were

³ Board Decision on 2020-2022 DSM Resource Plan



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limited to discussion only. A summary of the results of these interviews can be found in Section 6. **Appendix A** contains further detail on this review.

Overview of EfficiencyOne

As outlined in EfficiencyOne's 2018 Annual Report:

"EfficiencyOne ("the Corporation") was incorporated in July 2014 under the Canada *Not-for-profit Corporations Act*.

"Under Section 79C of the *Public Utilities Act*, the Corporation, as the franchise holder, has the exclusive right to supply Nova Scotia Power Inc. ("NS Power") with reasonably available, cost-effective electricity efficiency and conservation activities. The franchise agreement expires on December 31, 2025."⁴

2.1 Key terms and concepts

Key terms and concepts discussed and referenced within the report include the following:

- **2013 Potential Study** – Completed on behalf of EfficiencyOne by a third-party. The purpose of the study was "...to conduct a DSM potential analysis of long-term electrical energy and peak-demand savings in Nova Scotia." The study outlined technical, economic and achievable potential in Nova Scotia.⁵
- **Admin Cost** – For DSM Resource Plan modelling purposes, these are all DSM costs, excluding incentive costs.
- **Balance Adjustment** – A true-up between what NSPI collected from ratepayers through the rate rider (DCRR) and actual expenditures of Efficiency Nova Scotia Corporation (ENSC).
- **Compliance Filing** – Prepared by EfficiencyOne as directed by the NSUARB. The filing is intended to reflect any changes order by the NSUARB's decision on a DSM Resource Plan application.
- **Continuation Plan** – A one-year plan for DSM activities in which, rather than developing a new three-year Plan for DSM, EfficiencyOne operates DSM activities as a continuation of the current NSUARB-approved Plan. Resource costs and energy savings are estimated using historical actuals, as well as projections for the remaining term of the Plan. Detailed measure level inputs, such as customer participation estimates, are not prepared. For EfficiencyOne, Continuation Plans were prepared in 2015 (a continuation of 2013 and 2014) and 2019 (a continuation of 2016-2018).
- **Demand Side Management (DSM)** – Activities and programs designed to manage overall consumer demand for energy, or to shift the demand to occur at "off-peak" times such as nights and weekends.
- **DSM Cost Recovery Rider (DCRR)** – The mechanism by which NSPI collected funds to support DSM activities from ratepayers. This was applied to most ratepayers in Nova Scotia. This

⁴ 2018 Annual Report

⁵ Nova Scotia 2015-2040 Demand Side Management (DSM) Potential Study



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mechanism ceased to exist with the introduction of EfficiencyOne and the Efficiency Nova Scotia franchise.

- **DSM Resource Plan** – A future-looking Plan that outlines the proposed programs and strategies for achieving energy and system-peak demand savings targets for the time period covered by the Plan. The purpose of the Plan is to outline DSM targets, objectives, performance metrics, strategies, and investments for the Plan period, provide a description to stakeholders, customers, partners and industries in the marketplace of the direction of electricity efficiency programs for the Plan period, and form the basis of a DSM Supply Agreement made pursuant to S79 of the *Public Utilities Act*. These Plans cover calendar years.
- **Efficiency Nova Scotia Corporation (ENSC)** – Created through legislation with the responsibility and accountability for DSM administration transferring from NSPI to ENSC effective October 1, 2010. This organization ceased to exist in 2015.
- **Enabling Strategies** – Activities that support EfficiencyOne's ability to achieve performance targets in the current DSM Resource Plan period and the future through investment in education and outreach, development and research and in other activities such as efficiency trade network, codes and standards, and DSM Resource Plan regulatory process.
- **Franchise Model** – Per the Electricity Efficiency and Conservation Grant of Franchise, the Minister of Energy granted EfficiencyOne the exclusive right to supply NSPI with "reasonably available, cost-effective electricity efficiency and conservation activities for the purposes of the Act."⁶ The Act refers to the *Public Utilities Act*.
- **Full Resource Modelling Approach** – An approach taken by EfficiencyOne in the development of three-year DSM Resource Plans to engage a third-party to conduct modelling of resource costs and energy savings to inform the DSM Resource Plan.
- **Incentive Cost** – For DSM Resource Plan modelling purposes, these are rebates and implementation costs directly attributable to specific measures and/or services offered to customers.
- **Incentive Setting Process (ISP)** – A new process stemming from the 2016-2018 DSM Resource Plan regulatory process. EfficiencyOne now follows the ISP, which involves documenting rationale for incentive rates, when adding a new measure or program, updating existing incentives for a measure or program, and completing a formal review of all incentive levels (completed at a minimum annually for each measure).
- **Measure** – A driver of energy efficiency or demand reduction offered through EfficiencyOne's DSM program components.
- **Mid-Course Adjustment** – This is an update of energy savings and costs for the year as compared to the approved DSM Resource Plan. This is included in EfficiencyOne's Quarterly Report to the NSUARB in the first quarter of the year. It presents a realignment of energy savings and investment by program component based on changes and additional insights. The mid-course adjustment does not result in adjustments to NSUARB approved funding and is not intended to be a forecast.

⁶ Electricity Efficiency and Conservation Grant of Franchise



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- **Not-for-profit, or Non-profit** – “Non-profit organization is a club, society, or association that is not a charity and that is organized and operated solely for social welfare, civic improvement, pleasure or recreation, any other purpose except profit.”⁷
- **Operating Budget** – EfficiencyOne’s operational budget is developed annually and designed to achieve DSM performance targets within the NSUARB-approved DSM investment.
- **Programs** – Programs as defined and approved by the NSUARB. These programs may be comprised of various program components as determined by EfficiencyOne.
- **Program Component** – EfficiencyOne markets and delivers energy efficiency and conservation activities through program components.

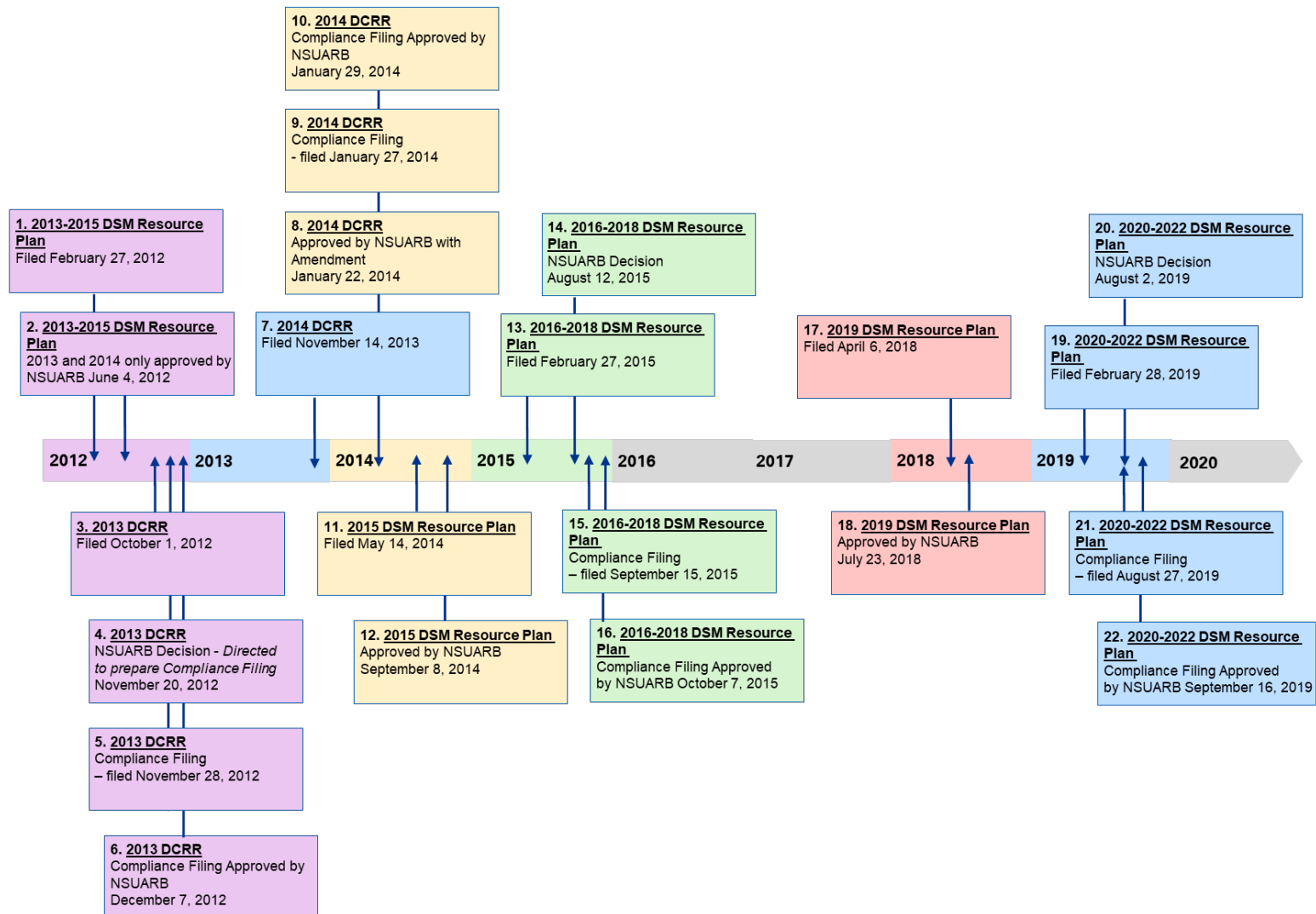
2.2 Timeline of EfficiencyOne DSM planning

The following chart provides an overview of the timeline of EfficiencyOne’s DSM Resource Plan milestones since 2012.

⁷ Income Tax Guide to the Non-Profit Organization (NPO) Information Return, Canada Revenue Agency retrieved from https://www.canada.ca/en/revenue-agency/services/forms-publications/publications/t4117/income-tax-guide-non-profit-organization-information-return.html#C1_NPO



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2.3 Our understanding

ENSC was established through legislation with the responsibility and accountability for DSM administration. This responsibility was transferred from NSPI to ENSC effective October 1, 2010. Under ENSC, the following activities occurred:

- ENSC filed its first DSM Resource Plan – the 2012 DSM Resource Plan – on February 28, 2011; this Plan was then approved by the NSUARB on June 30, 2011.
- Subsequently, ENSC filed a DSM Resource Plan for 2013-2015, which was approved by the NSUARB for the years 2013 through 2014.
- Until December 31, 2014, ENSC also filed the DCRR to fund DSM activities.
- On January 1, 2015, EfficiencyOne was incorporated under the *Canada Not-for-Profit Act* and became the first franchise holder of Efficiency Nova Scotia. At this point, ENSC was renamed ENS Transition Corporation, which remains in existence today. Additionally, the DCRR ceased to be the mechanism to fund DSM activities.

Revisions to the *Public Utilities Act*, proposed through the *Electricity Efficiency and Conservation Restructuring (2014) Act*, were proclaimed on May 1, 2014. Highlights of the legislation affecting DSM in Nova Scotia include the following, outlined in the 2016-2018 DSM Resource Plan Application:

- As of January 1, 2015, NS Power is required to undertake cost-effective electricity efficiency and conservation activities that are reasonably available in an effort to reduce costs for its customers (subsection 79I(1)).
- ENSC ceased to exist as the provider of DSM as of January 1, 2015. In its place, an Efficiency Nova Scotia (ENS) franchise was created and awarded by the Minister of Energy. The franchise, which “gives the franchise holder the exclusive right to supply Nova Scotia Power Incorporated with reasonably available, cost-effective electricity efficiency and conservation activities” (subsection 79C(2)(a)), was awarded for a 9-year term from January 1, 2016 to December 31, 2024 (subsection 79Q(1)), with an initial one-year transition added to the term for 2015 (subsection 79Q(2)).
- The supply of electricity efficiency and conservation activities will be administered by the ENS franchise on a contractual basis with NS Power, with the contract being approved by the NSUARB. For the 2015 transition year, NS Power and ENS were deemed to have entered into an initial agreement (subsection 79Q(2)).
- The legislation states that the NSUARB “shall establish such performance requirements for the franchise holder as it considers appropriate” (subsection 79R(4)).
- In 2015 only, the legislation limited the dollar amount approved by the UARB to be spent on electricity efficiency and conservation activities to not more than \$35 million, plus any over-recovery of funds by ENSC from 2013 (subsection 79R(1)). The costs NS Power can recover from ratepayers for the 2015 year, beginning in 2016 and over an 8-year period, must not exceed the lesser of \$35 million or the amount approved by the UARB, less the amount of any over recovery from 2013 (subsections 79R(2) & (3)).
- The legislation outlined the UARB may “determine the manner in which any costs recoverable by Nova Scotia Power Incorporated from its customers must be allocated amongst Nova Scotia



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Power Incorporated's customers, and in doing so may, in addition to any other factors considered appropriate by the Board, take into account the Rate Smoothing Adjustment" (section 79S).⁸

EfficiencyOne DSM Resource Plans

ENSC (EfficiencyOne after January 1, 2015) filed the 2015 DSM Resource Plan on May 14, 2014. This Plan was a one-year Plan designed as a Continuation Plan. The NSUARB approved an investment of \$38.98 million with a first-year energy savings target of 121.2 GWh. Legislation included a cap of \$35.0 million for the investment amount to be charged to NSPI. However, the NSUARB approved EfficiencyOne's request to apply the 2013 Balance Adjustment of \$3.98 million to the investment, bringing the total investment to \$38.98 million.

EfficiencyOne filed its 2016-2018 DSM Resource Plan with the NSUARB on February 27, 2015. The investment and energy savings levels were developed through the engagement of a third-party modelling consultant using a measure level bottom-up resource estimation approach. The proposed total investment was \$121.5 million for the three-year Plan period, with first-year energy savings of 405.9 GWh. Following a regulatory proceeding, the NSUARB directed EfficiencyOne to file a Compliance Filing with a total investment of \$102.15 million for the three-year Plan period, and first-year energy savings of 405.9 GWh. This Compliance Filing resulted in reductions in the investment of 14% in 2016, 15% in 2017 and 18% in 2018 from the original Plan filed. The NSUARB, as part of the decision, required the first-year energy savings targets to remain consistent between the original filing and the Compliance Filing, unless EfficiencyOne felt revisions were necessary as part of the Compliance Filing.

EfficiencyOne filed its 2019 DSM Resource Plan on April 6, 2018. Similar to the 2015 DSM Resource Plan, EfficiencyOne used a Continuation Plan approach. In accordance with the *Electricity Plan Implementation (2015) Act*, the 2019 Plan investment level to be charged to NSPI was capped at \$34.05 million. As such, this Application was an exception to the three-year DSM Resource Plan required under the *Public Utilities Act*. The NSUARB approved the investment of \$34.05 million and first-year energy savings of 127.2 GWh.

EfficiencyOne filed its 2020-2022 DSM Resource Plan on February 28, 2019. As with the 2016-2018 DSM Resource Plan, the 2020-2022 Plan investment and energy savings levels were developed through the engagement of a third-party modelling consultant using a measure level bottom-up resource cost estimation approach. The total investment proposed was \$129.1 million with first-year energy savings of 421.7 GWh. Following a regulatory proceeding, NSUARB directed EfficiencyOne to file a Compliance Filing with a total investment of \$110.0 million and first-year energy savings of 367.8 GWh for the three-year Plan period.

Purpose of the DSM Resource Plan

As per the *Public Utilities Act*, NSPI is required to undertake cost-effective electricity efficiency and conservation activities that are reasonably available in an effort to reduce costs for its customers, purchased from the franchise (i.e., from Efficiency Nova Scotia, operated by EfficiencyOne). As the *Public Utilities Act* does not identify the associated DSM savings targets and investment levels, these are to be established through the development and approval of DSM Resource Plans.

⁸ 2016-2018 EECA Supply Agreement Application Evidence and Appendices A-J - REVISED



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As previously defined under the Key Terms and Concepts, the DSM Resource Plan is a future-looking Plan that outlines the proposed programs and strategies for achieving energy and system peak demand savings targets for the time period covered by the Plan period. With the exceptions approved by the NSUARB, the DSM Resource Plan is to be a three-year Plan developed in accordance with the requirements of the *Public Utilities Act*. The major exception is that one-year Continuation Plans are occasionally approved to bridge the period between approved three-year Plans.

The DSM Resource Plan development process is consultative in nature. EfficiencyOne holds meetings with DSM stakeholders during the planning process to gather feedback on plan considerations and make any necessary adjustments to inform the final Plan. This has included the hosting of a Technical Conference by EfficiencyOne to discuss the Plan with stakeholders.

Once EfficiencyOne files its DSM Resource Plan with the NSUARB, the NSUARB sets out a regulatory process for review of this Plan. The NSUARB must approve all funding amounts and associated Plan details. For the 2016-2018 and 2020-2022 DSM Resource Plans (i.e., the three-year Plans filed by EfficiencyOne to date), the regulatory proceedings have included engagement by stakeholders through Information Requests (IRs), submission of evidence by stakeholders, Opening Statements, a public hearing and closing statements.

DSM Resource Plan Development

EfficiencyOne relies on external consultants to support the DSM planning process. Historically, this has included consultants such as:

- Dunskey Energy Consulting to provide insight on energy efficiency performance
- Navigant Consulting for the modelling process in 2016-2018 and 2020-2022 and recommendations for new measures to be included
- Vermont Energy Investment Corporation (VEIC) to provide advice regarding jurisdictional trends and opportunities
- Econoler, for energy savings inputs.

To develop three-year DSM Resource Plans, modelling is completed to calculate output tables, based on inputs provided by EfficiencyOne. Relevant inputs include incentive cost per unit, admin cost rates and energy savings. The input table is a collection of historic information and assumptions that are fed into the model. The output table presents the resulting calculations from the model.

Predicting customer program and measure participation is also one of the key components and inputs of the DSM Resource Plan. While EfficiencyOne can attempt to influence customer participation in program components and their selection of measures through marketing efforts, actual resource costs and energy savings are impacted by how the market responds to EfficiencyOne's offerings. Due to the time span between Plan development and approval and Plan implementation, changes in the market can also impact the degree of precision and accuracy of the customer participation estimates.

For 2020-2022, the number of participants by measure was included in the input table for the model. In contrast, the number of participants by measure was an output of the model in 2016-2018 (i.e., not a direct input within the table by EfficiencyOne).

The models used in 2016-2018 and in 2020-2022 are proprietary tools of Navigant Consulting.⁹ The initial outputs from these models are not the final outputs that are included in the Plans. Rather, an

⁹ <https://www.navigantresearch.com/>



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iterative process is used, allowing EfficiencyOne to adjust model inputs to arrive at revised outputs based on knowledge and experience, as well as on areas such as market trends and plans for the period. The final output tables, including investment and energy savings levels, are rolled up to the NSUARB program level and included in the Plan.

When Plans are developed and approved internally, the Plan is filed with the NSUARB. Once filed, there are various opportunities for stakeholders to provide comments, submit information requests and submit evidence prior to the public hearing. During the public hearing, EfficiencyOne defends the Plan and the NSUARB hears evidence from other stakeholders prior to issuing their decision.

Implementation of DSM Resource Plans

Within the Plan Application that is filed with the NSUARB, EfficiencyOne also includes language regarding the implementation of the Plan. The Plan is described in these filings not as an implementation plan, but as a tool for planning and testing cost-effectiveness. Over the three-year implementation period of the Plans, EfficiencyOne anticipates that it will make changes to react to "... lessons learned through program implementation experience and independent evaluations, as well as circumstances such as changing market conditions, changes in technology and changes in codes and standards."¹⁰

While the DSM Resource Plan is developed using the information available at the time, market conditions may change by the time the Plan is implemented (i.e., between one and four years in advance of implementation), particularly as these conditions relate to customer participation rates, incentive costs and industry capacity. Management believes that the information used to develop the Plan was the best information available at the time. The flexibility outlined in the DSM Resource Plans allows EfficiencyOne to make adjustments throughout Plan execution to adjust the allocation of DSM funding amongst program components while operating within the DSM funding envelope.

EfficiencyOne can make changes to programs and services outlined in Plans within the funding envelope and energy savings approved by the NSUARB through the mid-course adjustment mechanism, with this information provided as part of the first quarter report. However, the NSUARB must be given advance notice of any changes that exceed certain thresholds. This includes thresholds and circumstances such as adding or terminating a program and increasing or decreasing three-year budgets or energy savings targets by sector by more than a set percentage.

The NSUARB's decision on the Plan sets out the approved performance targets and investment for the Plan period, as well as identifying any items in the submitted Plan that have not been approved. EfficiencyOne operationalizes the approved DSM Resource Plan through the implementation of the program components and Enabling Strategies outlined in the Plan.

EfficiencyOne files quarterly and annual progress reports on the implementation of the approved DSM Resource Plan with the NSUARB. Quarterly and annual progress reports provide actual-to-date results against energy savings and expenditure, as well as qualitative analysis on the results.

Additionally, the Q1 report also presents the mid-course adjustment, which is a re-alignment of energy savings and investment by program component, within the approved NSUARB levels, as well as quantitative and qualitative analysis of the results of the first quarter.

¹⁰ 2016-2018 EECA Supply Agreement Application Evidence and Appendices A-J - REVISED



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Managing Approved Investment Levels

EfficiencyOne's only source of funding for DSM programs is the investment approved by the NSUARB. The investment approved by the Board is for NSUARB-approved DSM programs. Any funding not spent is returned to electricity ratepayers via NSPI.

The approved DSM Resource Plan is used by EfficiencyOne to define the overall organizational strategic direction, energy saving targets and the three-year investment envelope. The Plan informs the annual operating budget. When developing the annual operating budget, the program mix to be delivered or the investment in each program component may differ from the Plan, based on new information that becomes available.

Working within the approved performance targets and the approved DSM investment from the DSM Resource Plan, EfficiencyOne prepares annual operating budgets. These budgets are a management tool. The annual operating budget for DSM includes adjustments made to reflect changes in market conditions and any additional insights from evaluations or other sources.

The approved EfficiencyOne internal operating budget for DSM has been comparable to the approved DSM Resource Plan since 2015. Historically, the annual EfficiencyOne internal operating budget for DSM has been under Plan by less than 1% overall since EfficiencyOne was formed.

Table 1: Approved DSM Resource Plan Investment to Internal Operating Budget 2015-2020

	Approved DSM Investment	Internal Operating Investment Budget	Variance	Variance
	(\$ million)	(\$ million)	(\$ million)	% of Budget
2015	38.97	38.97	0.00	0.00%
2016	33.21	33.20	(0.01)	(0.04%)
2017	34.02	34.61	0.59	1.71%
2018	34.92	33.93	(0.99)	(2.92%)
2019	34.05	34.02	(0.03)	(0.09%)
2020	34.40	34.37	(0.03)	(0.09%)
Total	209.57	209.10	(0.47)	(0.23%)

Numbers may not total due to rounding.

An overview of the variance between Plan and actual for the 2015 and 2016-2018 DSM Resource Plans is provided below. The underspend has decreased over the two Plans for a total underspend of approximately 8% since the franchise was formed in 2015.

Table 2: Actual to Approved DSM Resource Plan 2015 and 2016-2018

	Approved DSM Resource Plan	Actual	Variance	Variance
	(\$ million)	(\$ million)	(\$ million)	%
2015	38.97	34.31	(4.66)	(11.96%)
2016-2018	102.15	95.16	(6.99)	(6.84%)
Total	141.12	129.47	(11.65)	(8.26%)

Numbers may not total due to rounding.



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Improvements within 2020-2022 DSM Resource Plan

EfficiencyOne's DSM Resource Plan development process has evolved over time as the organization has matured. The following improvements in the process were noted during the course of our analysis for the study:

- Customer participation rates for the 2020-2022 DSM Resource Plan were based on historic 2017 rates and the specific EfficiencyOne staff knowledge of the expected new initiatives, campaigns and changes in the market trends in Nova Scotia. In contrast, customer participation rates in the 2016-2018 Plan were model outputs as a result of model calculations and informed by the 2013 Potential Study. The 2013 Potential Study was prepared for ENSC by a third-party. The Potential Study was completed after only three full years of operations.
- There is more documentation to support the estimation of DSM resource costs for 2020-2022 than for 2016-2018. For the 2020-2022 DSM Resource Plan, there are measure level input and output tables, as well as spreadsheets indicating EfficiencyOne staff review of inputs. In contrast, KPMG did not see this degree of supporting documentation for 2016-2018. In 2016-2018, EfficiencyOne engaged a third-party consultant to support the development of the Plan cost estimates. Per EfficiencyOne, it relied on the work of this third-party to inform the Plan cost estimates.

Additionally, we noted that EfficiencyOne has implemented an incentive-setting process (ISP). Prior to the 2020-2022 DSM Resource Plan, EfficiencyOne did not have a consistent approach to setting and reviewing incentive levels. As outlined in the Key Terms and Concepts, during the regulatory process for the 2016-2018 DSM Resource Plan, EfficiencyOne committed to undertaking a review of how incentive levels were set. As a result of working with a third-party, EfficiencyOne has implemented the ISP, which was approved by the NSUARB. The ISP specifies the process to be followed when adding a new measure or program, when updating existing incentives for a measure or program, and when completing a formal review of all incentive levels (completed at a minimum annually for each measure). Per the process, the ISP includes a template to capture supporting considerations and rationale for incentive levels. The Program Managers and Service Delivery Managers determine the incentive level based on the documented considerations (e.g., research) and must retain the supporting documentation for future reference.



3 NSUARB Question 1

Question 1 posed by the NSUARB was *whether there is an upward bias in EfficiencyOne's estimate of resource costs*.

We have structured our response to the question in this section as follows:

1. **Approach to responding to NSUARB Question 1:** This section outlines the approach we took to gather information to respond to the question.
2. **Response to NSUARB Question 1:** This section outlines our response to the NSUARB's question, based on work conducted during the study.

We also documented EfficiencyOne's approach to developing the 2015 to 2020-2022 DSM Resource Plans. This documentation can be found in **Appendix B**.

We responded to NSUARB Question 1 for the Plan period of 2015 onwards (i.e. to 2020-2022).

3.1 Approach to responding to NSUARB Question 1

To answer the question of whether there was an upward bias, we sought to understand how assumptions related to resource costs were supported. In our planning work in the course of this study, we identified that the planned resource costs in the DSM Plans are similar in many respects to Future Oriented Financial Information ("FOFI") as defined in the CPA Canada Handbook – Accounting ("the Handbook"). FOFI definition in the Handbook encompasses information about prospective results of operations, based on assumptions about future economic conditions and courses of action. The FOFI guiding principles are similar to the principles to develop cost estimates for a DSM Plan. Accordingly, guidance provided in the Handbook may provide useful direction on the nature of support that could be provided for any assumptions made in EfficiencyOne's Plans.

In answering the question of whether there is an upward bias, we first set out, as noted above, to understand how cost estimate assumptions were supported. Potential sources of support for any assumptions are:

- Information on EfficiencyOne's past performance
- The performance of other organizations engaged in similar DSM activities
- Studies on program or product feasibility
- Marketing or customer studies
- Any other forms of supporting analysis or market data.

In undertaking our review, we appreciated that the extent of detailed information supporting each assumption can vary according to the type and nature of the resource cost. The depth of support will also be influenced by factors such as the significance of the cost and the availability and quality of the supporting information.

In our review, we noted that EfficiencyOne's cost estimates and assumptions at a measure level were often based on past performance. EfficiencyOne identified that past performance is adjusted and updated for the upcoming period through internal reviews and discussions. However, we did not see supporting documentation for some of these estimates and assumptions, such as documentation of the rationale for updates relating to key estimates that were based on past results and how this



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rationale linked to supporting studies, evaluations, etc. Documentation of the basis of changes would be particularly useful for estimates of participation rates and customers' choice of measure.

We further note that significant cost assumptions require the careful exercise of judgment by management. We understand that the exercise of this judgment may not always be documented. However, it would have been useful to see supporting documentation for how various Plan measure level cost assumptions were derived and the linkages to the marketing studies, customer studies and other data that were leveraged. In 2016-2018, EfficiencyOne relied on its third-party modeller for many inputs and customer participation was an output of the third-party model. In 2020-2022, we saw that customer participation was an input to the model and was based on 2017 actual participation. This is evidence of greater management involvement over time and greater tailoring to reflect actual experience. In the 2020-2020 process, however, we did not see documentation of the rationale for updates to the measure level historical information that was used as the starting point in the development of final estimates.

Additionally, for cost estimates, the starting assumption was historical performance. While in some instances there was supporting documentation for updates to historical information to arrive at the Plan cost estimates (e.g., many of the updates to admin cost in 2020-2022 had supporting calculations), we did not see documented rationale for the updates to historical information for some measure level incentive and admin costs.

Overall, while we did not consistently see supporting documentation, this does not mean that the assumptions made were unsupported or did not reflect management's best judgment at the time. In the absence of full supporting documentation, however, it is difficult to make a complete assessment of the robustness of the supporting process. Details of the process may have been lost with the passage of time. Accordingly, we recommend that, moving forward, EfficiencyOne enhance its documentation of input cost assumptions made by including the linkage of assumptions, rationale and justification to supporting studies, evaluations, etc. This will help to demonstrate the supportability of cost assumptions and the rationale for updates.

We appreciate that the degree of uncertainty increases with the length of the future period covered, as may be the case with a three-year DSM Plan. There are uncertainties inherent in predicting future resource costs and with longer-term plans there is more likelihood that future conditions, the market, and customer behaviour may vary from Plan. The DSM Plan is based on information and assumptions at an effective date. With the passage of time, actual experience, and new/updated market and measure information may impact the precision of the cost estimates.

We did see the Plans filed with the NSUARB from 2015 onward, as well as supporting documentation, such as evaluation reports. As a result, we reviewed available documentation to respond to the question. Discussions with EfficiencyOne were held to gather additional insights for those cases where we did see and did not see documentation. Our response to Question 1 is noted in the section below.

3.2 Response to NSUARB Question 1

We did not see evidence of an upward bias in EfficiencyOne's estimate of resource costs. We did see evidence of the following based on review of documentation and discussions with EfficiencyOne:

Use of Modelling in 2016-2018 and 2020-2022

We identified that modelling was completed to inform the costs and energy savings of the 2016-2018 and 2020-2022 Plans. For the 2016-2018 Plan, we saw the input table that was used. For the 2020-



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2022 Plan, we saw the input table and the output tables for the Preferred Scenario. EfficiencyOne engaged a third-party modeller. EfficiencyOne identified that it relied on the third-party when developing the inputs for the model, preparing the model and testing the model.

Development of 2015 and 2019 Continuation Plans

Continuation Plans were developed for 2015 and 2019. We understand from discussions with EfficiencyOne that costs for these Plans are based on historical information, with updates made for any changes expected in the year, by program component. We were provided with and saw evidence that EfficiencyOne had workbooks that were used in the development of the costs for the Plans. These workbooks documented the historical results and estimated costs to inform the development of these two Continuation Plans. We were also provided with the Plan filed with the NSUARB.

Estimation of Enabling Strategies

The development of costs for Enabling Strategies has been relatively consistent Plan over Plan, with the same categories of activities within and similar objectives (with the objectives of Enabling Strategies being consistent between 2016-2018 and 2020-2022). The relative consistency of the estimated costs for Enabling Strategies is outlined in the following table:

Table 3: Enabling Strategies 2015 to 2020-2022, Plan as Filed

(\$ million)	2015	2016	2017	2018	2019	2020	2021	2022
Education & Outreach	\$ 1.60	\$ 1.32	\$ 1.43	\$ 1.43	\$ 1.60	\$ 0.90	\$ 1.00	\$ 1.00
Development & Research	\$ 1.60	\$ 1.00	\$ 1.04	\$ 1.09	\$ 2.20	\$ 0.90	\$ 1.00	\$ 1.00
Other	\$ 0.30	\$ 0.52	\$ 0.58	\$ 0.76	\$ 0.70	\$ 1.80	\$ 2.00	\$ 2.00
Total Enabling Strategies Cost	\$ 3.50	\$ 2.84	\$ 3.05	\$ 3.28	\$ 4.50	\$ 3.60	\$ 4.00	\$ 4.00

Numbers may not total due to rounding.

We noted that increased costs in 2017, 2018, 2019, 2021 and 2022 were related to the cost to develop and defend three-year DSM Resource Plans. In 2019, there was also \$1 million allocated for demand-focused activities. The 2020-2022 DSM Resource Plan also saw an increase linked to new initiatives such as new pilot programs and research into new technologies.

Estimation of Admin Costs

Admin costs comprise all other costs remaining after the incentive costs have been removed. EfficiencyOne uses its Cost Allocation Model (CAM), which is audited, and the energy savings as evaluated by a third-party to calculate the admin cost rate for inclusion in the model. The admin cost rate is the program's or program component's admin cost, divided by its first-year energy savings. We reviewed the calculation of the admin cost rates for the 2016-2018 and 2020-2022 Plans, including the following:

- We identified that the historic costs in the audited Cost Allocation Model (CAM) were included in the calculation of the admin cost rates with the exception of the direct incentive costs, with some exceptions as determined by management.
- We agreed a sample of the energy savings used in the calculation of the admin cost rates to the third-party evaluation reports with no issues.
- We were able to flow through a sample of the admin costs rates to the input tables, with few exceptions.



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- In 2020-2022, we found that there was documentation to support changes to the historic admin cost rate calculations.

Estimation of Incentive Costs

Management identified that incentive costs by measure were based on the most recent incentives offered and/or contracts with delivery agents as the starting point. We were able to trace approximately half of the measures we sampled across 2016-2018 and 2020-2022 to supporting documentation as the starting point for determining incentives by measure. Per EfficiencyOne, the measures in the 2020-2022 Plan went through the Incentive Setting Process.

Estimation of Customer Participation

In 2020-2022, there was a constraint in the model related to customer participation, as identified in NSPI IR-52. This constraint had a 33% tolerance and allowed for measure uptake only within a specified range of 2017 historical kWh savings. Per EfficiencyOne, the 2017 actuals were loaded into the model and the constraint was applied. This generated the initial participation estimates, which EfficiencyOne identified were then reviewed and revised via the vetting process.

Overestimation in 2015 and 2016-2018

EfficiencyOne had an overestimation of costs in 2015 and 2016-2018 that resulted in the following total underspend:

- 2015 Plan to Actual – Underspend of approximately \$4.66 million or 12% of total budget
- 2016-2018 Plan to Actual – Underspend of approximately \$6.99 million or 7% of total budget.

We identified factors that appeared to contribute to the overestimation in 2015 and 2016-2018. These factors are discussed in our response to Question 2.



4 NSUARB Question 2

Question 2 posed by the NSUARB was, ***what are the factors that led to a historic overestimation?***

We have structured our response to the question in this section as follows:

1. **Approach to responding to NSUARB Question 2:** This section outlines the approach we took to gather information to respond to the question.
2. **Response to NSUARB Question 2:** This section outlines our response to the NSUARB's question, outlining the factors that contributed to the overestimation in 2015 and 2016-2018.
3. **Variance analysis for 2015 and 2016-2018:** This section provides the supporting analysis by which we arrived at our response to the NSUARB's question. We conducted a variance analysis of cost and energy savings for 2015 and 2016-2018, identifying explanations for the variances.

We responded to NSUARB Question 2 for the Plan period of 2015 onwards (i.e. to 2020-2022).

4.1 Approach to responding to NSUARB Question 2

To respond to NSUARB Question 2, we conducted a variance analysis of costs and energy savings for 2015 and 2016-2018. We worked with EfficiencyOne to understand and document the reason for the variances noted. This was conducted at the program component level. Much of the information in our analysis was obtained from previous information submissions to the NSUARB that are publicly-available. From the variance analysis and associated discussions with EfficiencyOne, we then identified the factors that contributed to the overestimation in 2015 and 2016-2018.

In consideration of Question 2, we did note the following circumstances related to 2015 and 2016-2018:

- EfficiencyOne has identified that it relied heavily on a third-party modeller (Navigant) in the development of the 2016-2018 Plan. This work was accepted by EfficiencyOne and informed the Plan that EfficiencyOne filed with the NSUARB for approval. As the organization has become more mature, it appears that EfficiencyOne has built additional internal capability and this may reduce its reliance on third-parties.
- In conducting the jurisdictional review, EfficiencyOne explained that comparable organizations were limited, particularly in Canada. The list of possible organizations for the jurisdictional scan was considered based on corporate, regulatory and legislative comparability with EfficiencyOne. As a result of these three factors, our jurisdictional interviews were limited to Efficiency Vermont and Efficiency Maine for comparability. There were no Canadian organizations that met the criteria as determined by EfficiencyOne. In earlier years, when developing the Plans for 2015 through 2018, EfficiencyOne was maturing in its ability to tap into other jurisdictional information. During that time, the organization may not have had the knowledge, relationships and experience it has today in obtaining information to inform its approach.
- While there was an underspend in each of the years 2016, 2017 and 2018, it should be noted that the estimates for each of these years are contained within a single Plan (the 2016-2018 Plan) and are thus the outcome of a single planning process. In 2016-2018 the NSUARB directed EfficiencyOne to reduce its planned costs by 14%, 15% and 18%, respectively. In this instance, EfficiencyOne chose not to remodel the plan on a measure by measure basis, but rather to make adjustments on a program component level to maintain the NSUARB approved investment level.



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- The underspend has declined from 2015 to 2016-2018, for an overall underspend over the four years of approximately \$12 million or 8% of total budget. When developing a DSM plan with future cost information, the costs are based on assumptions of future program components occurring, participation rates, customer choice, measure costs, and market factors based on EfficiencyOne's management's judgement as to the most probable set of future market and economic conditions. Actual experience can differ from plan, given actual market and economic conditions may vary. As with any future-oriented financial information, FOFI guidance suggests variations could be material.

4.2 Response to NSUARB Question 2

Based on the results of our variance analysis, we identified specific factors that contributed to the overestimation in 2015 and 2016-2018. These factors can be categorized as follows:

1. **Inherent in the maturity of the organization:** Factors specific to the organization and its maturity level in regard to the estimation of DSM total resource costs. EfficiencyOne has some control in regard to these factors.
2. **Inherent in the operating environment:** Factors specific to the environment in which the organization operates. EfficiencyOne has limited control in regard to these factors.
3. **Inherent in the regulatory environment as defined by external factors:** Factors specific to the regulatory environment in which the organization operates. EfficiencyOne has limited control in regard to these factors.
4. **Result of management decision:** Factors specific to the decisions that EfficiencyOne makes as an organization. EfficiencyOne has inherently more control with respect to these factors compared to those noted above.

The factors presented below outline the contributing factors to the overestimation in 2015 and 2016-2018. We did not conduct any variance analysis for 2019, as at the time of our fieldwork, this information was not available. These are specific to the overestimation of cost (and ultimately underspend of budget), as per the NSUARB's question.

Factors of overestimation – Inherent in the maturity of the organization

The maturity of EfficiencyOne and the organization's access to information and experience. EfficiencyOne has been operating for 10 years, and has been operating as the franchise holder of Efficiency Nova Scotia since 2015. As a relatively new organization in the development of earlier Plans, EfficiencyOne would have had limited data on past performance, as well as limited experience in developing and implementing DSM Resource Plans. Time was necessary to build capability and collect information. This may have impacted EfficiencyOne's accuracy and precision of cost estimates in its 2015 and 2016-2018 Plans.

Through the course of our study, we reviewed documentation and held discussions with EfficiencyOne regarding the supporting documentation for the cost estimates included in the 2015 and 2016-2018 Plans. We did not see consistent documentation of the rationale and updates from initial cost estimates to final measure-level cost (e.g., incentive cost) estimates included in the Plan. We did observe differing levels of documentation related to the cost estimates for the Plans. The most recent Plan (i.e., 2020-2022), had the most supporting documentation for its cost estimates, which appears to be indicative of a maturing organization. Traceability of rationale and justification for



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updates made through the process for cost estimation can support the internal review process and provide staff with additional context to consider and refine estimates, which may contribute to increased precision and accuracy. EfficiencyOne has opportunities to continue increasing the maturity of its DSM planning process in the future, as it relates to clearly indicating its rationale and justification of estimates for key inputs and cost drivers at the measure level.

Overview of participation in 2016-2018

In 2016-2018, EfficiencyOne overestimated customer participation in higher cost program components and program component measures. The level of customer participation and the measures that customers choose to participate in within a program component will directly impact the costs incurred by EfficiencyOne. Within a program component, there are a variety of measures that have varying costs and energy savings. For example, lighting measures within a program component are typically low cost and have low energy savings per measure.

We recognize that, while EfficiencyOne estimates customer participation, changes can occur between the time of Plan development and Plan implementation, which can impact customer uptake in the market. EfficiencyOne indicated that they felt the customer participation estimates were reasonable based on the approach of the third-party, including the use of the 2013 Potential Study that was developed for EfficiencyOne.

In 2016-2018, EfficiencyOne overestimated resource costs in seven of its 11 program components. The overestimation in these programs was partially offset by the underestimation in the remaining four program components. In 2016-2018, EfficiencyOne had a total underspend on incentive costs of approximately \$7.38 million. This is summarized in the following table:

Table 4: Summary of Three-Year Actual to Plan Total Variance, 2016-2018

(\$ million)	Three-Year Actual to Plan Total Variance
Appliance Retirement	1.77
Instant Savings	4.25
New Residential	2.10
Efficiency Product Rebates, BNI	3.61
<i>Subtotal - Underestimation</i>	<i>11.73</i>
Residential Direct Install	(2.42)
Green Heat	(1.39)
Solar	(1.46)
Home Energy Assessment	(3.48)
Rental Properties and Cond.	(2.12)
Custom Incentives	(8.08)
Direct Installation, BNI	(0.15)
<i>Subtotal - Overestimation</i>	<i>(19.10)</i>
Total Net Three-Year Overestimation	(7.38)

Numbers may not total due to rounding.



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The largest overestimation of cost occurred in the following four program components and further detail on these four programs is provided:

Table 5: Key Expenditure Variances in 2016-2018

(\$ million)	Three-Year Actual to Plan Total Variance
Residential Direct Install	(2.42)
Home Energy Assessment	(3.48)
Rental Properties and Cond.	(2.12)
Custom Incentives	(8.08)
Total Overestimation	(16.10)

Numbers may not total due to rounding.

Factors of overestimation – Inherent in the operating environment

Challenges that are present with the estimation of participation. We appreciate that it is challenging to estimate customer uptake of measures within program components. Predicting customer behaviour is inherently challenging, as it is dependent on customer choice and available opportunities. As such, some instances of overestimation may not be unexpected.

Lower energy savings were realized in program components Residential Direct Install (RDI) and Rental Properties and Condos as a result of customers favouring lighting measures, resulting in lower costs paid to delivery agents.

For RDI and Rental Properties and Condos, EfficiencyOne underestimated overall program component participation in terms of number of measures installed (i.e., actual total units installed were 157% and 104% compared to the Plan, respectively). However, customers in these two program components appear to have chosen more lighting measures than anticipated by EfficiencyOne in its Plan. Relative to Plan, lighting measures installed were 21% and 54% higher than plan for RDI and Rental Properties and Condos, respectively.

In 2016-2018, as a result of installing more lighting measures than anticipated, EfficiencyOne had lower energy savings than planned for RDI and Rental Properties and Condos. This reflects the fact that lighting measures have lower energy savings per measure than other offerings. As a result of achieving lower energy savings, however, EfficiencyOne also incurred lower costs. This follows from the fact that the RDI and Rental Properties and Condos program components are delivered by delivery agents. Delivery agents are paid by EfficiencyOne on a per kWh basis, not on a per measure basis. Lower energy savings thus translate to lower costs for delivery agents. Additionally, per EfficiencyOne, the organization issued a Request for Proposal for these services after the 2016-2018 Plan was filed, resulting in lower costs than had been anticipated, which also impacted underspend.

External factors impacting Home Energy Assessment resulted in lower than estimated customer participation. Home Energy Assessment (HEA) is a higher cost program component. EfficiencyOne overestimated customer participation in this program component, only achieving 46% of Plan estimated customer participation. EfficiencyOne had expected customer participation to increase; however, this did not materialize. In 2015, provincial funding for HEA ended. Participation was lower in 2016 as a result, as participation was limited to homes that were primarily electrically



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heated.¹¹ In 2018, there was also a lower-than-anticipated number of HEA projects completed. Funding for non-electrically headed homes was re-introduced in 2018, leading to capacity issues with service organizations due to an increased demand for home assessments in 2018. EfficiencyOne and service organizations worked to increase its number of Energy Advisors to address the increased demand.¹²

Factors of overestimation – Inherent in the regulatory environment as defined by external factors

The length of time between the development and implementation of the DSM Resource Plan. Because the DSM Resource Plan is for a three-year period, cost estimates are developed well in advance of actual plan implementation. Since actual performance can differ from estimates – particularly if estimates are prepared in advance – our analysis found variances between the key estimates. This included variances between actual and planned actual performance, per program component, given market conditions and customer uptake.

Factors of overestimation – Result of management decision

EfficiencyOne overestimated customer participation in Custom. Custom Retrofit, as a program component, is the highest cost program offered by EfficiencyOne. The 2016-2018 planned budget for Custom Retrofit was \$19.8 million. EfficiencyOne overestimated uptake in the Custom program. As a result of lower participation than expected, EfficiencyOne realized lower costs than planned. We recognize that there are challenges in estimating uptake in participation in the Custom program. We understand from EfficiencyOne that, as this program consists of a small number of large projects, any changes such as delays related to expertise, equipment, etc., can have significant impacts on cost.

The 2015 Continuation Plan costs were based on historic performance/actuals with adjustments at the program component level, rather than a detailed measure level bottom-up approach. In 2015, as a result of legislation, EfficiencyOne developed the 2015 DSM Resource Plan as a Continuation Plan. As this Plan was developed within a compressed time period and for one year only, EfficiencyOne determined that, for a one-year Plan, it was not beneficial from a cost perspective to initiate a full modelling process at the measure level. Per EfficiencyOne, conducting modelling at the measure level is a lengthy and costly process. Rather than modelling a one-year Plan, EfficiencyOne identified it relied on historical information from 2013 on a program component level adjusting for future expectations for each of these programs as informed by the third-party evaluator reports. EfficiencyOne outlined that the same approach to developing the 2015 Plan was taken for 2019. We did not conduct any variance analysis on the 2019 cost estimates to actual.

Based on this approach, cost estimates were made at the program component level, which may not be as precise and accurate as more detailed measure level cost estimates. The Continuation Plan was built to the approved investment amount within legislation.

4.3 Variance analysis for 2015 and 2016-2018

For the purposes of tracking progress against DSM Resource Plans, EfficiencyOne does not have an automated mechanism to comparatively track actuals against Plan at the measure level. It is a

¹¹ 2016 DSM Evaluation Reports

¹² 2018 DSM Annual Progress Report



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challenge when a plan or budget is completed to a differing level of detail than the progress tracking and reporting mechanisms used, as was observed for EfficiencyOne. Given changes to measures and measure characteristics as implementation progressed, it was not possible to trace and compare the measures included in the Plan to the actual measures employed. Measures can evolve based on the results of evaluations and, as such, cannot be consistently compared to the measures included in the Plan. Instead, we conducted a variance analysis at the program component level. Additionally, variance analysis was also completed based on units rebated/installed, as well as percentage of lighting planned and actually installed.

4.3.1 2015 DSM Resource Plan – actual to plan

The following table provides an overall view for actual to Plan results for 2015.

Table 6: Overall Actual to Approved DSM Resource Plan 2015

	Approved DSM Resource Plan	Actual	Variance - Actual to Plan	Variance
	(\$ million)	(\$ million)	(\$ million)	%
2015	38.97	34.31	(4.66)	(11.96%)

Numbers may not total due to rounding.

The \$38.97 million approved in the DSM Resource Plan for 2015 did not include provisions for HST costs. Per the 2015 DSM Resource Plan, a ruling on EfficiencyOne's ability to claim Input Tax Credits on HST payments (and to therefore recover these payments) was still outstanding at the time of Plan development. Given this uncertainty, EfficiencyOne opted to reduce spending in 2015 to offset HST costs.¹³ Per EfficiencyOne, the approved DSM investment less HST and amortization was \$35.70 million.

Table 7: Detailed Actual to Approved DSM Resource Plan 2015, excluding HST and Amortization

	Approved DSM Resource Plan			Actual			Variance - Actual to Plan (underspend)		
	Incentives	Admin & Enabling Strategies	Total	Incentives	Admin & Enabling Strategies	Total	Incentives	Admin & Enabling Strategies	Total
	(\$ million)	(\$ million)	(\$ million)	(\$ million)	(\$ million)	(\$ million)	(\$ million)	(\$ million)	(\$ million)
2015	25.36	10.34	35.70	20.23	11.80	32.03	(5.13)	1.46	(3.67)

** Excludes HST and Amortization*

Numbers may not total due to rounding.

In discussion with EfficiencyOne, as well as in a review of the annual report, we identified a number of factors that contributed to the underspend, including:

1. Incentive costs were approximately \$5.13 million less than Plan, though this was partially offset by an overspend on admin and on Enabling Strategies. Per EfficiencyOne, the most significant underspend contributing to this \$5.13 million was in Residential Direct Install (RDI) and Direct Installation at \$1.64 million and \$1.92 million, respectively.

For RDI, EfficiencyOne indicated that the Plan was built based on 2013 actual customer participation results. Per EfficiencyOne, the target was reduced by 3 GWh in anticipation of decreased activity. In 2015, however, customer participation was lower than estimated as a result

¹³ 2015 DSM Resource Plan Evidences and Appendices A-D



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of changes in the market. This was noted in the 2015 Annual Progress Report. EfficiencyOne indicated that this was due to the number of opportunities decreasing as people progress through the RDI program.¹⁴

For Direct Installation, EfficiencyOne noted that this program changed, becoming Small Business Energy Solutions in August 2015. After the transition the program had fewer participants than expected.

2. For Custom, EfficiencyOne indicated that there were fewer new construction projects than estimated (four in 2015 compared to 13 in 2014), which influenced the underspend, particularly as the incentive costs are highest in the Custom component for these projects.¹⁵

The table below outlines the variance in energy savings for 2015 at the program level.

Table 8: Actual to Approved DSM Resource Plan Energy Savings 2015 by NSUARB Program

(GWh)	2015 As Filed	2015 Actual	Variance - Actual to Plan (underachievement)
Residential Programs and Services			
Efficient Product Rebates	15.50	13.20	(2.30)
Existing Residential	26.90	25.60	(1.30)
New Residential	3.00	4.00	1.00
Energy Savings Actions	15.40	27.20	11.80
Business, Non-Profit and Institutional Programs and Services			
Efficient Product Rebates	27.00	36.40	9.40
Custom Incentives	20.50	24.50	4.00
Direct Installation	13.00	7.00	(6.00)
Total	121.30	137.90	16.60

Numbers may not total due to rounding.

Per the 2015 Annual Report,¹⁶ the following outlined the overachievement of energy savings in 2015:

1. **New Residential:** Despite a reduction in customer participation from 846 in 2014 to 569 in 2015, net savings per participant increased. The Annual Report outlined two potential factors. The first is that the energy savings per EnerGuide point are now based on New Home Construction homes, rather than Home Energy Assessment homes. The second was that "...some builders who had previously participated in the program built homes in 2015 that were more efficient than a Code-built home, despite no longer participating in the program. This positive influence of past customer participation resulted in ENS receiving credit for energy savings for non-participating homes."¹⁷
2. **Energy Savings Actions:** 2015 was the last year for the three-year pilot for the Home Energy Report with nearly 90,000 participating homes.
3. **Efficient Product Rebates (BNI):** Per the annual report, the higher energy savings resulted from a larger number of products rebated than anticipated. While mail-in rebates were relatively constant, the average savings per project increased.

¹⁴ ENS 2016 Annual Progress Report and Appendices A-D

¹⁵ ENS 2016 Annual Progress Report and Appendices A-D

¹⁶ ENS 2016 Annual Progress Report and Appendices A-D

¹⁷ ENS 2016 Annual Progress Report and Appendices A-D



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4. **Custom Incentives:** There was limited detail in the annual report related to the overachievement of energy savings for Custom.¹⁸ Appendix B of the 2015 Plan identified that the Custom Incentives program planned to include the Custom Retrofit and New Construction program components.¹⁹ The 2015 DSM Evaluation Report identified that the Custom Incentives program included Custom Retrofit, New Construction, Existing Building Commissioning, Strategic Energy Management (SEM) and Energy Management Information Systems (EMIS).²⁰ There were additional program components than what was planned, thus the impact of these services would not have been in the historical results used for planning purposes.

4.3.2 2016-2018 DSM Resource Plan – actual to plan variance analysis

The table below outlines the variance by year for first-year energy savings and spend between the approved DSM Resource Plan and actual results by year. Please note, all analysis on the 2016-2018 DSM Resource Plan was conducted on the approved Compliance Filing.

Table 9: 2016-2018 Variance Analysis - Investment and First Year Energy Savings - Actual to Compliance Filing

	Approved DSM Resource Plan Investment	Actual Results Investment	Variance (underspend)	Approved DSM Resource Plan First -Year Energy Savings	Actual Results First -Year Energy Savings	Variance (underachievement)
	(\$ million)	(\$ million)	(\$ million)	(GWh)	(GWh)	(GWh)
2016	33.21	30.87	(2.34)	133.14	136.86	3.72
2017	34.02	30.34	(3.68)	136.51	130.74	(5.76)
2018	34.92	33.95	(0.97)	136.29	151.40	15.11
Total	102.15	95.16	(6.99)	405.94	419.01	13.07

* All analysis on 2016-2018 Compliance Filing

Numbers may not total due to rounding.

For the three-year period of the 2016-2018 DSM Resource Plan, EfficiencyOne had an underspend of approximately \$6.99 million, with an overachievement of energy savings of approximately 13.07 GWh.

Based on these results, additional analysis at the program component level was undertaken to identify where the variances occurred to provide further insight from a cost and energy savings perspective. The total cost has three different components – admin, Enabling Strategies, and incentive.

4.3.2.1 2016-2018 admin cost variance analysis

The table below outlines the variance between the DSM Resource Plan and actual admin costs for 2016-2018:

¹⁸ ENS 2016 Annual Progress Report and Appendices A-D

¹⁹ 2015 DSM Resource Plan Evidences and Appendices A-D

²⁰ 2015 DSM Evaluation Report



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Table 10: 2016-2018 Admin Cost Variance Analysis, Actual to Plan

	Approved DSM Resource Plan Admin Cost (\$ million)	Actual Admin Cost (\$ million)	Variance Admin Cost (underspend) (\$ million)	Variance Admin Cost (underspend) %
2016	8.60	8.28	(0.32)	(3.75%)
2017	8.58	8.75	0.17	1.99%
2018	8.50	9.07	0.57	6.73%
Total	25.68	26.10	0.42	1.63%

* All analysis on 2016-2018 Compliance Filing

Numbers may not total due to rounding.

The actual admin costs were actually higher than Plan, and therefore did not contribute to the overall underspend in 2016-2018. EfficiencyOne indicated that the overspend was related to costs incurred to litigate the organization's HST appeal with the Tax Court of Canada.

4.3.2.2 2016-2018 Enabling Strategies variance analysis

In the 2016-2018 Plan, Enabling Strategies costs were estimated by EfficiencyOne based on 2014 actual costs for Enabling Strategies, adjusted based on knowledge of initiatives, pilots, and other Plan-related activities, and were included in the costs for the Plan.

The table below outlines the variance between the DSM Resource Plan and actual enabling strategy costs for 2016-2018:

Table 11: 2016-2018 Enabling Strategies Variance Analysis, Actual to Plan

(in \$ millions)	2016			2017			2018			Total		
Enabling Strategies	Variance			Variance			Variance			Variance		
	Plan	Actual	(underspend)	Plan	Actual	(underspend)	Plan	Actual	(underspend)	Plan	Actual	(underspend)
Education and Outreach	1.38	1.72	0.34	1.44	1.61	0.17	1.48	1.69	0.22	4.29	5.02	0.73
Development and Research	0.95	0.38	(0.56)	1.01	0.25	(0.77)	1.07	0.49	(0.57)	3.03	1.12	(1.90)
Other Enabling Strategies	0.52	0.95	0.43	0.59	0.91	0.32	0.74	1.09	0.35	1.85	2.95	1.10
Total	2.84	3.05	0.21	3.04	2.76	(0.28)	3.28	3.27	(0.01)	9.16	9.09	(0.08)

Numbers may not total due to rounding.

The above indicates that any variances in the estimates for Enabling Strategies were not a significant contributing factor for the underspend during 2016-2018. The underspend was approximately \$0.08 million or less than 1% of the total underspend.

4.3.2.3 2016-2018 incentive cost and energy savings variance analysis

We used the following reports to prepare the 2016-2018 incentive cost and energy savings variance analysis at the program component level:



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Public Reports

- 2016-2018 DSM Quarterly and Annual Progress Reports
- 2016-2018 DSM Evaluation Reports

Internal Reports Prepared by EfficiencyOne

- EfficiencyOne – Summary of 2016-2018 Approved and Actual Spending: This report, prepared by EfficiencyOne, provides a planned-to-actual spending variance analysis for several of the largest program variances. This was completed through the use of actual-to-Plan cost information, information within the quarterly and annual progress reports, as well as additional insight based on knowledge of the business.
- 2016-2018 Units Rebated Planned versus Actual Summary-2: This analysis details the planned and actual number of units rebated per program, by year.
- Attachment A – with Units Rebated: This document presents several measure data points, such as measure life, annual energy savings, and cost.
- 2016-2018 Plan versus Actuals Lighting Percentage per Program Component: This analysis presents the planned versus actual percentage proportion of program component energy savings derived from LED lighting.

It should be noted that where we relied on internal reports prepared by EfficiencyOne, we did not undertake any procedures to validate the outputs of these reports.

2016-2018 incentive cost variance analysis

Within the DSM Resource Plan, incentive costs are defined as rebate costs. Overall, each year of the 2016-2018 DSM Resource Plan saw an underspend on incentive costs. The underspend by year on incentive costs is the main driving factor for the overall underspend for the 2016-2018 DSM Resource Plan. An overall variance analysis is noted below:

Table 12: 2016-2018 Incentive Cost Variance Analysis, Actual to Plan

Incentive Cost	Approved DSM Resource Plan	Actual	Variance (underspend)
	(\$ million)	(\$ million)	(\$ million)
2016	21.81	19.53	(2.27)
2017	22.39	18.83	(3.57)
2018	23.14	21.61	(1.53)
Total	67.34	59.97	(7.38)

Numbers may not total due to rounding.

Variance in incentive costs are driven by the below main factors:

1. **Variance between estimated and actual program component and measure uptake.** Participant levels are variable, as customer participation is dependent on the market. Any shift in customer participation levels can impact the cost incurred by EfficiencyOne to deliver the program.
2. **Changes within program components related to rebate levels.** Each measure within a program has its own set rebate costs. These rebate costs may change over the course of the three year period.



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3. **Changes within program components related to measure mix.** EfficiencyOne may achieve energy savings and incur costs through a mix of measures within each program component that is different than the mix originally estimated in the Plan (i.e., there is variance in measure level customer uptake). Changes in mix can be driven internally by factors such as transitioning away from measures, or externally, by having higher customer market demand for some measures than others.

The following table illustrates variances between the DSM Resource Plan and actual spending for each program component, by year. Factors which led to three-year absolute variances greater than \$2 million by program component have been identified in the discussion following the table.

Table 13: 2016-2018 Incentive Cost Variance Analysis Actual to Plan by Program Component

(\$ million)	2016	2017	2018	Three Year Plan Total Variance
Variance - Actual to Plan (underspend)				
Residential DSM Programs				
Appliance Retirement	0.63	0.61	0.53	1.77
Instant Savings	2.32	0.94	0.99	4.25
RDI	(0.17)	(0.82)	(1.43)	(2.42)
Green Heat	(0.56)	(0.52)	(0.31)	(1.39)
Solar	(0.30)	(0.52)	(0.65)	(1.46)
Home Energy Assessment	(0.79)	(1.01)	(1.68)	(3.48)
Rental Properties and Cond.	(0.35)	(0.89)	(0.89)	(2.12)
New Residential	0.45	0.39	1.27	2.10
Business, Nonprofit and Institutional Programs				
Efficient Product Rebates	0.24	0.77	2.60	3.61
Custom Incentives	(3.01)	(2.55)	(2.51)	(8.08)
Direct Installation	(0.74)	0.03	0.56	(0.15)
Total (underspend)	(2.27)	(3.57)	(1.53)	(7.38)

Numbers may not total due to rounding.

Instant Savings

Over a three-year period, the Instant Savings program overspent by \$4.25 million, with the highest spending in 2016.

This variance was driven by higher-than-expected program customer participation, with EfficiencyOne rebating approximately 2.39 million units – approximately 2.16 million higher than the expected 233,189 units.

When discussed, EfficiencyOne identified that, as outlined in 2016-2018 annual reports, high program customer participation was driven largely by LED lighting sales, which were led by strong retailer support and incentive pricing, as well as fall and spring marketing campaigns. Sales of energy efficient appliances, such as refrigerators, were also higher than expected.

While customer participation in this program was higher than expected, EfficiencyOne identified that overspend in Instant Saving was limited in part due to customers favouring lower cost measures, such as lighting.



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Residential Direct Install (RDI) and Rental Properties and Condos

During 2017, the Residential Direct Install (RDI) and Rental Properties and Condos programs were merged into the Efficient Product Install (EPI) program. Over a three-year period the former RDI and Rental Properties and Condo programs underspent by a combined \$4.54 million.

Although customer participation levels declined from 2016 to 2018, units rebated over this time period were 193,709 units higher than anticipated, with EfficiencyOne rebating 989,051 units compared to an anticipated 795,342 units. Customers in these program components favoured lighting measures, which are measures that have lower energy savings per unit. Delivery agents are paid on a \$/kWh basis. As a result of lower energy savings, costs paid to delivery agents by EfficiencyOne were lower than expected, resulting in an underspend. Additionally, per EfficiencyOne, the organization issued a Request for Proposal for these services after the 2016-2018 Plan was filed, resulting in lower costs, which also impacted underspend.

Home Energy Assessment

During 2016-2018, the Home Energy Assessment program underspent by \$3.48 million. This variance is due primarily to low customer participation.

EfficiencyOne expected to complete 7,706 assessments during 2016-2018. As it happened, EfficiencyOne completed only 2,615 assessments over the three years, with annual demand falling during this time. This fact is consistent with the increasing annual underspend observed during the 2016-2018 period.

In 2015, provincial funding ended. Participation was lower in 2016 as a result, as participation was limited to homes that were primarily electrically heated.²¹ In 2018, there was also a lower-than-anticipated number of HEA projects completed. Funding was re-introduced in 2018, leading to capacity issues with service organizations. There was an increased demand for home assessments in 2018. Service organizations worked to increase its number of Energy Advisors to address the increased demand.²²

New Residential

Over a three-year period, the New Residential Program overspent by \$2.1 million with an overspend of \$1.27 million observed in 2018 alone.

Per the 2018 Annual Progress Report, participant new incentive structure was introduced on January 1, 2016 to simplify the program and reduce barriers to participation. Incentives were further updated in 2017. As a result, it exceeded the planned investment amount due to these incentive changes.²³

Efficient Product Rebates (BNI)

During 2016-2018, the Efficient Product Rebates (BNI) program overspent by \$3.61 million, with \$2.6 million of overspend in 2018.

Overspend is attributable to the higher-than-anticipated program customer participation. EfficiencyOne planned to rebate 581,476 units, but rebated 740,743 more units than expected (approximately 1.32 million units) over the three-year period. In 2018 in particular, EfficiencyOne

²¹ 2016 DSM Evaluation Reports

²² 2018 DSM Annual Progress Report

²³ E1-2018-Q4-Annual-Progress-Report



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rebated more than five times as many units as expected. EfficiencyOne identified that market success, similar to Instant Savings, could be attributable to high demand for LED lighting.

Also, similar to the Instant Savings program, EfficiencyOne identified that overspend was somewhat offset by the fact that participants selected a measure mix with a lower unit cost, such as LED lighting.

Custom Incentives

With a total underspend of \$8.08 million, the Custom Incentives program is the largest contributor to the overall underspending during 2016-2018.

The program customer participation rate was lower than planned. Annual Progress Reports in 2016, 2017 and 2018 explained that low customer participation rates were driven primarily by client-related delays in project timelines on some large projects, fewer project leads generated than expected, and delays in re-launching the Building Optimization service within the Custom program in 2016.

Based on discussion with EfficiencyOne, it was noted that activities within the Custom Incentive program are – by nature – varied and client-driven.

During each 2016-2018 Q1 mid-course adjustment, EfficiencyOne reported that it expected underspend variances against budget in the Custom Incentives program as shown in the table below. However, these mid-course adjustments totaled only approximately \$2.30 million. The underspend was thus significantly more than what was estimated in the mid-course adjustment.

Table 14: 2016-2018 Custom Mid-Course Adjustment - Program Level

(\$ million)	Planned Total Expenditure (Including Administrative Costs)	Q1 Midcourse Adjustment to Planned Total	Midcourse Decrease from Plan
2016	6.80	6.40	(0.40)
2017	6.50	6.00	(0.50)
2018	6.50	5.10	(1.40)
Total Decrease in Spend	19.80	17.50	(2.30)

Numbers may not total due to rounding.

2016-2018 energy savings variance analysis

The following table outlines variances between the DSM Resource Plan and the actual energy savings realized, by year. Of EfficiencyOne's 11 programs, eight of these did not achieve their respective energy saving targets. However, overall energy savings targets were surpassed by 13.08 GWh as a result of the energy savings in the Instant Savings and Efficient Product Rebates programs, which both surpassed targets. Factors which led to three-year absolute variances greater than 10 GWh by program component have been identified in the discussion following this table.



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Table 15: 2016-2018 First Year Energy Saving Variance Analysis Actual to Plan by Program Component

(GWh)	2016	2017	2018	Three Year Plan Total Variance
Variance - Actual to Plan (underachievement)				
Residential DSM Programs				
Appliance Retirement	(1.57)	(1.19)	(1.50)	(4.26)
Instant Savings	26.48	11.22	13.49	51.19
RDI	(4.17)	(3.34)	(7.01)	(14.53)
Green Heat	(2.35)	(4.29)	(3.00)	(9.64)
Solar	(0.35)	(0.60)	(0.70)	(1.65)
Home Energy Assessment	(4.12)	(4.10)	(6.61)	(14.83)
Rental Properties and Cond.	(0.52)	(3.13)	(3.00)	(6.65)
New Residential	0.12	(0.50)	0.50	0.11
Business, Nonprofit and Institutional Programs				
Efficient Product Rebates	4.71	13.98	42.68	61.37
Custom Incentives	(8.13)	(11.71)	(19.72)	(39.56)
Direct Installation	(6.37)	(2.11)	(0.01)	(8.49)
Total (underachievement)	3.72	(5.76)	15.11	13.08

Numbers may not total due to rounding.

Instant Savings

Over a three-year period, the Instant Savings program surpassed its energy savings target by 51.19 GWh, surpassing target each year.

Energy savings were driven by higher-than-planned program customer participation. As described in the annual progress reports, strong demand for LED lighting was the primary driver for this high customer participation and the associated energy savings. This is despite the fact that, on average, lighting saves less energy per unit (measure) when compared to other, more complex measures. However, the significant variability in actual participation to plan more than offset the low energy savings per measure.

Overall, EfficiencyOne had planned for 42% of total energy savings to be generated from lighting. In fact, 91% of energy savings in the Instant Savings program were generated by lighting.

Residential Direct Install (RDI)

During 2017, the Residential Direct Install and Rental Properties and Condos programs were merged into the Efficient Product Install (EPI) program. Over a three-year period RDI failed to meet its energy savings target by 14.53 GWh, falling below expectations each year. Rental Properties and Condos also failed to meet its target by 6.65 GWh over a three-year period.

Targets were not met despite the RDI and Rental Properties and Condos programs exceeding the expected total number of units rebated. This variance can therefore be explained by the fact that the program component measure mix favoured a greater percentage of LED lighting installations than expected per the Plan. This type of installation generally has a lower energy savings per unit rebated. For example, the installation of an Embertec energy efficient power bar saves more than 10 times more energy per unit (460 kWh) than the installation of one 10.5 W LED lightbulb (44 kWh). The proportion of total energy savings generated by lighting was 21% higher than originally planned for the RDI program, and 54% higher than planned for Rental Properties and Condos.



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Home Energy Assessments

Over a three-year period, the Home Energy Assessment program failed to meet targeted energy savings by 14.83 GWh, falling below expectations each year.

Lower-than-expected customer participation was the key reason for the underachievement. EfficiencyOne expected to complete 7,706 assessments during 2016-2018. EfficiencyOne completed only 2,615 assessments over the three years (5,091 less than expected), with annual demand falling during this time.

Efficient Product Rebates (BNI)

During 2016-2018, the Efficient Product Rebates (BNI) program surpassed its energy savings targets by 61.37 GWh and surpassed the 2018 target by 42.68 GWh.

This overachievement was driven by higher-than-expected demand, particularly in 2018. EfficiencyOne planned to rebate 581,476 units, but actually rebated 740,743 more units than expected (approximately 1.32 million units) over the three-year period. High demand was supported by LED lighting sales. This overachievement occurred despite the fact that on average, lighting saves less energy per unit (measure) when compared to other, more complex measures.

Overall, EfficiencyOne had planned for 78% of total energy savings in Efficient Product Rebates (BNI) to be generated from lighting. In fact, 89% of energy savings in the Efficient Product Rebates (BNI) program were generated by lighting.

Custom Incentives

Custom Incentives failed to meet energy saving targets by 39.56 GWh in 2016-2018, falling below target each year. This underachievement is primarily due to lower customer participation than expected in the program.

As described above as it related to underspend, these factors in turn led to underachievement of energy savings.

4.3.2.4 Overall themes of variances

The following table outlines overall themes noted during the variance analysis, particularly for 2016-2018:

1. Actual customer participation levels differing from Plan

The number of units actually rebated during 2016-2018 differed from what was estimated in the DSM Resource Plan, with several programs seeing unit sales rebated either greater than 1000% of Plan or less than 50% of Plan. The table below outlines a summary of the expected units rebated versus actual units rebated by program component:



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Table 16: 2016-2018 Expected Units Rebated vs. Actual Units Rebated by Program Component

Program Component	Planned Units Rebated 2016-2018	Actual Units Rebated 2016-2018	Variance - Actual to Plan	% of Plan
Appliance Retirement	23,503	17,777	(5,726)	75.6%
Instant Savings	233,189	2,389,139	2,155,950	1024.6%
Residential Direct Install	711,867	921,437	209,570	129.4%
Green Heat	4,937	6,823	1,886	138.2%
Home Energy Assessment	7,706	2,615	(5,091)	33.9%
Rental Properties and Cond.	83,475	67,614	(15,861)	81.0%
New Residential	1,668	1,643	(25)	98.5%
Efficient Product Rebates	581,476	1,322,219	740,743	227.4%
Direct Installation	98,851	232,036	133,185	234.7%
Total	1,746,672	4,961,303	3,214,631	284.0%

Numbers may not total due to rounding.

The Custom program was excluded from the above table, as the methodology of calculating the planned units rebated from the model did not provide a number of projects comparator. However, EfficiencyOne indicated that Custom did have fewer projects completed than planned, which was the contributing factor to the significant three-year underspend in the program component.

2. Customer participation favouring lighting, which are lower cost and lower energy savings measures

For each program component containing lighting (rebates or installation), the proportion of total program energy savings related to lighting was higher than expected. The table below presents planned versus actual proportion of program energy savings from lighting.

Table 17: 2016-2018 Planned to Actual Proportion of Energy Savings from Lighting by Program Component

Program Component	Planned % of Program Component Savings Coming from Lighting Measures 2016-2018	Actual % of Program Component Savings Coming from Lighting Measures 2016-2018	Variance - Actual to Plan
Appliance Retirement	0%	0%	0%
Instant Savings	42%	91%	49%
Residential Direct Install	43%	64%	21%
Green Heat	0%	0%	0%
Home Energy Assessment	0%	0%	0%
Rental Properties and Cond.	27%	81%	54%
New Residential	0%	0%	0%
Efficient Product Rebates	78%	89%	11%
Custom Incentives	0%	10%	10%
Direct Installation	25%	82%	57%

This is particularly true for the Instant Savings program, where the proportion of energy savings from lighting was 91%, compared to the planned 42% of savings from lighting. Lighting is a low cost per energy savings measure, and is therefore a key driver of the underspend. Overall, customers selected lower cost measures as opposed to high cost measures. EfficiencyOne's Plan estimated that customers would select a higher level of higher cost measures; hence causing the variance when compared to actual.



5 NSUARB Question 3

Question 3 posed by the NSUARB was ***whether the factors that led to the overestimation continue to be present in EfficiencyOne's current operating environment.***

We have structured our response to the question in this section as follows:

1. **Response to NSUARB Question 3:** This section outlines our response to the NSUARB's question, outlining whether the factors that contributed to overestimation as identified in Question 2 continue to be present in EfficiencyOne's operating environment.

We responded to NSUARB Question 3 for the Plan period of 2015 onwards (i.e. to 2020-2022).

5.1 Response to NSUARB Question 3

To respond to this question, we considered the factors noted in Question 3 in the context of whether these factors continue to be present in EfficiencyOne's operating environment.

We did note that beginning with the development of the 2020-2022 Plan, EfficiencyOne has been directed to file a preferred and alternate scenario Plan.

We noted, based on the work conducted during this study, many factors of overestimation continue to be present in EfficiencyOne's operating environment. These factors can be categorized as:

1. **Inherent in the environment:** Factors specific to the environment in which the organization operates. EfficiencyOne has limited control in regard to these factors.
2. **Inherent in the regulatory environment as defined by external factors:** Factors specific to the regulatory environment in which the organization operates. EfficiencyOne has limited control in regard to these factors.
3. **Result of management decision:** Factors specific to the decisions EfficiencyOne makes as an organization. EfficiencyOne has inherently more control with respect to these factors compared to those noted above.

EfficiencyOne's planning process has evolved and become more mature since its inception. Per EfficiencyOne, the organization continues to rely on third-party experts in the development of its Plans and is leveraging the experience from the past 10 years to better inform cost estimation. The degree of supporting documentation for Plan estimates and associated adjustments has improved. Additionally, the NSUARB has approved a new Standardized Filing Framework, which outlines the required content of all future DSM Resource Plans. This took effect with the 2020-2022 Plan. EfficiencyOne now also has access to a larger quantity of historical information, which it can leverage to better inform future cost estimates.

Factors of overestimation – Inherent in the environment

The success of programs and program components is dependent on market uptake. Variances between Plan estimates and actual performance may occur, since customer participation in EfficiencyOne program components depends on the market's reaction to these offerings.

Additionally, each program component has a variety of measures. Each measure has its own cost and energy savings. Some measures are more costly and produce more energy savings than others. Customers decide which measures they avail of, which impacts the measure mix realized by



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EfficiencyOne. EfficiencyOne estimates a measure mix when developing a Plan. Actual measure mix is a result of customer behaviour and choice.

Uptake by customers impacts the costs, energy savings and ultimate measure mix realized by EfficiencyOne. While variances in costs and energy savings will likely continue as a result of changes in market uptake, EfficiencyOne can continue to conduct marketing efforts to influence actual market response.

Incentive costs may change from those included in the Plan by the time the Plan is implemented. Per EfficiencyOne, the incentive costs of individual measures can change between the time of Plan development and the time of implementation. This can be a result of market transformation, change in industry capacity/competition, market price changes, new delivery methods and/or evaluation results.

Factors of overestimation – Inherent in the regulatory environment as defined by external factors

The length of time between the development and implementation of the DSM Resource Plans. DSM Resource Plans and modelling inputs are developed by EfficiencyOne one to four years before Plans are implemented. During this time, a number of external factors can change, including market demand, availability of efficiency technologies, incentive costs, industry capacity/competition and evaluation results for measures included in the Plan. These changes naturally impact the implementation of the Plans and inputs.

EfficiencyOne develops its Plan based on the most recent evaluation results from the third-party evaluator, which is the most current information available at the time of development. Per EfficiencyOne, these evaluation results support the measure mix on which the Plan is built. EfficiencyOne undergoes a third-party evaluation of its program components each year. As a result of these evaluation results, there may be changes to measures, incentive costs, energy savings, etc., which ultimately can lead to the implementation of a different measure mix than planned. This can result in variances between Plan and actual.

If Plans continue to be developed one to four years in advance of implementation, there is a high likelihood that variances between Plan and actual will continue. This can be mitigated in part by mid-course adjustments; however, this will likely not address all variances.

Current reporting does not provide sufficient information to adequately address overestimation when it occurs. EfficiencyOne, as the DSM administrator, has the flexibility to re-allocate funding among years, programs, and program components during implementation of the DSM Plan in response to current conditions, as long as performance targets are met at the end of three years. Currently, we understand that EfficiencyOne has the following reporting to the NSUARB:

1. Mid-course adjustment – We understand from EfficiencyOne that the mid-course adjustment allows EfficiencyOne to re-allocate investment and energy savings among programs and program components to account for any changes from the annual evaluation process. This mid-course adjustment is reported in the DSM Q1 Report. EfficiencyOne is required to provide explanation to the NSUARB of any instances where the mid-course adjustment results in a shift/re-allocation of +/- 25% of the original budget or energy savings targets amongst programs and program components. We conducted a variance analysis between Plan, mid-course adjustment and actual for 2016-2018. This outlines the degree to which mid-course adjustments were made and how those updates compared to actuals incurred.



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Table 18: 2016-2018 Plan, Mid-Course Adjustment and Actual Expenditures, Variance Analysis

Mid Course Adjustment	Plan Expenditures (\$ million)	Mid-Course Adjustment Expenditures (\$ million)	Plan to Mid-Course Adjustment Variance (decrease)	Plan to Mid-Course Adjustment % Variance (decrease)	Actual Expenditures (\$ million)	Mid-Course Adjustment to Actual Variance (underspend)	Mid-Course Adjustment to Actual % Variance (underspend)
2016	33.21	33.20	(0.01)	-0.03%	30.87	(2.33)	(7.02%)
2017	34.02	34.60	0.58	1.70%	30.34	(4.26)	(12.31%)
2018	34.92	33.90	(1.02)	(2.92%)	33.95	0.05	0.15%
Total Three-Year Plan	102.15	101.70	(0.45)	(0.44%)	95.16	(6.54)	(6.43%)

Numbers may not total due to rounding.

2. Quarterly progress reports – We understand that EfficiencyOne submits a quarterly progress report to the NSUARB that outlines actual quarterly and year-to-date results for budget and energy savings. Currently, EfficiencyOne includes a table that presents a 'stop light' approach to signal the expected energy savings at the end of the year compared to the annual targets. Additionally, a qualitative summary of activity for each program component is provided.
3. Annual progress reports – We understand that EfficiencyOne submits an annual progress report each year that provides a qualitative summary of the activity in each program component, as well as a comparison of spending and energy savings results against Plan and mid-course adjustment.

While EfficiencyOne provides the progress information in the above reporting, it does not appear to provide detailed forecast data on energy savings and spending for the year or the Plan period as a whole. Additionally, while the quarterly reports do provide the 'stop light' indication of expected energy savings compared to annual targets, there is limited additional insight shared by EfficiencyOne regarding where it expects actual results will be over the remainder of the year or over for the Plan period as a whole in the case of a three-year Plan. Currently, the 'stop light' in the quarterly report does not provide insight on spending. There is an opportunity for enhancements within the current reporting to include additional information to support the expected results and how these results differ from Plan as a result of changes in market conditions and customer choice trends as the Plan is implemented. This more detailed information may provide the NSUARB with a common understanding with EfficiencyOne on trends and on the re-forecasting of the expected actual results against the Plan.

Enhancements to reporting would provide further robust information to address overestimation when it occurs including enabling EfficiencyOne to:

- Address the quantum and degree of overestimation
- Provide an understanding and meaningful information to users of the reports regarding areas of estimation, trends to date, re-allocation of costs, and forecasted results within the Plan period.

For comparative purposes, we inquired with Efficiency Vermont and Efficiency Maine Trust as to their approach for any course corrections during the period of their Plans if overestimation is identified. Both Efficiency Vermont and Efficiency Maine Trust operate within a different regulatory environment. Efficiency Vermont and Efficiency Maine Trust have thresholds against which, when surpassed, they obtain approval from their regulator to carry forward underspend above these thresholds on an annual basis. EfficiencyOne's Supply Agreement outlines that any underspend is addressed at the end of the three-year Plan period.



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Efficiency Vermont and Efficiency Maine were selected as a result of their similar structures to EfficiencyOne. We do recognize that there are differences in the structures and operating environments of each organization relative to those of EfficiencyOne. Our discussions with Efficiency Vermont and Efficiency Maine Trust were limited to one-hour interviews.

Factors of overestimation – Result of management decision

Precision and accuracy of customer participation estimates. There were significant differences between the planned and actual customer participation rates in 2016-2018. There were overestimations of customer participation by EfficiencyOne in higher cost program components and measures. When these estimated customer participation levels were not realized, underspends occurred. This was discussed under our response to Question 2.

When considering whether this could occur in the future, we reviewed EfficiencyOne's process to estimate customer participation in 2020-2022. We noted that EfficiencyOne did not appear to document the basis of its changes to the starting estimates (i.e., 2017 actual participation) to arrive at the final customer participation estimates, by measure, included as an input to generate the Plan cost estimates. Per EfficiencyOne, a vetting process occurs internally through which staff consider items such as:

1. Process and market evaluations conducted by Econoler, which are completed approximately once every three years
2. High-level marketing strategies
3. Market-related research conducted by the EfficiencyOne Customer Experience team such as research identifying barriers to entry, etc.

While we understand this vetting process occurs, there was no documented linkage between the items noted above and the rationale and justification that informed the updates to customer participation at the measure level.

We do recognize that variances between estimate and actual customer participation will occur as a result of market factors. However, to minimize significant variances in the future, EfficiencyOne will, to the extent possible, need to increase the accuracy of its estimates of customer participation rates by program component and measure to minimize the variance between Plan and actual to the extent possible. Traceability of rationale and justification for updates made through the process for estimating customer participation can support the internal review process and provide staff with additional context to consider and discuss to refine estimates. Collectively, these steps may contribute to increased precision and accuracy through the internal vetting process. Additionally, having this information documented can provide EfficiencyOne with considerations for future estimates, as the organization will have the ability to reflect on what may or may not have occurred in comparison to assumptions.

Continuation Plan costs estimated based on historic performance/actuals with adjustments at the program component level, rather than a detailed measure level bottom-up approach. In 2015, as a result of legislation, EfficiencyOne developed the 2015 DSM Resource Plan as a Continuation Plan. As this Plan was developed within a compressed time period and for one year only, EfficiencyOne determined, for a one-year Plan, it was not beneficial from a cost perspective to initiate a full modelling process at the measure level. Per EfficiencyOne, conducting modelling at the measure level is a lengthy and costly process. Alternatively, EfficiencyOne identified it relied on historical information from 2013 on a program component level adjusting for future expectations for



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each of these programs as informed by the third-party evaluator reports. EfficiencyOne outlined that the same approach was taken for 2019. We did not conduct any variance analysis on the 2019 cost estimates to actual.

Based on this approach, cost estimates were made at the program component level, which may not be as precise and accurate as more detailed measure level cost estimates. The Continuation Plan was built to the approved investment amount within legislation.

However, if Continuation Plans occur in the future, the approach of basing a plan on higher level estimates rather than a bottom-up approach, may increase the risk of cost overestimation.



6 Jurisdictional review

We conducted a jurisdictional review, which involved conducting a one-hour interview with representatives from Efficiency Vermont (run by Vermont Energy Investment Corporation – VEIC) and Efficiency Maine Trust to understand their DSM planning processes. The results of this jurisdictional review were limited to discussion only. A summary of the results of these interviews is noted below.

- **Efficiency Vermont:**

The Vermont Energy Investment Corporation (VEIC) runs Efficiency Vermont's DSM programs. Efficiency Vermont develops and provides the regulator with three-year DSM Plans, which also includes six-year outlook and 20-year outlook information. The regulator approves only the three-year Plan. The Plan is informed by the organization's in-house, web-based modelling tool. The model is loaded with actual data from the most recent year as a starting point. Modelling is completed at the measure-level. Once initial inputs are loaded and outputs are generated within the model, the DSM planning team holds various discussions with program managers and relevant parties to understand which internal and external factors could potentially impact the Plan. A vetting process occurs and updates are made based on feedback provided on various iterations. Through implementation of the plan, Efficiency Vermont has flexibility to respond to changing conditions. Efficiency Vermont reports at the major market level (residential new construction, existing homes, efficient products, business new construction and business existing facilities). Efficiency Vermont is currently looking at the potential of moving to six-year DSM Plans.

Efficiency Vermont has major markets that it serves. Throughout the three-year plan cycle, the organization has flexibility to move funds within the same market and also has the ability to move the funds from one market to another if the aggregate transfer amount is less than 20% of the budget for that market from which funds are withdrawn. The organization reports on this on a quarterly basis. When more than 20% of the budget for one market is transferred, then the quarterly report must provide an explanation of the variance and a new output from the modelling tool after the revised inputs are loaded.

In a given year, if the organization underspends the annual budget by more than 5%, an annual rate refund process commences. During this process, the underspend is reviewed by the regulator, which determines whether a refund is provided to ratepayers or whether the organization can carry this forward. In the case of an underspend by less than 5%, the organization can request the commission to carry forward the underspending amount to the next year. At the end of the three-year Plan period, any overspend is automatically returned to the ratepayers if it is greater than 5% of the total budget. If it is less than 5% of the total budget, the organization can request it as carry forward.

It should be noted that Efficiency Vermont has developed its own in-house model and has the ability to cost effectively re-run the model based on any changes through Plan implementation. Efficiency Vermont also has performance targets, which are weighted and scaled. There is an opportunity to receive a performance award for attaining performance targets; however, there are also financial penalties if minimum performance requirements are not met or if overspending occurs.

- **Efficiency Maine Trust:**

Efficiency Maine Trust is the administrator for DSM programs in Maine. The Trust is a quasi-state agency governed by a Board of Trustees with oversight from the Maine Public Utilities



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Commission. Efficiency Maine Trust develops three year plans, which are approved by the regulator. Modelling and analysis for the DSM Plan are completed in-house using an excel-based model. Opportunity studies and best practices provided by third-parties are incorporated into the model. The key inputs into the model are participation rates, incentive costs, administrative costs and delivery costs. Modelling is completed at the measure level and is based primarily on historical performance. Market studies are leveraged for estimating participation and third-party market research is used to estimate incentive costs where historical information is not available. When all the inputs are finalized, outputs are generated to be included in the DSM Resource Plan. When implementing the DSM Plan, Efficiency Maine Trust has some flexibility to re-allocate funding within programs. There are no financial penalties if targets are not met and there are no performance incentives.

Efficiency Maine Trust identified the DSM Plan is developed on a program-by-program basis and not as a total portfolio, resulting in targets and reporting on a program level, though a total portfolio view is also reported.

Efficiency Maine Trust provides the regulator with an annual report on or before October 1, which provides an update on progress. Efficiency Maine Trust also provides an annual update, filed with the regulator, on or before March 1 of the first two years of the Plan period, or as needed to request a significant change. This update includes any proposed significant changes, as well as an overview of non-significant changes. Significant and non-significant changes have been defined and documented. Any requested significant changes must be approved by the regulator before being implemented. This is the organization's opportunity to begin the conversation on any recovered budgets, with an order for any recovered budgets to utilities being completed by the end of May. Any underspend in excess of one twelfth of budget that Efficiency Maine Trust would like to carry forward is included in the October 1 annual report. Efficiency Maine Trust can carry-forward, without approval, underspending of less than one twelfth of budget.



7 2013-2015 DSM Resource Plan – Approach and results

7.1 2013-2015 DSM Resource Plan

The 2013-2015 DSM Resource Plan was filed by ENSC on February 27, 2012. The NSUARB approved the first two years of the 2013-2015 DSM Resource Plan (i.e. 2013 and 2014). ENSC would be required to file a subsequent application for 2015. The 2015 DSM Resource Plan was completed as a result of the transition to the Efficiency Nova Scotia franchise through the *Electricity Efficiency and Conservation Restructuring (2014) Act*. The *Act* mandated the investment level for 2015, rendering the last year of the 2013-2015 DSM Resource Plan irrelevant. The next section discusses the development of the 2013-2015 DSM Resource Plan and provides an overview of results against Plan. This overview is discussed separately from the DSM Resource Plans from 2015 onwards, as the 2013 and 2014 DSM Resource Plans were implemented under ENSC, not EfficiencyOne.

7.1.1 Development of the Plan

The 2013-2015 DSM Resource Plan was filed by ENSC on February 27, 2012. Per the Plan, “To aid in the preparation of the 2013-2015 DSM Plan, ENSC retained the advice and assistance of Navigant, Dunskey Energy Consulting (Dunskey) and Elenchus Research Associates Inc. (Elenchus).”²⁴ The Plan was developed in the organization’s first full year of operations, with only one year of historical data to leverage. Per management, audited financial and verified energy savings information were not finalized at the time the Plan was filed with the NSUARB.

The 2013-2015 DSM Resource Plan also applied during the time when the DSM Cost Recovery Rider (DCRR) was the method used to collect funding from NSPI ratepayers. This Rider was eliminated in 2015 with the creation of the Efficiency Nova Scotia franchise.

7.1.2 Results – Plan to actual

To provide the following results, we observed the DSM Resource Plan and annual progress reports for 2013 and 2014, and obtained additional information through discussion with EfficiencyOne.

2013 Results

The analysis of 2013 results is based primarily on a review of the 2015 DSM Resource Plan Application submitted to the NSUARB.

The following table outlines a summary of the results against the Plan as filed for 2013. We noted that there was no overall change to investment levels as a result of the mid-course adjustment.

²⁴ 2013-2015 DSM Plan – Revised Evidence April 18, 2012



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Table 19: Actual to Approved DSM Resource Plan 2013

	Approved DSM Resource Plan	Actual	Variance	Variance
	(\$ million)	(\$ million)	(\$ million)	%
2013	46.25	43.52	(2.73)	(5.90%)

Numbers may not total due to rounding.

Management identified that approximately \$2.1 million of the variance was related to programs. Of this \$2.1 million, EfficiencyOne identified that approximately \$2 million was related to incentive cost. In 2013 there were variances in each program component, either under or over spent, which netted to the approximately \$2 million underspend in incentive cost.

The Low Income Homeowner program component had the largest underspend with a total underspend on incentives of approximately \$1.2 million, due to a shift in energy savings and measure mix/contract price. BNI Direct Install also had an underspend of \$1.7 million due to a shift in energy savings.

In 2013, ENSC achieved 163.20 GWh of energy savings compared to 135.20 GWh as planned (i.e., an overachievement of 21%). Per the 2013 results, Efficient Product Rebates (mainly Instant Savings) and Existing Residential (mainly Residential Direct Install) were the driving programs for this overachievement. The following items were noted in the 2015 DSM Resource Plan discussion of 2013 results:

- **Instant Savings:** This program component had spring and fall events and an extended rebate period. Some retailers committed to reduced prices during the campaign, which increased sales. Additionally, a number of retailers reduced the price of LED products, which generated significant sales. In 2013, 220,000 LED bulbs were sold compared to 20,000 in 2012. With this overachievement of customer participation, higher than planned energy savings were realized.
- **Residential Direct Install:** The 2013 results noted that this program component had the majority of the energy savings in Existing Residential. Upgrades were completed in 23,587 homes. In the last quarter, a new pilot for advanced power strips was implemented.²⁵

2014 Results

The 2014 DSM Resource Plan was originally approved by the NSUARB as a \$47.7 million investment. However, per EfficiencyOne, with the 2014 DCRR application, reductions to the investment level were directed by the NSUARB and therefore there was a Compliance Filing. The derivation of the funding amount is outlined in the table below, as well as the overall variance against the funding available for DSM activities:

²⁵ 2015 DSM Resource Plan Evidences and Appendices A-D



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Table 20: Actual to Approved DSM Resource Plan 2014

	\$ million
2014 Approved DSM Resource Plan	47.70
Inflation Added in DCRR Application	1.00
Reduction Directed by NSUARB in DCRR Decision	(0.30)
Additional Reduction to Cover Balance Adjustment Shortfall	(0.90)
Reduction to Offset Delay in 2014 DCRR Collections until February	(1.50)
Amount Available for DSM Programs including HST and Amortization	46.00
Actual Spend for 2014	38.92
Variance	(7.08)
% Variance	(15.39%)

Numbers may not total due to rounding.

In discussion with EfficiencyOne, there were a number of factors that contributed to the variance in resource costs noted in the preceding table.

1. Enabling Strategies had an underspend of \$0.4 million. ENSC had estimated that regulatory costs would include costs to develop and defend the next three-year DSM Resource Plan. However, as a result of legislative changes, the 2015 DSM Resource Plan was developed as a one-year a Continuation Plan and did not include third-party modelling costs. As such, regulatory costs were underspent in 2014.
2. Admin costs had an underspend of \$1.2 million. Per EfficiencyOne, given that the 2014 DSM Resource Plan was based on information from the first year of operations, actual spending could have been impacted by factors such as staffing levels, etc.
3. Per EfficiencyOne, \$3.0 million of the underspend was related to incentive costs. Instant Savings and Custom had the highest overall underspend at \$1.08 million and \$1.09 million, respectively, as further discussed below:
 - **Instant Savings:** Per the 2014 DSM results presented in the 2016-2018 DSM Resource Plan application, ENSC discontinued incentives for compact fluorescent lighting and transitioned fully to LED due to increased market penetration. This resulted in more than 182,000 LEDs being sold.²⁶
 - **Custom:** A new program component – Custom Existing Building Commissioning – was offered in 2014. This program component provided energy savings at a low cost and contributed to the underspend.

In 2014, ENSC also exceeded its energy target by 14.1 GWh, or by 10.2% of the approved Plan target of 137.8 GWh. As per EfficiencyOne, the primary reason for this overachievement was a result of the Home Energy Report, which had actual energy savings of 25.4 GWh compared to a target of 15.4 GWh. This is 10 GWh (or 71%) of the overachievement. This program was a new offering and ENSC identified that specific historical results were not available when considering the target for inclusion in the Plan. As a result, management opted to set a more conservative target. Based on a

²⁶ 2016-2018 EECA Supply Agreement Application Evidence and Appendices A-J - REVISED



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review of the mid-course adjustment presented in the Q1 2014 DSM Report, the energy savings for Existing Residential (including Home Energy Report) was increased from 16.9 GWh to 34.2 GWh.

The Plan was based on historical results available for a single year of full operation results. The use of limited historical results may have contributed to the variances.



Appendix A Scope and approach

The scope of the study included:

- Review of DSM planning process at EfficiencyOne including the key considerations used to inform the development of DSM Resource Plans (both projected costs and associated energy savings);
- Identify where key sources of information are gathered for DSM Resource Plan development for costs and energy savings;
- Assess the implementation of DSM Resource Plans into EfficiencyOne's operations such as from a program actual cost perspective and energy savings traction including the actual market and customer experience;
- Assess the constraints, limitations and parameters surrounding DSM Resource Plan development and implementation for costs and energy savings; and
- Assess the continuous monitoring of DSM costs and energy savings performance throughout the DSM Resource Plan term.

In light of the objective and scope, the following is a summary of our engagement approach:

We started this engagement with a project kick-off meeting to reaffirm the objective of the engagement, obtain any relevant documents, and identify key personnel for the completion of the engagement.

To complete the study, we performed the following:

- Obtained an understanding of the existing end-to-end DSM planning and implementation thereof at EfficiencyOne by conducting interviews with key EfficiencyOne personnel involved in the DSM cost and energy savings planning and implementation processes thereof and reviewing documentation related to the 2014, 2015, 2016-2018, the 2019, and the 2020-2022 DSM planning processes, including identifying relevant operating parameters and constraints on these plans. We also reviewed documentation on implementation of the DSM Resource Plans and the impact of the associated performance metrics
- Obtained an understanding of sources and reports used to inform the development of the DSM Resource Plan for 2013, 2014, 2015, 2016-2018, 2019 and 2020-2022
- Obtained an understanding of cost and energy saving models, estimates, and formulas used by EfficiencyOne and tools and third-party service providers engaged in the modelling process of the plan
- Observed the process to support and evidence the process description as provided by EfficiencyOne
- Documented the current state of the process through process flows and validate the flows with EfficiencyOne's Management
- Gathered an understanding of DSM cost and energy saving planning process, sources and key assumptions evolution over time to understand potential impact on EfficiencyOne's future estimates and plans
- Identified what is working well with the current processes and identified areas for improvement based on leading practices (if any) based on a jurisdictional scan of similar organizations.



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Our procedures included identifying and assessing how DSM costs were/are estimated. To do this, we required from EfficiencyOne:

- A listing of all cost categories for all DSM periods in scope (as noted above) and their associated cost assumptions and rationale used in estimation. We discussed these cost categories, assumptions, cost drivers, and rationale with management to understand how they are compiled.
- Details of program mix proposed versus actually implemented
- Estimated measures versus actual measures
- Variance analysis of projected costs and energy savings versus actual experience/performance and Management's view on why variances occurred.

We also conducted interviews with key members of EfficiencyOne to identify why and how the plan assumptions and the plan implementation experience was different.

For both cost projections and energy saving estimates, we performed the following:

- Assessed the assumptions used in estimating and the actual performance versus the assumptions and why or why not did the assumptions prove to be accurate
- Identified the rationale for these assumptions
- Identified what information was used to develop the assumptions and estimates
- Identified where and why variances occurred between actual performance and estimates.
- We interviewed two other jurisdictions for our jurisdictional review. Jurisdictions have been selected by KPMG in collaboration with EfficiencyOne. EfficiencyOne was responsible for contacting the other jurisdictions, requesting their participation, and booking the interview with KPMG. EfficiencyOne was responsible for requesting and securing the other jurisdictions' permission that the information provided by them may be included in our report. We developed a standard interview guide for each jurisdiction to guide our interview with them. Our review of the other jurisdictions was inquiry based only and we did not attempt to audit or verify the information provided by the other jurisdictions. The jurisdictional review was contained to a one-hour interview with the jurisdiction. The jurisdictional review did not involve reviewing supplementary information or other information related to the jurisdiction.

The participation by the other jurisdictions was completely voluntary. We did not provide the findings from the jurisdictional review to the participating jurisdictions and did not develop a stand-alone deliverable from the jurisdictional review. Relevant findings from the jurisdictional review are included in this report.



Appendix B EfficiencyOne approach to plan development

The below following overviews outline the approach to developing the DSM Resource Plans from 2015 to 2020-2022, as outlined by EfficiencyOne.

Overview of 2015 DSM Resource Plan

2015 was the transition year from Efficiency Nova Scotia Corporation to Efficiency Nova Scotia (ENS) Franchise; therefore, the 2015 DSM Resource Plan was designed as a Continuation Plan that did not take a modelling approach. However, the 2015 DSM Resource Plan was to meet the requirements of the new legislation.

In 2015, legislation limited the dollar amount to be spent on electricity efficiency and conservation activities to not more than \$35 million, plus any funds remaining as a result of underspending by ENSC in 2013. Within the 2015 DSM Resource Plan, EfficiencyOne requested that it be permitted to invest the surplus available from 2013, which totalled approximately \$4 million. This gave it a total budget of \$39 million for 2015 activities.²⁷ The Plan was based on historical experience, market research and evaluated savings results and was a continuation of actual 2013 and 2014 activities.

Approach by EfficiencyOne

As the 2015 DSM Resource Plan was a Continuation Plan, it was not modelled with assistance by a third-party and, as such, did not require the model inputs of incentive cost and admin cost.

Overview of 2016-2018 DSM Resource Plan development

For the development of the 2016-2018 DSM Resource Plan, EfficiencyOne engaged Navigant Consulting to provide planning and modelling support. The following outlines the methodology undertaken by EfficiencyOne to estimate the incentive, admin and enabling strategy costs for the 2016-2018 DSM Resource Plan.

2016-2018 incentive costs and customer participation – model input approach by EfficiencyOne

The total incentive costs included in the Plan investment, as calculated by the model, are the result of the incentive cost and the customer participation rates assumed at a measure level. Customer participation levels were an output of the model (in kWh) and were not an input provided by EfficiencyOne.

2016-2018 admin costs – model input approach by EfficiencyOne

As identified by EfficiencyOne, admin costs are all other remaining costs after the incentive costs have been excluded. EfficiencyOne used the most recent audited full year of the 2013 Cost Allocation Model (CAM) outputs and the 2013 evaluation results of the first-year energy savings at the NSUARB program level to calculate the admin costs for the model input. The total CAM output by program was reduced by those costs defined as incentive costs for model input, with the remaining balance used as the admin cost.

²⁷ 2015 DSM Resource Plan Evidences and Appendices A-D



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The admin cost at the NSUARB program level was divided by first-year energy savings achieved by the program to calculate the admin cost rate per kWh. This admin cost rate was an input into the model and applied to each measure within the applicable program to allocate admin cost.

EfficiencyOne identified that for two programs in 2016-2018, the admin cost was adjusted by EfficiencyOne to reflect upcoming changes to the program.

2016-2018 Enabling Strategies – approach by EfficiencyOne

The level of investment for the 2016-2018 Enabling Strategies was informed by the 2014 actual spending level. The Enabling Strategies costs are not part of the modelling process. EfficiencyOne leverages the most current cost information and makes any adjustments necessary based on plans to run new initiatives or pilots. Enabling Strategies also include costs to develop and defend a DSM Resource Plan. EfficiencyOne identified that the increase in costs in the 2017 and 2018 Plans was to account for the development and defense of the 2019-2021 DSM Resource Plan. EfficiencyOne estimated the cost to develop and defend the 2016-2018 DSM Resource Plan was \$1.2 million, which is the basis for the estimate.

The 2016-2018 DSM Resource Plan Compliance Filing reduced the Enabling Strategies as per the reduction ordered by the NSUARB. The reduction order by the NSUARB was 14%, 15% and 18% in 2016, 2017 and 2018, respectively, while maintaining the planned energy savings targets.

Overview of 2019 DSM Resource Plan

The 2019 DSM Resource Plan was a Continuation Plan and was not modelled. As outlined in the 2019 DSM Resource Plan, EfficiencyOne developed the Plan based on the average annual budget in the NSUARB approved 2016-2018 DSM Resource Plan and based on the set 2019 DSM investment amount of not greater than \$34.05 million as outlined in the *Electricity Plan Implementation (2015) Act*.²⁸

2019 DSM Resource Plan – approach by EfficiencyOne

As a result of EfficiencyOne's decision to approach 2019 as a Continuation Plan, the 2019 DSM Resource Plan was not informed by third-party modelling. As such, there were no measure level inputs, including incentive and admin cost.

To prepare the first version of the Plan and to document assumptions, the Program Managers for each program component were provided with a template to complete. This included insight into any market transformations and saturations. There were various iterations of the Excel-based 2019 DSM Resource Plan.

Overview of 2020-2022 DSM Resource Plan development

In the development of the 2020-2022 DSM Resource Plan, EfficiencyOne engaged Navigant Consulting to provide modelling support. EfficiencyOne worked with Navigant to determine the inputs into the model at the measure level.

The 2020-2022 DSM Resource Plan Application was subject to a regulatory process as determined by the NSUARB.

²⁸ 2019 DSM Resource Plan Evidence with Appendices A-D



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The following outlines the methodology undertaken by EfficiencyOne to estimate the incentive, admin and enabling strategy costs for the 2020-2022 DSM Resource Plan.

2020-2022 incentive costs and customer participation – model input approach by EfficiencyOne

The total incentive costs included in the Plan investment are the result of the incentive cost and the customer participation rates by measure.

Per EfficiencyOne, for each program component measure, the 2017 actual incentive costs and/or 2018 rebates by measure were used to inform the incentive cost included in the input table.

In its decision following the 2016-2018 DSM Resource Plan, the NSUARB required EfficiencyOne to implement an enhanced approach for determining incentives. In response, EfficiencyOne implemented a new Incentive Setting Process (ISP) in 2018. This followed the NSUARB accepted Incentive Setting Methodology report and Implementation Plan filed by EfficiencyOne on May 11, 2017.

In 2017, EfficiencyOne conducted an initial review of current incentives against the thresholds in the new incentive setting methodology. Since 2017, any new measures were subject to the ISP, as were any measures that were receiving incentive updates.

EfficiencyOne outlined that all incentives within the 2020-2022 DSM Resource Plan were assessed as part of the Plan development process. EfficiencyOne explained that this meant that all existing incentives were compared against the thresholds in the incentive setting methodology. Any new initiative incentives were subject to the full ISP. EfficiencyOne leveraged a third-party during this time to obtain updated information for this assessment. This was the third-party consultant EfficiencyOne had engaged in the development of the new ISP.

For each program component, an Incentive Review workbook was developed. This outlined, for each measure within a program component, any adjustments to incentives made as a result of staff review of the input tables. Per EfficiencyOne, these incentive adjustments were based on staff experience and knowledge of trends for the program component and measures. This information was included within the Incentive Review workbooks.

For customer participation rates, EfficiencyOne explained that the rates by measure were initially informed by the 2017 actual results by measure and were adjusted within the model.

These customer participation levels were then reviewed and updated based on a review by staff. As confirmed by EfficiencyOne, as customer participation rates are a driver of energy savings and all costs, changes to these customer participation rates occurred several times during the various iterations of the model and vetting process. This process ultimately determined the customer participation rates by measure for the final run of the model and were subsequently included in the final DSM Resource Plan as filed with the NSUARB.

2020-2022 admin costs – model input approach by EfficiencyOne

EfficiencyOne stated that the methodology applied to estimate and allocate the admin cost in 2020-2022 DSM Resource Plan was consistent with that which was followed in the 2016-2018 DSM Resource Plan, but at a program component level rather than NSUARB program level. The admin costs were based on the 2017 audited CAM output by program component level, reduced by direct incentive costs. The 2020-2022 DSM Resource Plan had the following differences from the 2016-2018 DSM Resource Plan:



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- A list of new demand savings measures had been introduced and included in the Plan. Such measures do not produce energy savings but rather reduce the demand for electricity at system utility peak hours. For these new measures, the admin cost was allocated based on average admin cost rate per measure unit.
- To account for any new initiatives and additions or changes to the existing program components, EfficiencyOne estimated the additional admin cost required and the additional energy savings to be achieved. The costs were then added to the 2017 total admin costs per program component and divided by the new estimated energy savings to determine the admin cost rate per kWh.

2020-2022 Enabling Strategies – approach by EfficiencyOne

Similar to the 2016-2018 and 2019 DSM Resource Plans, EfficiencyOne identified that the Enabling Strategies investment for the 2020-2022 DSM Resource Plan was informed by historical spend and were not part of the modelling process.

EfficiencyOne identified in the 2020-2022 DSM Resource Plan that an increase in investment in Enabling Strategies was linked to new initiatives. These new initiatives, in addition to existing programs, included investing in new pilot programs, research into new technologies and measures to prepare for future DSM, and demand response/reduction. The 2021 and 2022 costs were projected to be higher with the development and defense of the 2023-2025 DSM Resource Plan.