

EfficiencyOne

IN THE MATTER OF: The Public Utilities Act

- and -

IN THE MATTER OF:
EfficiencyOne 2024 Q3 Demand Side Management Report

M11983

EfficiencyOne Responses to Information Requests (RIRs)

E1 (NSUARB) RIRs 01-07

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Request IR-01:

In EfficiencyOne's (EOne) Q3 2024 Demand Side Management Report (Q3 Report), EOne noted that a billing analysis to update the HOT2000 modelling software overestimation ratio was planned for the 2024 DSM Evaluation.

(a) How does the HOT2000 model calculate energy savings, and what factors contribute to the overestimation ratio that may impact forecasted results?

(b) What methodology was used in the recent billing analysis to adjust the HOT2000 model's overestimation ratio, and how does this impact overall energy savings projections?

(c) Please provide examples of when the HOT2000 overestimation ratio was notably high, and what corrective actions were taken to address it?

(d) What is the current overestimation ratio for the HOT2000 model, and how does it compare to previous years or historical trends?

(e) How often is the HOT2000 model recalibrated using real-world billing data, and is this process done on an annual basis or as needed based on data updates?

Response IR-01:

(a) HOT2000 is an energy simulation modelling software developed and maintained by Natural Resources Canada. As a subscriber to the HOT2000 software, EfficiencyOne (E1) is not responsible for the model itself. The HOT2000 model calculates energy savings by simulating a buildings' energy consumption based on its design features (like insulation

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1 levels, window types, HVAC systems), allowing users to compare the energy use of a
2 baseline design (e.g., pre-upgrades) to a modified design (e.g., post-upgrades) showing the
3 difference in energy consumption between the two scenarios; this difference represents
4 the calculated energy savings.

5
6 The HOT2000 model can overestimate energy savings primarily because it often makes
7 simplifying assumptions about building construction and occupant behaviour. Factors such
8 as inconsistent installation quality and variable homeowner usage patterns can lead to
9 overestimation of energy efficiency measures in the model as compared to in-operation
10 conditions. The version of HOT2000 being used and the type of space heating equipment
11 being modelled can impact the overestimation ratio determined in a billing analysis,
12 compared to previous overestimation ratios.

13
14 E1 calculates space heating energy savings for building envelope and space heating
15 measures using the electrical space heating energy consumption obtained from HOT2000
16 for specific program components such as Home Energy Assessment. The reduction
17 between the electrical space heating energy consumption at the pre (D) and post (E)
18 assessments are adjusted by applying the overestimation ratio (depending on the heating
19 system in place during the D and E assessments).

20
21 The overestimation ratios are established by E1's independent evaluation consultant and
22 are used to adjust the modelled consumption values generated by HOT2000 to account for
23 the software tending to overestimate savings. For each participant in the billing analysis, a
24 regression model was built to express the energy consumption and compared to the
25 heating consumption obtained in the HOT2000 software to calculate the overestimation
26 ratios.

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1 (b) As part of the 2024 DSM Evaluation, E1's independent evaluation consultant, Econoler, is
2 performing a billing analysis for the Home Energy Assessment program component. The
3 billing analysis will obtain measured electrical energy savings generated through the
4 installation of energy efficiency upgrades. Using energy consumption advanced metering
5 infrastructure (AMI) data, the analysis will compare the electricity consumption of current
6 Home Energy Assessment participants before and after their participation (treatment
7 group), and past Home Energy Assessment participants (comparison group) whose
8 variation in electricity consumption is then deducted from that of the treatment group to
9 eliminate impacts that are not due to the program. It will also include a survey with
10 treatment participants to identify participants who did not make other changes to their
11 homes (e.g., adding square footage or begin heating a part of their home that previously
12 was not heated) and only these participants will be included in the billing analysis to
13 measure the real impact of the program. Econoler plans to use the savings values obtained
14 with the energy consumption AMI data to develop adjustment ratios that can be directly
15 applied to the savings estimates obtained from HOT2000.

16
17 Details on the methodology used in the 2024 DSM Evaluation billing analysis and results
18 will be described in the 2024 DSM Evaluation Reports, which are expected to be filed March
19 31, 2025.

20
21 2024 tracked savings as reported in E1's quarterly DSM reports have accounted for
22 HOT2000's trend of overestimating savings by using an overestimation ratio.

23
24 (c) The last billing analysis that resulted in conclusive results was performed for Home Energy
25 Assessment by Econoler as part of the 2018 DSM Evaluation¹ to revise the overestimation

¹ M09096, Exhibit 5, Efficiency Nova Scotia 2018 DSM Evaluation Reports, Existing Residential Program, page 8 and Appendix II, March 27, 2019

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1 ratios for the new version of HOT2000 at that time, version 11. The billing analysis served
2 to compare each participant's electricity billing consumption to the electricity consumption
3 obtained from the HOT2000 simulation models. The 2018 billing analysis resulted in an
4 overestimation ratio for three scenarios:

- 5 • A participant who registered with a heat pump: overestimation ratio = 0%
- 6 • A participant who registered without a heat pump and who did not install one = 19%
- 7 • A participant who registered without a heat pump and then installed one = 19%

8
9 To address overestimation of savings by HOT2000 modelling software, E1's evaluation
10 consultant establishes overestimation ratios through the DSM Evaluation. E1 applies the
11 overestimation ratios established by the evaluation consultant to the tracked savings for
12 program components that use HOT2000 modelling software to calculate savings. As part of
13 the 2024 DSM Evaluation, a billing analysis is planned for Home Energy Assessment to
14 establish an adjustment ratio for HOT2000 which E1 expects to apply to tracked savings in
15 2025 for programs with HOT2000 modelled savings.

16
17 Econoler determined E1's HOT2000 overestimation ratios in 2015 and 2018 and analyzed
18 by D and E Assessment as presented in Table 1 below.

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Table 1: E1's 2015 and 2018 Overestimation Ratios for HOT2000²

Scenario	Overestimation Ratio D Assessment		Overestimation Ratio E Assessment	
	2015	2018	2015	2018
A participant who registered with a heat pump	16%	0%	16%	0%
A participant who registered without a heat pump and who did not install one		19%		19%
A participant who registered without a heat pump and then installed one		19%		0%

(d) Please see E1's response to part (c) of this IR response.

(e) E1's independent evaluation consultant recommends when billing analyses should be performed to update overestimation ratios for HOT2000, which is done on an as needed basis. The overestimation ratios were updated in 2018 to account for the new version of HOT2000 as well as the increased use of heat pumps compared to the last billing analysis in 2015. The evaluation consultant performed a billing analysis as part of the 2023 DSM Evaluation for Home Energy Assessment³, the results of which were inconclusive. The most recent billing analysis to establish overestimation ratios for HOT2000 is being performed as part of the 2024 DSM Evaluation, which is expected to be filed March 31, 2025.

² M09096, Exhibit 5, Efficiency Nova Scotia 2018 DSM Evaluation Reports, Existing Residential Program, page 17 - Table 12, March 27, 2019

³ M11630, Exhibit 2, EfficiencyOne 2023 DSM Programs Evaluation Reports, Existing Residential Program, page xvii and Appendix IV (HEA Detailed Methodology and Billing Analysis Results), April 1, 2024

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Request IR-02:

The original forecast for first-year energy savings in the 2024 plan for the Existing Residential Programs was set at 58.8 GWh with an associated investment of \$22.5 million. Mid-course adjustments reduced the energy savings forecast to 46.5 GWh at a cost of \$19.7 million, and the year-end forecast now projects 43.2 GWh in savings with a revised cost of \$22.7 million. This represents a reduction of 15.6 GWh in energy savings, yet the overall cost has increased.

(a) Please explain the factors driving this cost increase despite the reduction in energy savings?

(b) Specifically, the original forecast indicated a unit cost of \$0.38 per kWh of savings, the mid-year adjustment raised this to \$0.42, and the current year-end forecast reflects a cost of \$0.53 per kWh. What is driving the rising cost per kWh of savings, and how does this align with program efficiency.

Response IR-02:

(a) The cost increase despite the reduction in energy savings seen in the 2024 year-end forecast for Existing Residential, as compared to the Plan as Approved estimates for 2024, is largely driven by the increase in unit cost for the Residential Behaviour program component.

The 2024 Plan as Approved savings for Residential Behaviour was 29.8 GWh, which was reduced to 8 GWh in the mid-course adjustment, and to 4.4 GWh in the current year-end forecast. The reduction from 29.8 GWh to 8 GWh was the result of EfficiencyOne (E1) having the benefit of a recent, updated forecast from its delivery agent, Bidgely. The Plan

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number relied on information from the DSM Plan modeler based on their experience in other jurisdictions and the results from E1's previous Home Energy Report program delivered in 2014-2015. Bidgely's forecast considered several factors including weather and the impact that other energy efficiency programs may be having on customer usage, as well as Bidgely's more recent experience with similar programs in other jurisdictions, and with NS Power customer consumption data. Based on Bidgely's forecast, savings per participant were significantly lower than had been set out in the Plan. The delayed launch of Residential Behaviour also negatively impacted savings as it meant participants would not be receiving reports for a full 12-month period in 2024 and during most of the 2024 heating months (when usage is typically greatest in Nova Scotia). The reduction from 8 GWh to 4.4 GWh in the latest year-end forecast is the result of E1 further refining expectations following the program component launch on April 30, 2024 and as it tracked progress over the first few months. With time required for participants to begin acting on energy savings reports and tips, much of 2024 is expected to be a ramp up period of lower savings.

Spending remains aligned with program efficiency as it reflects a period of ramp up for Residential Behaviour, which remains an important component of the Existing Residential program. The Residential Behaviour program component targets a significant portion of the residential market of over 260,000 customers and there are no financial barriers for Nova Scotians to participate. Residential Behaviour also serves as a conduit for increasing awareness and participation in other E1 programs.

(b) Please see E1's response to part (a).

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Request IR-03:

The Instant Savings Program was initially forecast to achieve 9.2 GWh in savings at \$3.5 million, but the forecast was revised to 12.5 GWh at \$4.5 million mid-year, and 15.1 GWh at \$6.5 million by year-end. Despite higher energy savings being achieved, the unit cost per kWh saved for the Instant Savings Program increased from \$0.36 in the mid-year forecast to \$0.43 in the year-end forecast. What factors are contributing to this rise in the cost per unit of savings?

Response IR-03:

The mid-course adjusted target of 12.5 GWh with an investment of \$4.5 million was set in April, prior to a decision in Q3 to further increase rebates for certain LED lighting products during Instant Savings' fall campaign. Rebates of up to 70% off these eligible lighting products were introduced in the Instant Savings spring campaign, as 2024 is the last year rebates will be offered on them before they are considered baseline in 2025. Rebates for these same products were increased to up to 80% off for the fall campaign, as a last chance for Nova Scotians to benefit from rebates on these products. Higher rebates were introduced in both the spring and fall campaigns for certain LED lighting products to capture remaining potential for these products before baseline changes in 2025. The higher rebates, the high uptake in the spring campaign, and the expected high uptake in the fall campaign are the main contributors to the rise in the Instant Savings unit cost.

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Request IR-04:

The Residential Behaviour Program was initially forecast to achieve 29.8 GWh in savings at a cost of \$2.2 million, but this was revised mid-year to 8 GWh at \$2.7 million, and the year-end projection now shows 4.4 GWh at \$2.5 million.

(a) Please provide insight into the reasons behind the significant reduction in energy savings for the Residential Behaviour Program, from the original forecast to the current year-end estimate.

(b) Furthermore, why has the cost per GWh of savings increased, despite the reduction in total savings? How are changes in participant engagement, or behavioral outcomes impacting the cost and effectiveness of this initiative?

Response IR-04:

(a) The 2024 Plan target for Residential Behaviour was 29.8 GWh in energy savings, which was reduced to 8 GWh in the mid-course adjustment, and to 4.4 GWh in the current year-end forecast. The reduction from 29.8 GWh to 8 GWh was the result of EfficiencyOne (E1) having the benefit of a recent, updated forecast from its delivery agent, Bidgely. The Plan number relied on information from the DSM Plan modeler based on their experience in other jurisdictions and the results from E1's previous Home Energy Report program delivered in 2014-2015. Bidgely's forecast considered several factors including weather and the impact that other energy efficiency programs may be having on customer usage, as well as Bidgely's more recent experience with similar programs in other jurisdictions, and with NS Power customer consumption data. Based on Bidgely's forecast, savings per participant were significantly lower than had been set out in the Plan. The delayed launch of

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1 Residential Behaviour also negatively impacted savings as it meant participants would not
2 be receiving reports for a full 12-month period in 2024 and during most of the 2024 heating
3 months (when usage is typically greatest in Nova Scotia). The reduction from 8 GWh to 4.4
4 GWh in the latest year-end forecast is the result of E1 further refining expectations
5 following the program component launch on April 30, 2024, and in tracking progress over
6 the first few months. With time required for participants to begin acting on energy savings
7 reports and tips, much of 2024 is expected to be a ramp up period of lower savings.

8
9 (b) The cost per GWh of savings has increased, despite the reduction in total savings because
10 although the average savings per participant are lower than assumed in the Plan as
11 Approved, the number of participants has increased. Participation is close to double what
12 was estimated in the 2023-2025 DSM Plan for 2024 (131,379 for 2024 in the Plan; 243,562
13 in Q3 2024 year-to-date participation results), so although savings per participant are
14 lower, costs associated with sending the reports and delivering the Residential Behaviour
15 program component remain unchanged or have increased slightly with the higher level of
16 participation.

17
18 2024 reflects a period of ramp up for Residential Behaviour and the cost and savings results
19 of the program component will continue to be tracked and reported by E1. As discussed
20 above, the average savings per participant are expected to be lower than estimated in the
21 2023-2025 DSM Plan. The Residential Behaviour program component is currently
22 undergoing its first evaluation for the 2024 program year. The evaluation is being
23 conducted by E1's independent evaluation consultant and will be detailed in the 2024 DSM
24 Evaluation Reports, which are expected to be filed on March 31, 2025. In addition to
25 generating energy savings, Residential Behaviour is an important part of the Existing
26 Residential program as it targets a significant portion of the residential market and there

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- 1 are no financial barriers for Nova Scotians to participate. Residential Behaviour also serves
- 2 as a conduit for increasing awareness and participation in other E1 programs.

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Request IR-05:

In the Q3 Report EOne noted that participation in the Small Business Energy Solutions program has been relatively low year-to-date. However, several program adjustments made in Q2—including increasing the eligibility cap from 350,000 kWh to 600,000 kWh in annual energy consumption, extending the pre-approval window from 120 days to 180 days, and raising unitary incentives across the measure catalog—are reported to have positively impacted participation in Q3, with an even larger boost expected in Q4.

(a) Please provide further insights into how these changes have influenced Q3 participation levels and early trends in Q4?

(b) Based on the adjustments made, what percentage increase in participation or energy savings does EOne anticipate for Q4 2024 and the remainder of the 2023-2025 plan period (i.e., through 2025)?

(c) Are there additional strategies or initiatives being implemented to accelerate participation and improve program performance during Q4 and throughout the remainder of the plan period?

Response IR-05:

(a) Small Business Energy Solutions saw a 43% increase in participation, in Q3 compared to Q2 (13,275 products in Q3, compared to 9,313 products in Q2). Q3 2024 was also the highest quarterly participation achieved by Small Business Energy Solutions to date in the 2023-2025 Plan. Early indications for Q4 are that participation will exceed Q3 participation.

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1 (b) The year-end forecast in the Q3 Report shows that EfficiencyOne (E1) expects Small
2 Business Energy Solutions to achieve 10.1 GWh in energy savings in 2024, indicating
3 approximately 4.2 GWh is expected in Q4, adding to the 5.9 GWh that had been achieved
4 year-to-date at the end of Q3. All 2024 results, including Q4, are currently being evaluated
5 and final evaluated results will be reported in E1's Annual Progress Report being filed March
6 31, 2025. An updated forecast for the 2023-2025 Plan (that includes 2023 and 2024 actual
7 results and the forecast for 2025) will also be provided in that Annual Progress Report. E1
8 is in the process of finalizing its forecast and program expectations for 2025.

9
10 (c) Several marketing initiatives were undertaken throughout 2024 to promote participation
11 in Small Business Energy Solutions, including a year-round marketing campaign, and a
12 contractor campaign in Q4 that targeted lighting and heating, ventilation and air
13 conditioning (HVAC) contractors on the benefits of Small Business Energy Solutions for
14 them and their customers. Marketing efforts will continue in 2025, with details of those
15 activities to be outlined in 2025 quarterly and annual reporting.

16
17 E1's business development and energy manager teams also drive participation in Small
18 Business Energy Solutions, by reaching out to, and working with, small businesses who may
19 qualify for the program component.

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Request IR-06:

In the notes to Table 2, EOne stated that Residential Behaviour participation is defined as the number of unique participants who have received an Efficiency Insights Report, with participation fluctuating month-to-month based on customer billing cycles. Quarterly participation is represented by the highest monthly participation achieved in that period, and year-to-date participation reflects the highest monthly participation achieved year-to-date.

(a) Please clarify whether the participation metrics for the Residential Behaviour Program include only new customers who are reviewing their reports for the first time, or if they reflect all customers, including those who have already participated in the past and are reviewing their reports again?

(b) How many eligible customers have not yet received the Efficiency Insights Report, despite being eligible for it? Is there any specific reason or barrier that might be preventing these customers from receiving or engaging with their report?

(c) What system or methodology does EOne use to track the receipt and engagement with the Efficiency Insights Report? How does the utility ensure that the reports are successfully delivered to eligible customers, and how is receipt confirmation monitored?

Response IR-06:

(a) The participation metrics for the Residential Behaviour program component reflect all unique customers, including those who have received reports previously. In 2024, each Residential Behaviour participant will receive up to four reports, tied to their bi-monthly NS Power billing cycle. Each report is customized to the unique customer and related NS

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1 Power billing cycle thereby offering customer energy savings opportunities through each
2 report.

3
4 (b) Approximately 21,000 eligible customers have not received an Efficiency Insights Report.
5 There is a subset of customers whose mailing address or email address on file has an error,
6 is incomplete, or is not valid. EfficiencyOne (E1) is working to gather and update as many
7 addresses as possible from customers to maximize report dissemination. The other core
8 group of customers not receiving reports have ended their service with NS Power or
9 transitioned to solar since they were selected for the Residential Behaviour treatment
10 group, meaning they are no longer eligible and will not receive reports going forward. Note:
11 Residential Behaviour participants must have an active NS Power account and at least 13
12 months of billing data to be selected for either the treatment group (those who receive
13 reports) or the control group (those who do receive reports). E1's evaluator, Econoler,
14 selects the treatment and control groups.

15
16 (c) E1 contracted a delivery agent to provide E1's Residential Behaviour program component.
17 This delivery agent is responsible for generating and issuing reports to participants and
18 monitoring and reporting key performance indicators to E1, including the status of emailed
19 reports (number of reports that have been sent, delivered, opened, clicked), and mailed
20 reports (number of reports that have been sent). The delivery agent also monitors user
21 feedback from email reports (number of email like/dislike votes, and other detailed
22 feedback provided by users).

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Request IR-07:

The forecast for Enabling Strategies’ costs has increased from \$5.4 million in the mid-year forecast to \$6.7 million in the year-end forecast, reflecting a 24.1% increase in costs.

(a) Please provide an explanation for the factors driving this cost increase of \$1.3 million (24.1%) in the Enabling Strategies component?

(b) What specific elements have contributed to this increase, and how does it align with the overall program goals and expected outcomes?

(c) Are there specific metrics or performance indicators used to assess the effectiveness of the various components within the Enabling Strategies, such as Education and Outreach, Development and Research, and Other Enabling Strategies?

Response IR-07:

(a) The increased spending forecast for Enabling Strategy is being driven by the “Other Enabling Strategies” category, Regulatory Affairs, and includes DSM Plan development and reporting, Demand Side Management Advisory Group engagement, and other regulatory initiatives (e.g., participation in non-DSM Plan regulatory matters). The other two Enabling Strategies categories – Education and Outreach, and Development and Research – are forecast to be at or below their mid-course adjusted investment levels.

(b) In the Other Enabling Strategies category, costs are forecast to be above mid-course adjusted investment levels specifically driven by the development of the next DSM Plan. The increase in costs is primarily related to third-party support inclusive of the

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1 implementation of the NSUARB directive to review and develop an optimal benefit cost
2 analysis (BCA), consideration of new DSM resources such as strategic electrification, solar-
3 PV and market transformation as a program delivery approach, and modelling and
4 assumption updates. Increased costs for stakeholder engagement related to the BCA and
5 DSM Plan development are also reflected in the forecast. Meaningful stakeholder
6 engagement continues to be important during the development stage to enhance
7 transparency, demonstrate consideration of stakeholder feedback, and achieve greater
8 alignment with stakeholders prior to filing an application with the regulator.

9
10 (c) It is more challenging to assess the effectiveness of the Enabling Strategies program than it
11 is to assess energy efficiency or demand response programs, as the impact of many
12 Enabling Strategies activities (particularly Education and Outreach, and Development and
13 Research categories) are represented in, and contribute to, the participation and energy
14 savings results of energy efficiency and demand response programs generally. As noted in
15 EfficiencyOne's (E1) 2019 DSM Resource Plan, "Energy savings are not attributed directly
16 to Education and Outreach activities. Rather energy savings are captured through
17 participation in the individual DSM programs that benefit from these broader activities."¹

18
19 Despite that challenge, and in an effort to provide insights into Enabling Strategies, E1
20 provides updates and information about each Enabling Strategy component in its quarterly
21 and annual reporting on the 2023-2035 DSM Plan. In those reports, several metrics are
22 detailed, such as:

- 23 • ongoing tracking of the number of Efficiency Preferred Partner network members;
- 24 • the number of schools participating in the Green Schools program;

¹ M08604, EfficiencyOne, 2019 DSM Resource Plan, Appendix A, page 16-17

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- 1 • describing how surveys are being used to enhance programs and the participant
2 experience;
- 3 • listing the reports filed and stakeholder engagement that has been completed by
4 E1's Regulatory team; and
- 5 • providing updates on the contributions E1 has made to codes and standards
6 development in Canada.