Nova Scotia Utility and Review Board

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 a Supply Agreement for Electricity Efficiency and Conservation Activities between EfficiencyOne and Nova Scotia Power Inc., the establishment of a final agreement between the parties and approval of a 2016-2018 Demand Side Management ("DSM") Plan (M06733).

2016-2018 DSM Plan

Nova Scotia Power Evidence

April 10, 2015

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1.0 EXECUTIVE SUMMARY

Nova Scotia Power Incorporated ("NS Power" or "Company") supports the acquisition of affordable and cost-effective demand side management ("DSM") that will help provide stable, predictable and affordable electricity prices for Nova Scotians. Between September, 2014 and February, 2015, NS Power was actively engaged in negotiating with EfficiencyOne ("E1") towards a three year agreement for the supply of DSM. From the outset of those negotiations, NS Power sought to establish a supply agreement that was transparent, affordable and in the best interests of NS Power customers. In NS Power's view, the DSM plan proposed by E1 and included with its application ("E1 DSM Plan") does not go far enough in considering affordability for Nova Scotia Power customers.

The E1 DSM Plan is neither cost-effective nor affordable when measured in the context of the following:

- E1 DSM Plan recommends DSM spending that is among the highest in Canada on both a per-capita basis and a per-customer basis;

- the level of DSM proposed by E1 is significantly more than required to avoid capacity investments by NS Power; and

- additional demand side management is not needed during the current contract period for compliance with Nova Scotia's Renewable Electricity Standards or to meet power system demand.

NS Power recommends a DSM plan with a spending level of approximately $22 million per year. Such a DSM plan would be consistent with the average cost per kWh of DSM spending among Canadian jurisdictions surveyed with DSM programs. It also mitigates

rate pressure for customers and avoids resource additions for capacity planning purposes until 2032.

During the course of contract negotiations, NS Power had requested E1 to model a $10 million per year DSM plan and plans at increasing $10 million increments up to the level proposed by E1. NS Power also submitted an information request ("IR") to E1 in this proceeding requesting a DSM plan within an annual $20 million dollar investment level.[1] E1 has refused to produce such a plan. Indeed, E1 did not develop any such lower cost scenarios as part of its DSM plan development process thereby limiting the ability of NS Power and other stakeholders to make informed decisions.[2] Instead, E1 has put forward a plan which will continue to place Nova Scotia among the highest in Canada for DSM spending on both a per capita and per customer basis.

Beyond the high spending level, E1 has also requested a considerable level of autonomy and flexibility be afforded to E1 under the E1 DSM Plan. In particular, NS Power is concerned, among other things, with the following items:

- the adequacy of the description and understanding of the scope of DSM services;
- the proposal of a three year cumulative deliverable target rather than annual deliverables;
- providing E1 with broad decision-making authority for the potential shifting of budgets among programs or altering the design of the portfolio;
- compensation that is proposed to be paid to E1 over the course of the contract but based on E1 achieving the cumulative energy and demand savings at the end of the three year contract period; and

[1] E1 (NSPI) IR-14, March 27, 2015, page 1, lines 3-6.
[2] E1 (NSPI) IR-26(b), March 27, 2015, page 1, lines 26-28.

- the creation of a "reserve fund" financed by NS Power customers with 50 percent of any surplus balance being placed in a reserve fund for the benefit of E1 and the remaining 50 percent being returned to NS Power as an offset to the next supply agreement.[3]

NS Power requests E1 be directed to redesign its DSM plan with a more appropriate portfolio of programs and spending level. In NS Power's view, a DSM plan in the best interests of NS Power customers would provide DSM funding of approximately $22 million dollars per year over the Contract Period and contain more complete and transparent program information. This level of expenditure, in combination with non-administrator energy savings initiatives such as NS Power's program with Clean Nova Scotia, would achieve energy savings of approximately 100 GWh per year with the associated demand savings and, based on NS Power's 2014 Integrated Resource Plan ("2014 IRP"), would enable NS Power to avoid adding any additional generation capacity until 2032.[4] It would also be consistent with the average (per customer) DSM expenditures of other Canadian jurisdictions. NS Power believes this is an appropriate DSM plan to achieve DSM goals and still remain affordable for NS Power customers.

In addition to developing a lower cost DSM plan, NS Power also makes, among others, the following specific requests in respect of E1's Application:

- The contract price to be paid by NS Power under the Supply Agreement be allocated on an annual basis over the 3 year Contract Period, such that if E1 does not spend the full annual amount in a given year, it is to be deducted from the amount owing in the following.

[3] EfficiencyOne Evidence, February 27, 2015, page 55.
[4] Please refer to Figure 4.1 on page 34 herein.

- A decision on the allocation and recovery of costs of any approved DSM Plan from NS Power be deferred until an application is made by NS Power.

- E1's request for the establishment of a reserve fund as part of the DSM Plan be rejected.

- EI's request to change the cost-effectiveness testing methodology from TRC to PAC for subsequent DSM plans be rejected.

- A standardized filing for future DSM applications be established.

2.0 INTRODUCTION

As a result of recent amendments to the *Public Utilities Act* (Nova Scotia) ("Act"), the Province of Nova Scotia has created a franchise system for the supply of cost-effective energy efficiency and conservation activities ("EECAs"), commonly referred to in the electric industry as demand side management or "DSM".[5] The first franchise under the Act was granted to E1 effective as of January 1, 2015.

In accordance with the Act, NS Power is now required to enter into an agreement with E1 for the purchase of EECAs over a 3 year term ("Supply Agreement"), commencing on January 1, 2016 and ending on December 31, 2018 ("Contract Period"). The terms of the Supply Agreement are to be negotiated by E1 and NS Power and approved by the Utility and Review Board ("UARB or "Board").

Despite actively negotiating with E1 since September 2014, NS Power and E1 were unable to finalize the Supply Agreement prior to E1 submitting its Application to the Board in this proceeding. The main points of disagreement between the parties are the quantity of DSM that will be in the best interests of NS Power's customers and the corresponding amount NS Power's customers should be required to pay to achieve the savings resulting from such activities. NS Power also disagrees with the level of autonomy and flexibility which E1 is seeking to afford itself in both of these areas. In particular, NS Power refers to the direct testimony of David Pickles, where he finds that E1's request for the flexibility to make significant changes to the approved DSM plan is not appropriate. Mr. Pickles states he is, "not aware of any jurisdiction that gives to the implementer unilateral authority to make such significant changes to the programs."[6]

NS Power supports DSM that will help provide stable, predictable and affordable electricity prices for Nova Scotians. NS Power does not support the plan proposed by

[5] References to "Demand Side Management" or "DSM" are intended to mean energy efficiency and conservation activities or "EECAs".
[6] Please refer to Appendix A, Direct Testimony of David Pickles, April 10, 2015, page 36, lines 15-17.

E1. E1 has proposed a total energy savings from DSM of 405.9 GWh over the Contract Period at an aggregate cost of $121.5 million as compared to NS Power's alternate scenario of approximately 300 GWh of energy savings over the Contract Period (100 GWh per year) for an aggregate spend of approximately $66 million ($22 million per year).

In Section Five of this Evidence, NS Power has outlined an alternative DSM scenario for the Contract Period. NS Power recommends a DSM expenditure of approximately $22 million per year. NS Power's proposed level of savings, in combination with non-administrator energy savings initiatives, is consistent with the "Low Case DSM" produced by E1's predecessor, Efficiency Nova Scotia ("ENS"), in its 2014 DSM Potential Study[7] and modelled by NS Power at E1's request subsequent to the 2014 IRP. NS Power's modelling demonstrates that such a level of energy savings, with its associated demand savings, if continued into the future would enable NS Power to avoid adding any additional generation capacity until 2032. However, the level of expenditure required to achieve this level of savings is much lower for the Contract Period than modelled by ENS in its potential study and the price of the DSM significantly reduced from that proposed by E1 for the Contract Period. The level of expenditure proposed to achieve the noted savings would also be consistent with the average (per customer) DSM expenditure in Canada.

NS Power recently analyzed its capacity and energy needs for the next 25 years in its 2014 IRP. Based on the 2014 IRP results and NS Power's recent analysis, NS Power's proposed level of spending and savings would produce a similar supply-side resource plan to E1's proposed 2016-2018 savings over the next 17 years at approximately half the cost of E1's proposal. While the IRP analysis demonstrates that higher amounts of DSM programming could be economic towards the very end of the twenty-five year planning

[7] Navigant, 2014 IRP, *Nova Scotia 2015-2040 Demand Side Management (DSM) Potential Study, Presented to Efficiency Nova Scotia Corporation*, NSUARB M05522/P-884.14, January 7, 2014.

period, customer impacts can be mitigated by implementing a more affordable level and mix of DSM today.

In accordance with Section 79L(5) of the Act, NS Power seeks to provide the Board with evidence and information to assist it in its approval of a final Supply Agreement for the supply of EECAs to NS Power.

2.1 Transparency and Accountability

The new franchise system created under the Act for the supply of DSM was intended to change the model of DSM delivery in Nova Scotia. Accountability and affordability for NS Power customers are key factors in this new model. Indeed, the Act now deems the franchise holder to be a public utility for the purposes of carrying out its activities.

In NS Power's view, this Application must be viewed in the context of E1's new status as a regulated public utility and the fact that they are proposing to spend $121.5 million of NS Power's customers' money during the Contract Period. Prior to approval, E1 should be subject to the same rigour in demonstrating the prudency of its expenditures as any other public utility.

The requirement for transparency and accountability on the part of E1 in justifying the E1 DSM Plan is clear from the fact that under the Act, the Board can only approve the Supply Agreement if it is satisfied that it is in the best interests of NS Power customers. In making that assessment, the Board must take into account the affordability to NS Power customers. Specifically, Sections 79L(8) and (9) of the Act state as follows:

> (8) The Board shall approve an agreement pursuant to this Section if, in addition to any other matters considered appropriate by the Board, it is satisfied that the agreement, including the proposed electricity efficiency and conservation activities that are the subject of the agreement, **is in the best interests of Nova Scotia Power Incorporated's customers** and satisfies the requirements of Section 79J.

> (9) The Board's assessment of the proposed electricity efficiency and conservation activities for the purpose of the approval **must take into account their affordability to Nova Scotia Power Incorporated's customers**, along with any other matters considered appropriate by the Board or as may be prescribed.
>
> [**emphasis added**]

E1 acknowledges there may be an impact to the rates paid by NS Power customers as a result of the E1 DSM Plan.[8] As a result, NS Power believes this is all the more reason why the Board should be concerned with ensuring a high level of transparency by E1 in the development of a DSM plan for the Contract Period, and providing information in the level of detail required for the Board, NS Power and other stakeholders to make a determination in this matter.

This level of transparency is not reflected in E1's application. As noted in the evidence of David Pickles: "The EfficiencyOne proposal does not support the level of oversight, information, and management supervision necessary to ensure prudent delivery of the programs and is inconsistent with standard industry practice."[9]

NS Power notes the absence of important information from the E1 DSM Plan as well as E1's evasiveness in its responses to many of NS Power's requests for information (both in advance of E1's filing of its application and in response to NS Power's IRs). In particular, NS Power notes the following:

- During the course of negotiation, NS Power had requested E1 model a $10 million per year plan as well as plans at increasing $10 million increments up to the amount of DSM investment proposed annually by E1. This was required because in the absence of lower-cost scenarios, NS Power and customer representatives are left with a single plan presented for consideration by E1, with

[8] EfficiencyOne Evidence, February 27, 2015, page 38.
[9] Please refer to Appendix A, Direct Testimony of David Pickles, April 10, 2015, page 27, lines 16-19.

insufficient details to allow a robust review nor meaningful consideration of alternatives. E1 did not provide these plans.

- NS Power also submitted an IR to E1 in this proceeding requesting a DSM plan within an annual $20 million investment level. NS Power believes the development and presentation of lower levels of DSM expenditure which have a lesser impact on rates is critical to the ability of stakeholders and the Board to make an informed decision. Unfortunately, E1 continues to refuse to provide any such plan and has merely stated in response:

> [E1] did not develop these scenarios as part of its 2016-18 DSM Resource Plan development process so is not able to provide them. Modelling runs, particularly those varying so significantly from current DSM levels, and those with specific limitations as requested by NSPI, take extensive time and effort to complete.[10]

However, in his direct evidence, David Pickles confirmed it is common for planners of energy efficiency portfolios to quantitatively evaluate a wide range of potential programs and expenditures:

> In my experience, yes. Unless directed to spend a specific amount on specific programs, it is common for planners of such portfolios to consider a wide range of program types, designs, and expenditure levels. This typically involves development of several different scenarios which may reflect different incentive strategies, different distribution of funds across customer classes or types, and different perspectives with respect to other key assumptions. In my experience, this is not a particularly time consuming or burdensome task.[11]

- NS Power requested through the IR process that E1 provide updates to the figures in the E1 DSM Plan if it is not in a position to claim the input tax credits ("ITCs"). This information is required by NS Power in order to understand and

[10] E1 (NSPI) IR-14(a), March 27, 2015, page 1, lines 22-25.
[11] Please refer to Appendix A, Direct Testimony of David Pickles, April 10, 2015, page 19, lines 13-20.

assess the impacts, if any, which result if E1 is not able to claim ITCs and also to compare E1's DSM Plan to previous DSM plans. E1 refused to provide this information stating, "ENS has not modelled such a scenario and is therefore unable to provide it."[12]

- NS Power requested through the IR process that E1 provide a comparison of the 8760 hour DSM savings profiles by measure for the initial 8760 DSM profiles provided to NS Power with those used to prepare the E1 DSM Plan. This information is required now to assess the new demand savings estimates proposed by E1. In response, E1 produced 65 pages of data stating that the difference in each of the 8760 hours is -0.000000137.[13] This answer is non-responsive as it incorrectly utilizes flat load profiles (i.e. the load shapes provided appear to be two flat lines, rather than hourly profiles which would be expected to vary by time-of-day and month). NS Power also questions whether the information is correct since it does not correspond to the Final 8760 profile provided in conjunction with E1's Electric Resource Assessment Model ("ELRAM").

- NS Power had requested E1 provide certain information from its data tracking system with respect to past customer participation as well as information with respect to its past custom projects. The DSM programs offered span a number of years and NS Power believes that past performance is an indicator as to future performance. As such, the information would assist in testing the cost effectiveness of the programs. E1 refused to provide the information requested stating both that the individualized detail sought with respect to E1's historical performance was "not relevant" and that "much of the information requested was tracked separately prior to 2014 and it would take an inordinate amount of work to consolidate it."[14] Instead, where E1 stated that it tracked the information it was

[12] E1 (NSPI) IR-16(b), March 27, 2015, page 1, lines 4-5.
[13] E1 (NSPI) IR-17(e) Attachment 2, March 27, 2015.
[14] E1 (NSPI) IR-19 and IR-21, March 27, 2015.

provided to NS Power in the aggregate, making it extremely difficult for NS Power to perform any type of substantive analysis on it.

- E1 provides minimum detail on which to assess the activities and budget associated with each proposed program. As noted by David Pickles in his direct evidence:

> …[E1] provides only a very brief (averaging less than one page) narrative description of each program, and omits key items such as: incentive strategy, eligible measure descriptions, promotional plans, program activities, annual goals, staffing plans, and a detailed budget. Without these items, which, in my experience, are commonly required by regulators in other jurisdictions with third party implementers before approving such large expenditures, it is impossible to compare the programs to other programs and develop benchmarks demonstrating the reasonableness of the costs…[15]

NS Power submits that the E1 Application and its subsequent submissions contain many information gaps which limit the ability of parties to this proceeding to effectively assess its merits. These gaps will need to be addressed by E1 through this proceeding prior to a final determination on a 2016-18 DSM plan.

Beyond this hearing, the information shortcomings speak to the need to establish a standardized filing for future DSM applications. The standardized filing should be developed in consultation with NS Power and other stakeholders. NS Power refers to the direct evidence of David Pickles attached hereto as Appendix A with respect to the type of information NS Power would anticipate being included as part of a filing to assist the Board and other stakeholders in evaluating the prudency of the proposed plan.[16]

[15] Please refer to Appendix A, Direct Testimony of David Pickles, April 10, 2015, page 7, lines 8-16.
[16] Please refer to Appendix A, Direct Testimony of David Pickles, April 10, 2015, pages 30-32.

3.0 AFFORDABILITY

Affordability of electricity service is of paramount concern to NS Power customers. This is evident through NS Power engagements with our customers and stakeholders, both in regulatory forums such as General Rate Applications and the Annual Capital Expenditure Plan hearings and our direct customer interactions. Indeed, one of the goals behind the new DSM model in Nova Scotia is to make electricity more affordable. Section 79I(1) of the Act provides:

> 79I(1) On and after the Implementation Date, Nova Scotia Power Incorporated shall undertake cost-effective electricity efficiency and conservation activities that are reasonably available **in an effort to reduce costs for its customers**.
>
> [**emphasis added**]

In considering the issue of affordability and the objective of lowering costs for customers, NS Power is mindful of the fact that because the energy efficiency charge has been removed from electricity bills, there is no amount in customer rates at present to pay for DSM, so new DSM spend will add to rate pressure. In 2016, NS Power will also be in the first period of the eight year amortization of the 2015 expenditure on DSM as approved by the Board under Section 79Q of the Act. As such, every additional dollar in DSM spending the Board approves in this proceeding adds to rate pressure.

As a public utility, affordability for NS Power is expressed in terms of impacts on its revenue requirement. Increases in the Company's revenue requirement, without a corresponding increase in sales, create upward pressure on rates. This is compounded when the revenue requirement is increased and electric sales are decreased, as is the case for energy efficiency programs. Consequently, spending that produces the lowest impact on the Company's revenue requirement generally produces the lowest rates for its customers.

NS Power understands from its ongoing engagements with customers and stakeholders, including through consultations for the 2014 IRP and the Province of Nova Scotia's Electricity System Review, that minimizing revenue requirements and reducing the upward pressure on rates must be a priority for the Company, as it is a top priority for our customers. Currently, electricity rates in Nova Scotia are amongst the highest in Canada.

NS Power understands the importance of electricity rates as an economic driver for the Province and is concerned that adding additional near-term rate pressure will not only serve to dampen current economic activity in the Province, but could also push potential new industries to other jurisdictions. As such, the Company is actively seeking ways to mitigate any additional cost increases in the near-term, while also working to avoid the potential for a bow-wave effect in the longer-term. It is for this reason that NS Power proposes that DSM continue in the near-term, but at a more cost-effective and affordable level than proposed by E1.

3.1 DSM Spending Levels

NS Power understands and agrees cost-effective and affordable DSM can provide long term value to customers. Through our partner, Clean Nova Scotia, NS Power will finance efficiency upgrades for an estimated 6,600 low income homeowners who heat their homes electrically. Through better insulation and other efficiency solutions, this investment will provide lasting benefit for these Nova Scotians. To that end, NS Power has made a commitment to provide up to $37 million over 10 years – which will be paid for by NS Power's shareholders, with no cost to customers – to directly assist customers for whom affordability is the utmost concern.

Given concerns with affordability expressed by customers and the fact that with annual DSM levels in the range of 100 GWh per year and associated demand savings, the 2014 IRP forecasts that no additional generation capacity will be required by NS Power until

2032.[17] Any proposal which would obligate NS Power to pay for additional DSM in the near-term requires careful scrutiny and consideration.

Included with the direct evidence of David Pickles (Appendix A, Attachment A) is a copy of a report prepared by ICF International ("ICFI") for NS Power (Review of Nova Scotia Energy Savings Portfolio). The Report reviews E1's energy savings portfolio in the context of other DSM portfolios in Canada as well as Maine.

The ICFI Report concludes that of the jurisdictions reviewed, DSM spending in Nova Scotia is higher than any other jurisdiction in Canada on a per capita basis and among the highest on a per customer basis. Figure 3.1 below illustrates the amount of DSM expenditure in Nova Scotia in 2014 and planned for 2015, relative to recent information from other jurisdictions in Canada. In the Atlantic region, Figure 3.1 shows that Nova Scotia's DSM spend per capita is nearly twice as much as the province of New Brunswick and about four times more than the Province of Newfoundland & Labrador. For comparison purposes, the 2012 median household income was $67,910 for Nova Scotia. That is lower than both Newfoundland and British Columbia which are $70,900 and $71,660 respectively.[18] NS Power's proposed spending level during the Contract Period would place Nova Scotia at $44 per customer and in line with the average expenditure in provinces that have a DSM program. Considering there are some jurisdictions in Canada that do not have a DSM program, E1's recommended expenditure is well above the Canadian average.

[17] NS Power 2014 Integrated Resource Plan Final Report, NSUARB M05522, October 15, 2014, page 54.
[18] Statistics Canada, CANSIM, table 111-0009.

Figure 3.1: Recent and Projected DSM Spending by Canadian Province[19]

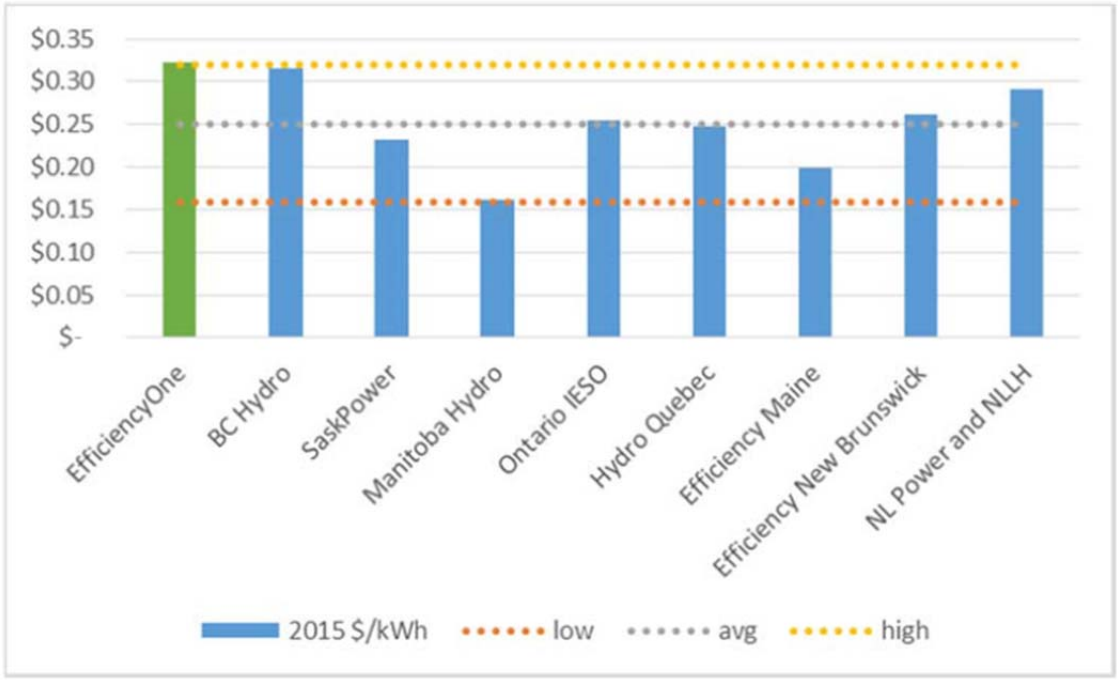
ACTUAL DSM SPEND				2015 PLAN DSM SPEND	
PROVINCE	YEAR	$DSM/CAPITA	$DSM/CUSTOMER	$DSM/CAPITA	$DSM/CUSTOMER
NOVA SCOTIA	2014	41.05	77.21	41.37	77.81
BRITISH COLUMBIA	2014	25.97	62.82	31.96	77.29
MANITOBA	2012	22.39	51.02	20.44	47.14
NEW BRUNSWICK	2013	22.07	47.51	24.54	52.71
ONTARIO	2013	19.67	55.52	22.57	63.72
QUEBEC	2014	14.61	28.97	16.43	32.59
SASKATCHEWAN	2013	13.92	30.74	8.89	19.96
NEWFOUNDLAND AND LABRADOR	2012	7.59	14.29	10.82	20.36

In addition to Nova Scotia having the highest spending level on DSM, the ICFI Report also reveals the unit cost of DSM is comparatively expensive relative to other

[19] Please refer to Appendix A, Attachment B, *Review of NS Energy Savings Portfolio*, April 8, 2015, page 5.

jurisdictions in Canada. Figure 3.2 below shows the 2015 budgeted DSM first year unit cost per kWh for E1 compared to other jurisdictions. The yellow and orange broken lines show the jurisdictions with the highest and lowest DSM costs in Canada and the grey broken line shows the average.[20]

Figure 3.2: 2015 First Year Cost Comparison ($/kWh of Planned Savings)[21]



A wide variety of DSM options are available for use at a wide variety of costs. Figure 3.3 below compares the costs of installed DSM in Nova Scotia with other Canadian jurisdictions. The planned cost of DSM in Nova Scotia on an installed basis as-approved is $0.32/kWh in 2015 ($0.32/kWh with ITCs[22]) and under the E1 DSM Plan for the Contract Period it is $0.30/kWh as indicated in Figure 3.3.

[20] DSM costs are incurred in the year in which the activities are undertaken, while the energy and demand savings continue for the lifetime of the DSM measure or program. Unit costs of DSM are typically expressed in two ways. "Installed" or "first year" unit cost is calculated by dividing the DSM cost by the first year energy savings only. "Lifetime" DSM unit cost is calculated by dividing the DSM cost by the energy savings accumulated over the lifetime of the DSM. EfficiencyOne and Efficiency Maine have not been included in the calculation of the average.

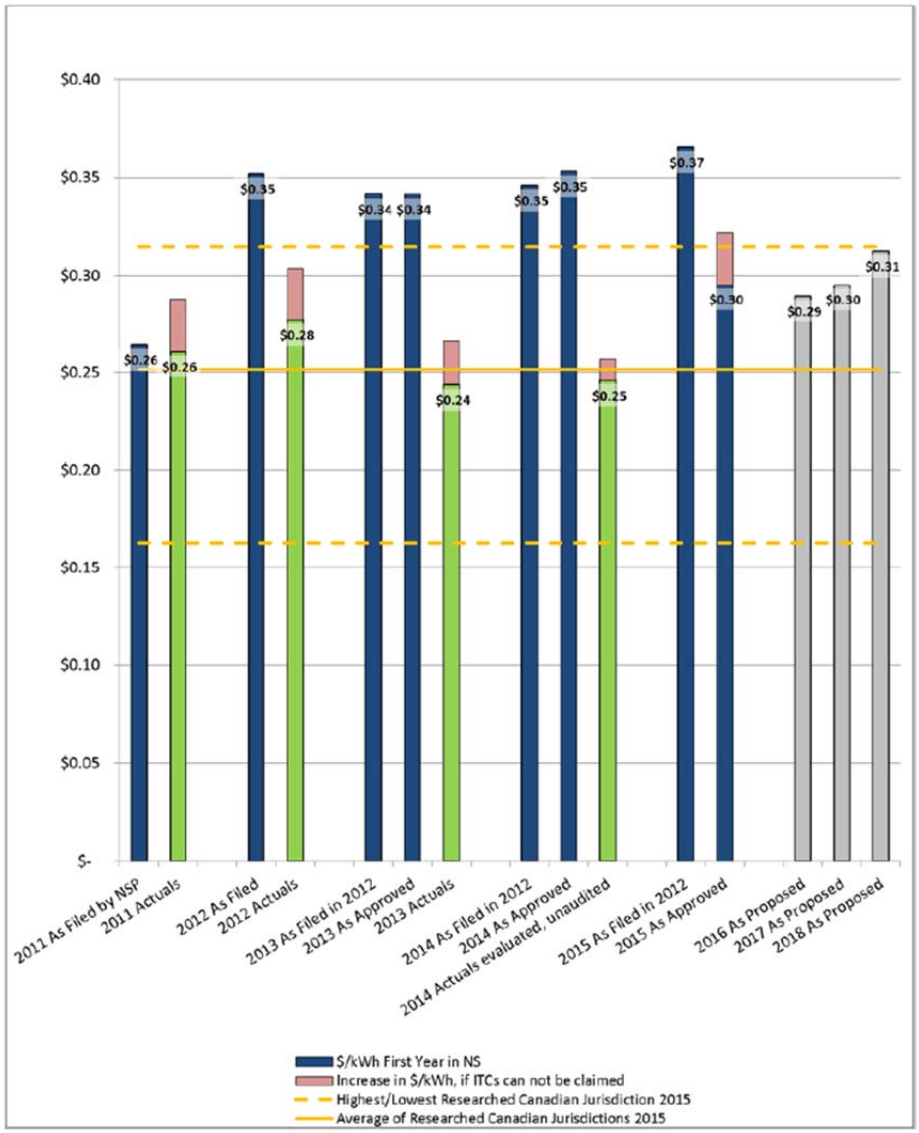
[21] Please refer to Appendix A, Attachment B, *Review of NS Energy Savings Portfolio*, April 8, 2015, page 6.

[22] E1 (NSPI) IR-35, March 27, 2015.

In each year, Nova Scotia's cost of installed DSM has been higher than that in other Canadian jurisdictions.[23]

[23] ENS has filed for approval of its costs at a higher price point than the price at which it has delivered. This difference in 2014 resulted in an unnecessary over-collection of DSM costs by $8.8 million. This raises a specific question about the eventual recovery of this $8.8 million. While NS Power assumes the funds will be returned to customers, it submits that customers would have been better served if they were not collected from customers in the first place.

Figure 3.3: Costs of Installed DSM ($/kWh)[24]



The information in Figure 3.3 provides a number of insights:

- Most Canadian jurisdictions outside of Nova Scotia are planning to deliver lower cost DSM savings in 2015 than E1 is proposing for the Contract Period, or that its predecessor, ENS, has provided in the past;

[24] Please refer to Appendix A, Attachment B, *Review of NS Energy Savings Portfolio*, April 8, 2015, page 15.

- In the E1 DSM Plan, E1 is now requesting $0.29 to $0.31/kWh, although they were able to achieve an actual delivered cost of $0.26/kWh in 2014 ($0.25/kWh with ITCs), a year that included as additional components both low income homeowner program costs (which had high unit cost) and full HST costs. For 2016 and beyond, the low income homeowner program costs have been removed from the E1 DSM Plan and the HST costs are expected to be reduced by ITCs. These changes alone should allow E1 to realize reductions, not increases, from the 2015 spending level of $35 million.

- In its initial evidence for the 2013-2015 DSM Plan Evidence, E1 proposed an increase in installed DSM costs.[25] Actual results to-date show that E1 actually achieved significantly lower costs than proposed. The approved price for 2014 was $0.35/kWh, with actuals being $0.26/kWh, a 28 percent reduction from projected unit cost,[26] and $0.25/kWh after accounting for ITC effects.

The ICFI Report also shows that Manitoba Hydro's 2015 DSM programs, if delivered as planned at $0.16/kWh will be the lowest-cost DSM programs in Canada on a first year cost basis.[27] By contrast, E1's approved 2015 DSM programs are shown to be the highest-cost in Canada. The ICFI Report also reveals that the average cost of DSM across six jurisdictions[28] with DSM programs in Canada is $0.25/kWh.[29] As previously stated, NS Power's position is that a robust program can be delivered at a cost that aligns with the Canadian average.

E1 provided very limited benchmarking information. However, to the extent E1 did provide such information, it suggests the costs of its proposed programs are higher than

[25] Efficiency Nova Scotia Corporation's Electricity Demand Side Management (DSM) Plan for 2013-2015, NSUARB M04819, February 27, 2012.
[26] $/kWh values were calculated from EfficiencyOne's Evidence, February 27, 2015, page 6, Figure 2.1 by dividing the expenditure by the first year energy savings for each target and actual.
[27] Please refer to Appendix A, Attachment B, *Review of NS Energy Savings Portfolio*, April 8, 2015, page 22.
[28] This six jurisdictions are: QC, NL, SK, BC, MB, and NB. Alberta is not included as it does not provide DSM.
[29] Please refer to Appendix A, Attachment B, *Review of NS Energy Savings Portfolio*, April 8, 2015, page 6.

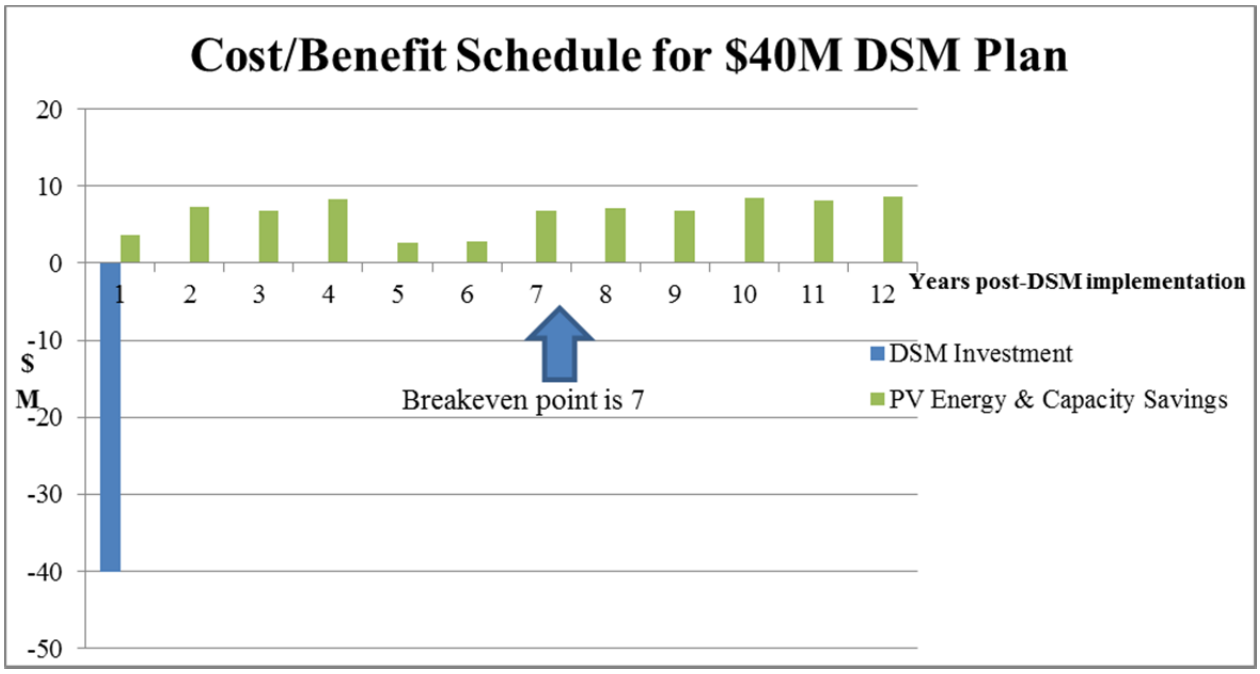
those of other DSM providers[30] and that there may also be other programs that are less expensive than those offered by E1. As such, by choosing a modified suite of programs, E1 should be able to deliver a robust DSM plan for Nova Scotians that is closer to the Canadian average. E1, through its predecessor, ENS, has been functioning as the DSM administrator in Nova Scotia for more than 5 years. As such, in NS Power's view, E1 should have acquired efficiencies to enable it to deliver programs in a more cost efficient manner rather than at a top tier level.

The ICFI Report also reviewed the level of investment in DSM across Canada as a function of population and number of customers compared on the basis of the most recently reported results as well as 2015 DSM plans. It shows that no other province in Canada has invested in DSM at a level as high as Nova Scotia (please refer to Figure 3.1). In addition, the level of savings as a percentage of the utility's electricity sales (MWh) proposed for Nova Scotia in 2015 is also higher, at 1.1 percent of electricity sales. Applying the average Canadian investment level in DSM for 2015, $44.82 per customer, establishes an investment benchmark for DSM for Nova Scotia's customers of approximately $22.6 million.

As shown in Figure 3.4 below, while the energy and demand *savings* associated with DSM are realized over 13 years,[31] the *cost* of DSM is incurred in the year in which the plan is executed.[32] Recognizing this, and accounting for the time value of money, the collective payback period for recovering these up-front DSM costs is approximately 7 years.

[30] Please refer to Appendix A, Attachment B, *Review of NS Energy Savings Portfolio*, April 8, 2015, page 5.
[31] The average program life of E1's 2016-18 plan is 12.96 years. EfficiencyOne Evidence, February 27, 2015, page 27, line 22.
[32] This may not be the case if deferral of DSM costs are under consideration, but deferral can lead to the creation of a "bow wave" of costs in the future, which raises intergenerational inequity and recovery concerns and must be managed within the $100 million limit on deferral of cost recovery stipulated under Section 79M(6) of the Act.

Figure 3.4: Cost/Benefit Schedule for $40M DSM Plan[33]



In short, the payback economics of DSM for customers in aggregate are realized only in the mid-term (7 years) leading to near term rate pressures. The importance of this imbalance is heightened during a period of increased focus on upward rate pressures and, as this filing demonstrates, during a period when it appears there is minimal requirement for DSM.

In addition, with respect to the cost/benefit payback of DSM measures, it is important to be aware that while all customers within classes subject to DSM charges will pay for the costs of DSM, not all customers within these classes will directly benefit from DSM in the short-term.

This inequity must be taken into consideration when assessing the affordability of DSM programming. To what extent does it remain appropriate to ask customers to pay for

[33] DSM measure effects are assumed to be realized on average midway through the year. As a result, recognized first year savings are 50% of the annual thereafter.

products and services that they do not personally use, but which may benefit them indirectly, over time, through lower system costs? This is of particular concern in the context of lower-income customers.

3.2 Lowering the Cost of DSM

NS Power submits that the level of investment proposed in the E1 DSM Plan is not required in the near-term and only adds unnecessary upward pressure on rates in the near term. Energy efficiency improvements within DSM Plans can also be achieved in ways other than through increased DSM expenditures.

A selection of measures and programs chosen based on their low unit costs could be grouped to provide substantial energy and demand savings at a much lower unit and total cost than proposed by E1. Similarly, developing and supporting effective national and provincial energy efficiency codes and standards is also an important aspect to promoting the wise and cost effective use of electricity. In addition, the market adoption of energy efficient technologies also brings about a reduction in the costs of those technologies, such that some higher cost programs will have lower costs in the future.

(a) Selection of Lower Unit Cost Options (Measures and Programs)

E1's primary DSM planning tool in the development of the E1 DSM Plan was the ELRAM. This is a proprietary spreadsheet-based model developed by Navigant which utilizes a wide variety of inputs to construct a detailed DSM portfolio from the measure level up. NS Power has analyzed the ELRAM supporting each of E1's 2014 DSM Potential Study scenarios and also reviewed various output tables from the current plan sorted by the unit cost of measures and programs. This analysis demonstrated, using E1's own model, that a selection of measures and programs chosen based on lower unit costs could be grouped to provide a robust

plan with substantial energy and demand savings at a much lower unit and total cost than that proposed by E1 in the E1 DSM Plan.[34]

The analysis also demonstrated that by focusing on the lower unit cost measures and reducing some of the higher cost measures, E1 can reduce both the unit and overall cost of the DSM portfolio.

The approach of selecting E1's own lower cost measures indicates there are opportunities to reduce the unit cost of the proposed DSM portfolio significantly by removing or reducing the most expensive measures, with a corresponding reduction in the cost of Enabling Strategies. E1 and its consultants have indicated that choosing only the lowest cost measures and programs is not a viable method of designing a DSM plan. However, other utilities in Canada have been providing portfolios at unit costs which are in line with the per unit cost proposed by NS Power, which is about 20 percent less than those E1 has provided and continues to propose. NS Power believes there is value in E1 itself investigating the approach more concertedly, particularly in the context of affordability. However, as previously noted, E1 has repeatedly refused to prepare lower cost plans for analysis by the UARB, stakeholders and NS Power.[35]

(b) Codes and Standards

Energy efficiency improvements can also be achieved in ways other than through rate-payer-funded DSM, such as through the enhancement of codes and standards and financing. E1 has indicated its support for, and participation in, efforts to bolster Codes and Standards. NS Power believes that developing and supporting effective national and provincial energy efficiency codes and standards is an important aspect of promoting the wise and efficient use of electricity. As codes

[34] Please refer to Section 5.0 herein.
[35] E1 (NSPI) IR-14(a), March 27, 2015, page 1.

and standards improve, the need for DSM incentives decrease. Appliance end-use standards, and building code standards should continually be reviewed and strengthened, which will improve the efficiency of energy-using stock over time without the need for direct incentives. This approach also addresses issues of cross-subsidization among customers.

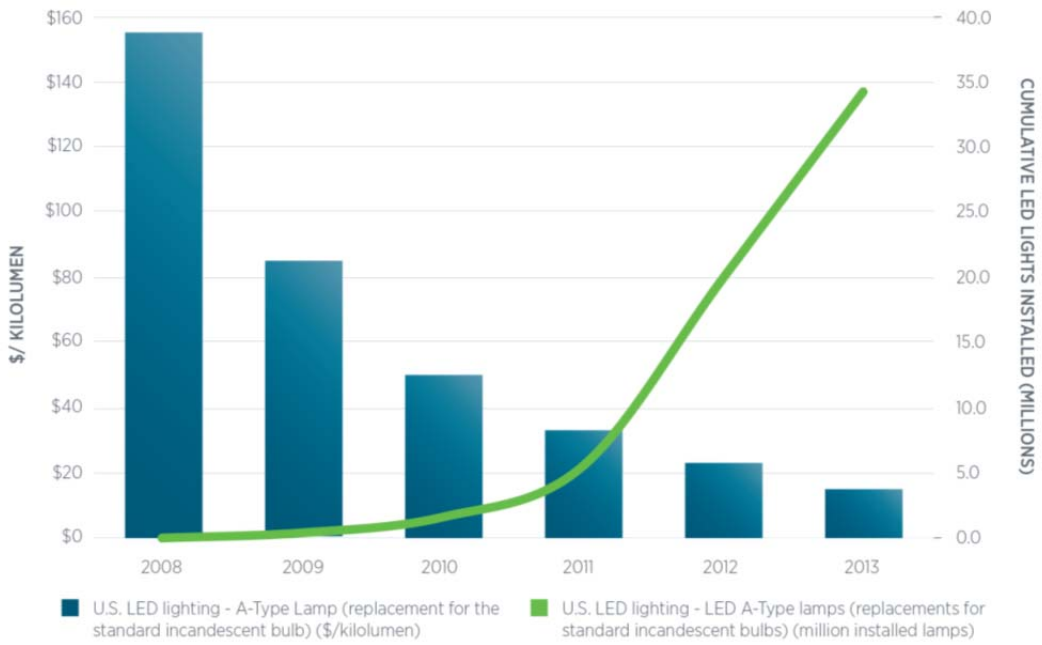
(c) Eliminate Adoption of Emerging Technologies at High Costs

With continual improvements in appliance efficiency standards and building codes, the market increasingly adopts more efficient technologies and the cost of these technologies tends to decline. This is driven by evolution in technology and increasing market demand resulting in economies of scale. Reduced cost of the technologies accelerates the economics and increases the uptake, and over time, less efficient technologies are phased out through legislated standards or decline in the market place as market transformation takes place.

An example of this market trend can be found with Light Emitting Diode ("LED") lighting, where reductions in the cost of LED bulbs have led to increases in the use of that technology. A 2014 report from the United States Department of Energy ("US DOE Report") revealed that in the United States in 2012, LED bulbs cost as much as $50 US each. However, by 2014, LED bulbs were of improved quality and could be purchased for less than $10 US each.[36] The report further revealed that as the price dropped, deployment of the technology increased. Indeed, between 2009 and 2013, deployment of LED lights had increased in the United States from less than 400,000 LED lights to 34 million. Figure 3.5A below from the US DOE Report illustrates the correlation between the increase in usage in LED bulbs and reduction costs.[37]

[36] US Department of Energy, *Revolution Now: The Future Arrives for Four Clean Energy Technologies – 2014 Update*, October 2014, page 8:
http://energy.gov/sites/prod/files/2014/10/f18/revolution_now_updated_charts_and_text_october_2014_1.pdf
[37] Ibid, page 7.

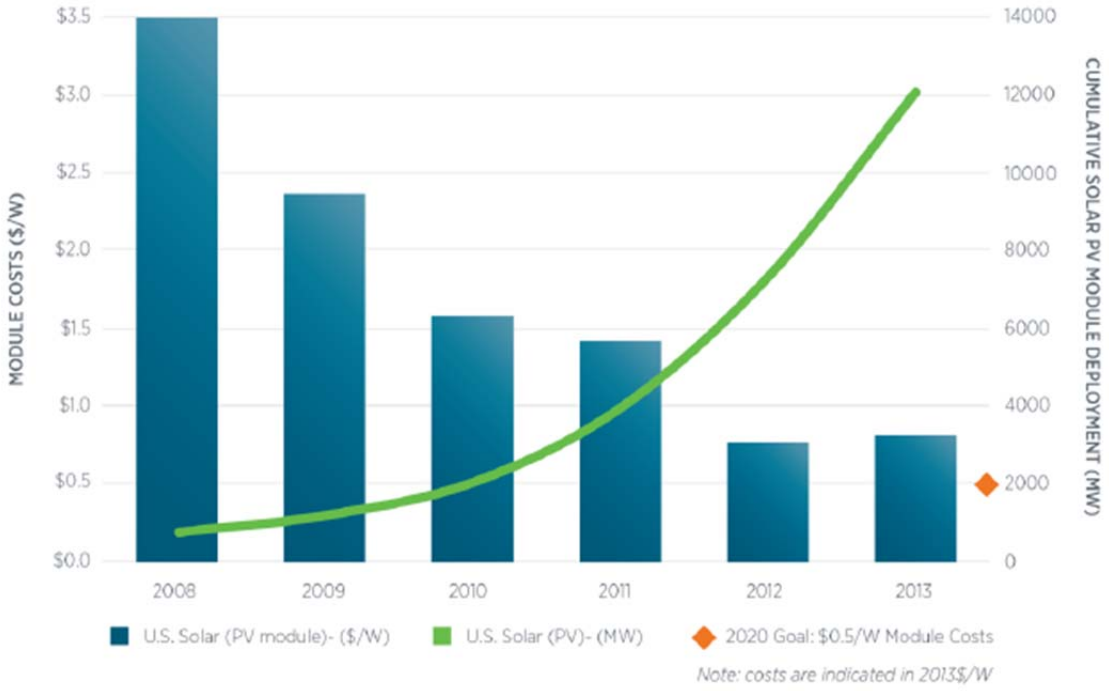
Figure 3.5A: U.S. Deployment and Cost for A-Type LED Lights 2008-2013



Similarly, the US DOE Report observed a comparable trend with solar photovoltaic ("PV") power, stating: "a doubling in industry capacity for solar PV manufacturing has correlated with about a 20% decline in PV prices. As more and more solar panels are built and deployed, costs have fallen."[38] Figure 3.5B[39] below from the US DOE Report shows that as demand for solar PV modules has increased and the technology has improved, costs have fallen.

[38] Ibid, page 6.
[39] Ibid, page 7.

Figure 3.5B: U.S. Deployment and Cost for Solar PV Modules 2008-2013



This raises the question as to when in a technology's evolution should a DSM program (which relies on paying a portion of the customers' cost of acquisition) be subsidized. If done too early in the technology's evolution, it is likely that those who fund DSM will pay more than had the program been delayed until the cost of the technology decreased through product maturation. In NS Power's view, the Nova Scotia market is simply not large enough to hold market power or weight in regard to enabling market transformation. If we adopt the technology at a later date, rather than subsidize the market to force early transformation, the programs will cost less and customers will pay less. Given Nova Scotia's relative size, it is better to benefit from the influence of larger markets and adopt emerging technologies only when it is more pressing to do so and at a lower cost.

Economies of scale and technology advancements will make some of today's higher cost programs, lower cost programs in the future.

(d) Elimination of Market Dampening Subsidies

Enabling market penetration of energy efficient products is a key function of DSM. Emerging products and market transforming industries can benefit from subsidies. However, the efficiency of subsidies tends to be significantly diminished and may even stifle market and economic growth when they compete directly against unsubsidized products and companies in the same markets. There has been some recent media related to this concept and NS Power understands that there are two intervenors in this Matter who will provide their perspective on this issue. It appears that some of ENS's past programs may have been in competition with local market players in the lighting sector – possibly creating inefficiencies in the local market structure.[40]

3.3 Affordability from a System Planning Perspective

Through the course of the 2014 IRP, the Company analyzed revenue requirements resulting from a variety of different DSM profiles. NS Power has further considered the affordability impact to its customers by analyzing the net present value ("NPV") of the revenue requirements of Candidate Resource Plans ("CRP") presented in the 2014 IRP over a variety of time horizons and a number of other scenarios from the DSM potential study or related to that data. Although the Contract Period extends out only to December 31, 2018, we can have greater confidence in the IRP NPV insights related to the nearer term than in the longer term. Comparisons of the various NPV time horizons are useful in assessing DSM planning, particularly in consideration of affordability and cost effectiveness.

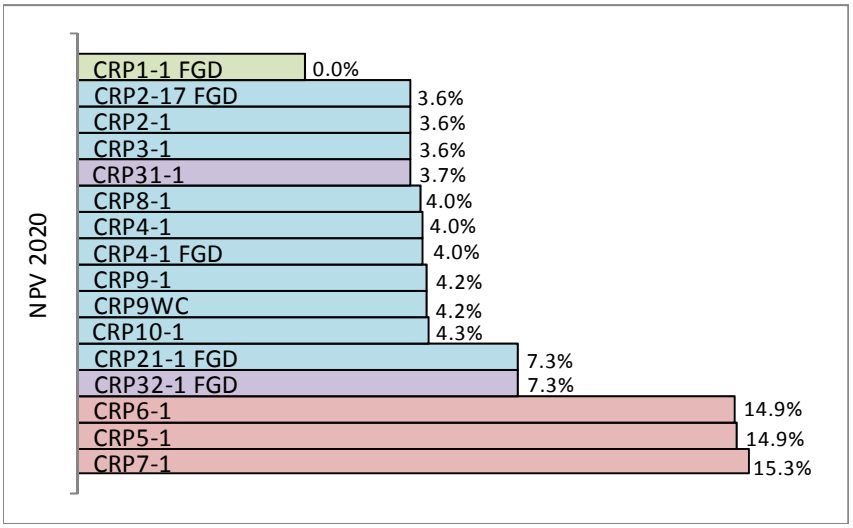
[40] "Private firms rap Efficiency Nova Scotia lighting rebate plan," *The Chronicle Herald*, April 2, 2015.

Figure 4.1 herein (NS Power System Requirements Based on 2014 IRP Assumptions)[41] compares the NPVs of a variety of DSM profiles and demonstrates that optimizing DSM plans on a contract period basis (i.e. the $22 million per year plan for the Contract Period) would produce the lowest NPV out beyond 2030 of any of the DSM profiles considered in the 2014 IRP. NS Power's analysis of the ELRAM indicates that it is reasonable to believe that in combination with non-administrator energy savings initiatives (such as NS Power's program with Clean Nova Scotia), approximately 100 GWh in energy savings and associated demand savings can be achieved at the overall cost of $22 million or less. In NS Power's view, such a DSM plan would also produce the least amount of upward pressure on rates among the options considered – balancing both short and long term.

The previous paragraph is in support of NS Power's proposal being the most affordable out past the year 2030. However, we also recognize that customers are concerned about short term affordability – the here and now. The near term NPV perspective of alternative DSM profiles is set out in Figure 3.6 below. This figure illustrates the affordability of the various profiles over a six year period. The most affordable is the $25 million DSM plan (CRP 1-1) based on the 2014 IRP information with a relative cost on the order of 15 percent less than a high DSM plan with the same assumptions.

[41] Please refer to Figure 4.1 on page 34 herein.

Figure 3.6: Ranking of CRPs



In terms of a revenue requirement analysis, the Low DSM energy and capacity savings for the $22 million expenditure plan again demonstrates superior near term affordability for customers. Figure 3.7 below shows how various plans with different levels of DSM expenditure would stack up over the full twenty-five year term of the 2014 IRP. In Figure 3.7, the X axis represents partial revenue requirements[42] with no investment in DSM and the other lines show various CRPs with escalating levels of DSM from half-low and low to a mid-investment level.

NS Power's proposed DSM savings and spend profile for the Contract Period would provide the "Low" level of capacity and energy savings at the "Half-Low" price. This DSM profile would provide the best balance between affordability in the short term and overall cost effectiveness out beyond 2030 for the following reasons:

(a) it aligns with near-term utility requirements for energy and capacity;

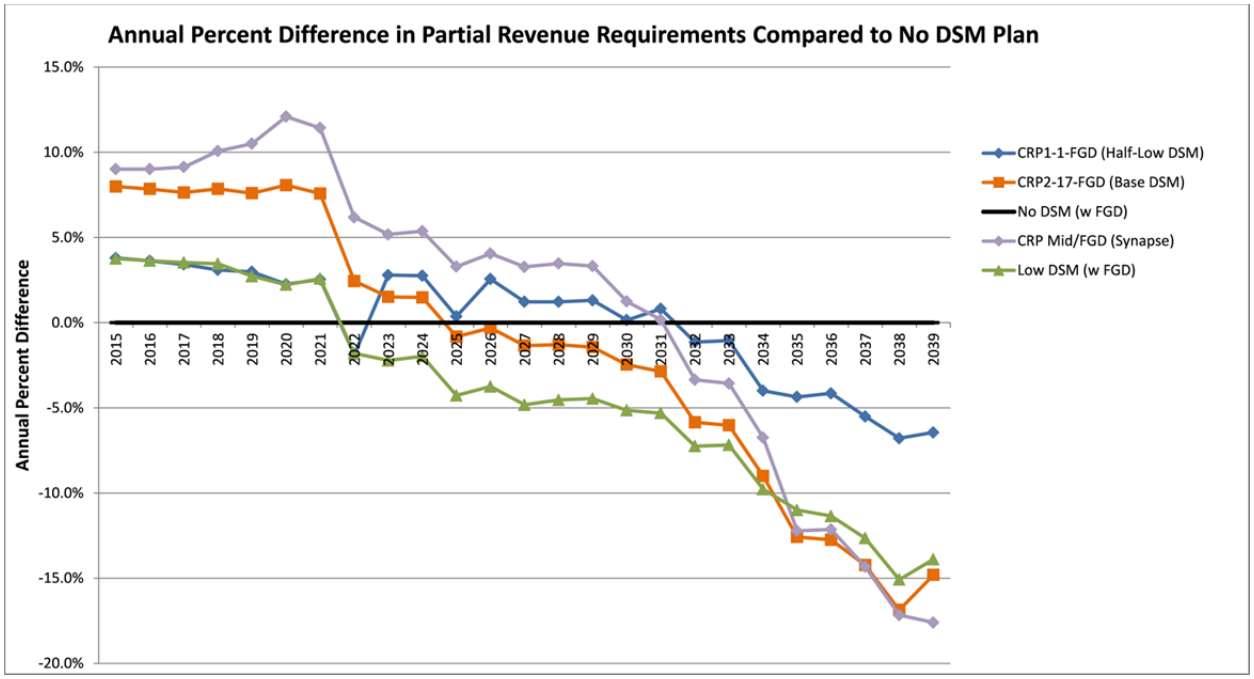
(b) it recognizes greater confidence in near term forecasts; and

[42] For a description of the partial revenue requirement, please refer to NS Power 2014 Integrated Resource Plan Final Report, NSUARB M05522, October 15, 2014, page 62.

(c) it is most economic at years 2025 and 2030, and the cross-over point (where it becomes less cost-effective than the higher DSM option) is not until 2034.

The delay required for a DSM plan to become economic indicates that a more moderate level of DSM should be undertaken to mitigate near term rate pressure for customers, while not sacrificing the future.

Figure 3.7: Annual Percent Difference in Partial Revenue Requirements Compared to No DSM Plan.

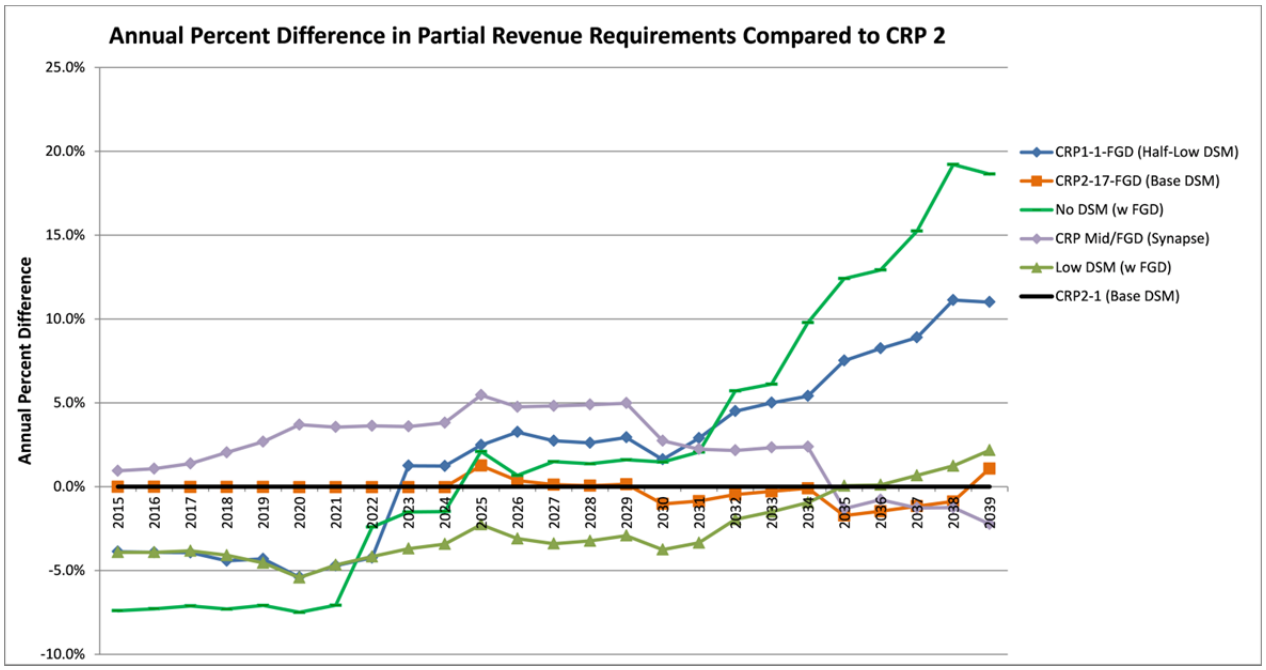


The magnitude of the difference in partial revenue requirements of customer rates is demonstrated by Figure 3.8 below. In Figure 3.8, the graph's baseline (X Axis) is CRP 2, a plan which represents the Base Case DSM level from E1's 2014 DSM Potential Study included in the 2014 IRP.[43] Customers could pay close to 5 percent less in revenue requirement under a "Low" DSM energy and capacity savings proposal relative to the

[43] Navigant, 2014 IRP, *Nova Scotia 2015-2040 Demand Side Management (DSM) Potential Study, Presented to Efficiency Nova Scotia Corporation*, NSUARB M05522/P-884.14, January 7, 2014.

base level of DSM from E1's 2014 Potential Study. This further shows that any DSM investment greater than a "Low" level only becomes competitive out past 2030. This is due to the fact the system need for energy and capacity can be adequately met with the current resources and lower levels of DSM than those being proposed by E1 for the Contract Period.

Figure 3.8: Annual Percent Difference in Partial Revenue Requirements Compared to CRP 2



4.0 ANALYSIS OF NS POWER'S DSM REQUIREMENTS

4.1 NS Power System Requirements

The 2014 IRP tested 3 alternative levels of DSM expenditure with capacity and energy savings based on ENS's DSM potential study with 25 year spending profiles. It did not seek to optimize annual DSM spending. It was made clear throughout the 2014 IRP process that the parties would subsequently undertake a more detailed examination of DSM and prepare the near term plan accordingly.

A comparison of the resource additions required under the various DSM scenarios modeled in the 2014 IRP is provided in Figure 4.1 below. Figure 4.1 demonstrates that DSM savings in the range of approximately 100 GWh per year and associated demand savings, would enable NS Power to avoid adding any additional generation capacity until 2032 ("Low DSM" scenario).

Figure 4.1: NS Power System Requirements Based on 2014 IRP Assumptions[44]

2014 IRP	No DSM Plan	CRP01-01-FGD-R01	Low DSM	CRP2-17 FGD	CRP Mid DSM/FGD
		Half-Low DSM		Base DSM	(Synapse Model)
2015					
2016					
2017	ML Oct 2017 Lin 2 retire	ML Oct 2017 Lin 2 retire	ML Oct 2017 Lin 2 retire	ML Oct 2017 Lin 2 retire	ML Oct 2017 Lin 2 retire
2018					
2019	Mersey Redevelopment Mersey Expansion Phase 1	Mersey Redevelopment Mersey Expansion Phase 1	Mersey Redevelopment	Mersey Redevelopment	Mersey Redevelopment
2020	CT 50 MW				
2021					
2022	PPA				
2023	Mersey Expansion Phase 2	Mersey Expansion Phase 2 PPA			
2024					
2025	TUC 1 Retire CT 100 MW FGD Lin 3/4 (300 MW)	TUC 1 Retire FGD (Lin 3/4 300 MW)	TUC 1 Retire FGD (Lin 3/4 300 MW)	TUC 1 Retire FGD (Lin 3/4 300 MW)	TUC 1 Retire FGD Lin 3/4 (300 MW)
2026		2 x CT 34MW			
2027	CT 50 MW				
2028					
2029					
2030	CT 50 MW				
2031		CT 50MW			
2032	TUC 2 Retire Wind Block 150 MW 2 x CT 50 MW (wind integration)	TUC 2 Retire CT 50MW	TUC 2 Retire CT 50MW	TUC 2 Retire	TUC 2 Retire
2033	CT 100 MW				
2034					
2035	Tre 5 Retire CC 145 MW	Tre 5 Retire CC 145MW	Tre 5 Retire 2 x CT 50MW CT 34MW	Tre 5 Retire CT 50MW	Tre 5 Retire
2036		CT 50MW			
2037	CT 34 MW				
2038	CC 145 MW	CT 50 MW			
2039	PHBM 51.7MW firm * Lin 1 Retire	CT 50 MW PHBM 51.7MW firm * Lin 1 Retire	2 x CT 50 MW PHBM 51.7MW firm * Lin 1 Retire	CT 100MW PHBM 51.7MW firm * Lin 1 Retire	PHBM 51.7MW firm * Lin 1 Retire
NPV 2020	3,679	3,784	3,690	3,815	3,851
NPV 2025	6,341	6,340	6,121	6,275	6,331
NPV 2030	8,674	8,762	8,097	8,230	8,277
Planning PV $M	12,302	11,762	10,774	10,731	10,623
Study PV $M	20,833	18,946	16,722	16,244	15,626

(NPV values include DSM PA costs. Does not include DSM customer costs or sustaining capital).

Option added primarily for capacity (or could be a DR solution)
Option added for economics
Option added for RES
Option added for both capacity and energy

Notes:

These resource plans are based on 2014 IRP assumptions. Plans could be further optimized based on more recent assumptions for the near term.
Half-Low DSM - Mersey Expansion not required for capacity. Added for economics. No capacity additions are required until 2024 with half-low DSM.
Half-Low DSM - PPA is required for RES in 2023 but is oversized.
* It is assumed that when a second Lingan unit retires it frees up transmission allowing PH Biomass to transition to firm capacity.

The CRP analysis process used in the 2014 IRP did not offer full optimization opportunities but was rather an approach to test a range of DSM scenarios. The detailed analysis undertaken through this proceeding provides a critical step in optimizing the recommended alternatives to best align with the near and mid-term needs of NS Power's system and customers.

[44] For the NPV analysis, NS Power assumed that the "low" DSM profile was achievable for the "half-low" DSM cost based on its analysis of the 2016-2018 ELRAM and available program profiles.

NS Power recognizes that DSM is more flexible in its implementation than some supply alternatives. Failing to adjust DSM spending to match system needs leaves the value of DSM flexibility unrealized. As a result, NS Power recommends continuing investment in DSM at a more moderate level than proposed by E1, with a focus on demand as well as energy savings. NS Power considers energy savings of approximately 100 GWh/year with the associated demand savings to be appropriate. This will provide the associated cumulative demand savings required to avoid adding any additional generation capacity until 2032.[45]

As an alternative to, or perhaps in addition to energy related DSM, demand-response ("DR") DSM programs (which focus on targeted demand reduction rather than energy reduction) may be implemented in future depending upon the cost of the programs and economics associated with the avoided cost of capacity. NS Power suggests that further study of DR options and characteristics be conducted in the 2016/2017 timeframe for inclusion in future planning analyses prior to the next contract period negotiations.

[45] E1's 2015 programs, targeting 120 GWh/year, are projected to provide 21MW of peak demand mitigation.

5.0 ALTERNATIVE DSM PLAN

5.1 NS Power's Alternative DSM Plan

E1 did not develop or model any DSM investment scenarios lower than that contained in the proposed E1 DSM Plan.[46] NS Power had requested E1 develop different plan scenarios, including one within an annual $20 million investment level. E1 has declined to produce this.[47] As a result, information from E1 regarding the costs and benefits of lower DSM plans is not available to NS Power, the Board, customer representatives and other stakeholders. In reviewing the range of expenditures in DSM programs considered by E1, David Pickles stated as follows:

> It is my opinion that EfficiencyOne should also have considered lower levels of expenditure that have lesser impact on rates, along with different distributions of that expenditure across measures, current program types, and new programs in order to make the portfolio more cost-effective. This approach would support a quantitative analysis of the trade-offs between resource requirements, short-term and long-term considerations, construction of a balanced portfolio, affordability, and risk. While EfficiencyOne asserts that is has assessed these factors in developing its recommended portfolio, it has not done so in a quantitative fashion and entered it into evidence, thereby limiting NSP, intervenors and the UARB's ability to make informed decisions.[48]

In the absence of E1 offering any lower costs scenarios, NS Power has endeavored to produce an alternate scenario for review by the Board and other stakeholders.

In NS Power's view, taking into account the issues of affordability and the best interests of NS Power customers, DSM spending in Nova Scotia for the Contract Period should be at a level and cost that is benchmarked appropriately to other Canadian jurisdictions. Aligning with Canadian averages, NS Power estimates that a DSM plan in the range of

[46] E1 (NSPI) IR-26(b), March 27, 2015, page 1, line 26-28.
[47] E1 (NSPI) IR-14(a), March 27, 2015, page 1, line 22-30.
[48] Please refer to Appendix A, Direct Testimony of David Pickles, April 10, 2015, pages 18-19, lines 19-21 and 1-8.

$22 million, in combination with non-administrator energy savings initiatives can achieve sufficient savings and serve to avoid capital capacity expenditure requirements for an extended period.

Attached hereto as Appendix B, also filed electronically, is a scenario which NS Power prepared, using the ELRAM Model supplied by E1, to estimate what E1 DSM components would constitute a more cost effective plan. NS Power is not recommending this plan for approval but submits it for the purposes of demonstrating that there are lower cost alternatives available.

NS Power developed the plan utilizing E1's data aggregated at the "Technology Type" (or "End-Use Category") level. The overall approach was to use these as building blocks to construct a potential portfolio with an overall cost of approximately $22 million (for the reasons described elsewhere in NS Power's evidence). The method was to simply select DSM end-use categories based on their first year unit costs, beginning with the least expensive and adding them according to increasing unit cost until the target $22 million was achieved.

The only adjustment NS Power made to E1's proposed DSM end-use category quantities relates to the RES-HVAC/Shell category. While it is among the more expensive programs, NS Power included a portion of this category in each of the three years of the Contract Period. This was included to recognize that there could be some DSM opportunity lost by not addressing projects in the residential new home construction market. The amount included (4,600 MWh at a cost of $1.2 million) is based on the 2014 Evaluation Report regarding new homes. The estimated cost of Enabling Strategies was reduced in proportion to the reduction in DSM program expenditure. NS Power did not look to incorporate programs or program costs from other jurisdictions, but would note that such incorporation could result in an even lower cost program with equivalent or better savings.

From a planning perspective, the difference between the alternative DSM scenario which NS Power produced and the E1 DSM Plan is approximately 35 GWh a year on average. This represents only approximately 0.3 percent of NS Power's total load. However, the cost difference between the two represents nearly $20 million per year which is approximately 1.5 to 2 percent of customer rates.

NS Power acknowledges that there could be enhancements to this approach that would benefit from further modeling and input from E1, especially if program costs can be achieved at similar levels to 2014 actuals, as opposed to the higher budget amounts included in ELRAM. In NS Power's view, a $22 million DSM plan over the Contract Period would be more affordable than the E1 DSM Plan and deliver energy efficiency results that would provide significant long term benefits to NS Power customers and is best-aligned with the near and mid-term needs of NS Power's system and customers.

A plan such as this would provide the best balance between affordability and energy efficiency results. As such, it would be in the best interests of NS Power customers for E1 to design a DSM Plan that would provide DSM spending of approximately $22 million and achieve savings in the range of approximately 100 GWh per year and to present such a plan to the Board, NS Power, customer representatives and other stakeholders for consideration.

To illustrate the potential impact of considering further alternate policy and program assumptions, NS Power refers to the Direct Testimony of David Pickles attached hereto as Appendix A. Mr. Pickles developed reasonable assumptions for additional scenarios and used the ELRAM model provided by E1 to generate new estimates of energy savings, demand savings and investment levels.

6.0 FORM OF AGREEMENT

Since September 2014, NS Power worked to negotiate a Supply Agreement with E1 that served the best interests of NS Power's customers taking into account the issues of both short-term and long-term affordability. The document attached as Appendix J to the Evidence filed by E1 contains those aspects of the Supply Agreement on which E1 and NS Power were able to reach agreement. These areas of agreement were achieved based on NS Power's understanding of E1's responsibility under the Act for the delivery of the EECAs and the Board's role in supervising E1 in relation to its DSM activities.

NS Power was unable to reach agreement with E1 on the two most critical aspects of the supply arrangement: the quantity and type of cost-effective DSM to be purchased from E1 and the amount NS Power's customers would be required to pay for that deliverable.

NS Power does not support the level of DSM nor the corresponding contract price proposed by E1 over the Contract Period. It also cannot recommend the payment terms, plan flexibility or proposed lack of oversight set forth by E1 in its Evidence.

6.1 Schedule "A" – Description of EECAs

Schedule "A" to the Supply Agreement is intended to describe the EECA deliverables E1 is to supply to NS Power over the Contract Period. E1 has proposed to supply NS Power with energy savings from EECAs of 405.9 GWh at an aggregate cost of approximately $121.5 million. For the reasons set out herein, NS Power does not view this quantity of DSM as being consistent with levels advanced elsewhere in Canada or as affordable to NS Power ratepayers.

NS Power is also not in agreement with E1's proposal that its deliverable to NS Power should be based on a 3 year cumulative deliverable and not individual years. This is not acceptable to NS Power. In order for NS Power to forecast its load requirements and

effectively manage the provision of capacity and energy, the Company requires annual DSM performance, measurement and reporting.

E1 cites s.79I of the Act as part of its authority for the proposition that the contracted deliverable is to be a 3 year cumulative deliverable; however, Section 79I of the Act merely states that the Supply Agreement itself is to be for a term of three years. It does not specify or restrict the period of the deliverable over the contract term. This is a supply arrangement and it is reasonable for NS Power to require E1, as the supplier, to have annual deliverables over the term of the contract. NS Power needs to ensure E1 is delivering the programs efficiently, on time, and on budget. NS Power can perform this analysis more efficiently and effectively with annual deliverables.

Although E1 may require some degree of flexibility in the implementation of its plan, decision-making authority for items as significant as shifting budgets between programs and those identified by E1 in its Evidence[49] should be subject to approval of the Board with input from NS Power.

6.2 Schedule B – Compensation

E1 takes the position that the Supply Agreement should effectively be a fixed price contract based on the total deliverable at the end of the Contract Period. E1 is paid monthly and this would entitle E1 to payment without having to provide a particular level of energy savings in a particular contract year.

In NS Power's view, the contract price should first be allocated on an annual basis. If E1 does not spend the full annual amount in a given year, it should be deducted from the amount owing in the following year or otherwise refunded to NS Power customers. In the absence of such a requirement there is arguably little in the way of accountability for E1 for the compensation it receives, particularly given it is also seeking to have the

[49] EfficiencyOne Evidence, February 27, 2015, page 44.

discretion to make significant adjustments to the approved E1 DSM Program without any further input from NS Power, the Board, or other stakeholders. Such changes could include last minute changes in programs in the final stages of the Supply Agreement, which would result in a very different implementation than the plan for which they first sought approval. In addition, such changes could also alter the unit cost of providing the overall DSM portfolio and the manner in which costs are distributed among NS Power's customers.

Attached hereto as Appendix C are draft forms of Schedules "A" and "B" to the Supply Agreement based on the alternate DSM plan proposed by NS Power in Section 5.0 herein.

7.0 COST-EFFECTIVENESS TESTING

At present, the Total Resource Cost test ("TRC") is applied for cost-effectiveness testing in Nova Scotia and much of North America.

When DSM began in Nova Scotia, the Board required individual Measures to pass economic effectiveness testing in order to be approved. E1's predecessor, ENS, subsequently requested, and the Board approved, a change whereby cost-effectiveness tests were applied at the program level rather than the measure level. E1 is now seeking approval to further relax its cost-effectiveness threshold, by requesting approval to apply testing at the sector level rather than program level in future DSM plans. E1 is also seeking to change from application of TRC to the less stringent Program Administrator Cost ("PAC") test in future DSM plans. The PAC test excludes participants' costs, and as a result is a more relaxed hurdle for DSM to pass. Relaxing the cost-effectiveness threshold could lead to less-than-optimal choices in future as a result.

In the context of the ongoing high unit costs proposed by E1 and the central issues of affordability in this proceeding, NS Power believes the Board should be enhancing rather than reducing the focus on cost-effectiveness.

NS Power recommends the Board not approve E1's request to change the cost-effectiveness testing methodology from TRC to PAC for subsequent DSM plans. E1 should continue to screen on TRC and provide results by measure, program and portfolio for the TRC, PAC and RIM tests. The requirement to report several economic tests, including the RIM test which is an indicator of the effect of DSM on non-participants' rates, is consistent with a number of utility/administrators in North America and will provide a variety of perspectives regarding the cost-effectiveness of proposed DSM without unnecessarily restricting the test view.

8.0 RATE IMPACT, BILL IMPACT AND PARTICIPATION RATES

As part of the E1 DSM Plan, E1 filed a Rate and Bill Impact analysis as Appendix C to its Application. NS Power and other stakeholders had provided feedback on the Rate and Bill Impact analysis model ("RBIM") prior to E1's filing of its application.[50] While received, NS Power's feedback was not incorporated by E1 into the version of the RBIM filed with its Application.[51] One of the most critical issues which NS Power identified to E1 was that its RBIM did not recognize the revenue increases required to offset the loss of fixed costs which results from the reduction in electric energy sales caused by DSM participant savings.

In a capital-intensive industry such as the electric industry, ongoing recovery of fixed costs is essential. A portion of NS Power's approved fixed costs are included for recovery in the variable portion of its rates (i.e. cents/kWh charge). As DSM reduces energy consumption for participants, the volume of energy and demand determinants over which the fixed costs can be recovered is reduced. This contributes to upward pressure on rates. In General Rate Applications, NS Power's rates are adjusted commensurately to ensure that fixed costs continue to be appropriately recovered in future revenues. E1's RBIM does not account for recovery of this cost component, and as a result, provides incomplete and understated rate and bill impact analysis. E1 overstates the savings to direct DSM participants and understates the rate and bill increases which will be faced by non-participants.

E1 has stated that it will examine how lost contribution to fixed cost can be incorporated with future versions of the RBIM. NS Power is supportive of this approach. However, as noted above the current version of the RBIM is incomplete and should be disregarded by the Board and stakeholders. It fails to consider critical customer cost impacts and therefore provides an inaccurate portrayal of the potential rate and bill impacts.

[50] EfficiencyOne Evidence, February 27, 2015, Appendix D, Attachment 1 (ENS Responses to Stakeholder Feedback).
[51] EfficiencyOne Evidence, February 27, 2015, Appendix D, page 2.

9.0 RESERVE FUND

E1 has requested UARB approval of the establishment of a reserve fund. In support of its Application, E1 identifies a number of areas of risk, including termination or expiration of the franchise, reduction in funding from other sources and other general market risk factors.[52]

NS Power is opposed to this proposal because it would use ratepayer funds to insulate E1 from financial risks for which E1 is responsible. Further, several of the risks cited by E1 can be mitigated though effective management of its undertaking or through future regulatory processes.

In addition to the foregoing it is important to note, the Province has stated its intent that E1 bear the financial consequences of the supplier's inability to deliver on the cost and volume of the programs as expected:

> The franchise holder will be responsible for any cost overruns in program spending, and if they under-perform, the license could be opened up to competition.[53]

The Province does not provide that this performance expectation should be buffered by additional funding collected from NS Power customers.

Further comment on each of the areas of reserve funding requirement cited by E1 in its Evidence is provided below.

[52] EfficiencyOne Evidence, February 27, 2015, page 53.
[53] "Using Less Energy: Nova Scotia's Electricity Efficiency and Conservation Plan", April 2014, page 4: http://0-fs01.cito.gov.ns.ca.legcat.gov.ns.ca/deposit/b10670427.pdf

(a) Termination or expiration of the franchise

This "risk" is central to E1's undertaking and will be alleviated by effective program delivery. In terms of termination or expiration of the franchise, the Act is clear. The term of the franchise is 9 years. This gives the franchise holder the ability to prepare for the eventual expiration of the franchise without establishing a reserve in the initial contract period. Termination of the franchise is described in Section 79C (2) (d) of the Act and generally results from the franchise holder not meeting its franchise obligations. This risk factor is squarely within E1's control.

(b) Reduction in other funding sources that impact the ability of DSM programs to continue realizing the efficiencies of shared costs

E1 is proposing that electricity customers provide a funding source to shield the entity in the event that provincial funding is reduced. This is requested despite putting forward no evidence that demonstrates such a development is imminent, the cost implications of such a development, or what measures are available to E1 to mitigate such a development.

Ratepayer funding to address such a development is at best, premature. E1's Evidence has not established its requirement.

(c) Other factors external to the organization

Under other factors, E1 provides a list of general market risk factors faced by commercial entities. NS Power submits that these general market factors can be addressed most effectively through effective program implementation and monitoring. Should changes be required over the term of E1's franchise, it is likely these can be addressed through the established regulatory process.

In summary, NS Power submits that the protections afforded E1 under its franchise and through effective EECA implementation are sufficient to avoid the need for ratepayers to further insulate E1 from market challenges. In addition, mitigation requirements of many of the risks can be brought before the UARB for consideration at the appropriate time.

Through this Application E1 has undertaken to provide NS Power and its customers with electricity efficiency and conservation services. It falls to E1 to deliver on this undertaking. Additional insulation from NS Power customers should not be required.

NS Power recommends the Board reject E1's application to establish a reserve fund.

10.0 COST ALLOCATION

NS Power did not reach agreement with E1 on a suitable level of DSM for the Contract Period. As such, the Company did not provide cost allocation detail to E1. However, NS Power has considered the issue of cost allocation and does not believe that there are compelling reasons to deviate from the current methodology.

The Company is mindful of the Board's finding in its 2009 Decision on DSM cost allocation:

> The Board has considered the SA and evidence filed in the hearing. The Board accepts the proposed method of DSM cost allocation, 25% system cost and 75% participant cost, to be a fair and reasonable method to recover DSM costs. The benefits received by customers varies based on the level of participation by each customer class. It is reasonable and fair that the DSM costs be partially based and shared on the benefit received by the customers.[54]

While NS Power does not propose any changes in its filing, it acknowledges, there may be other approaches that stakeholders wish to review in this proceeding and is open to engagement on this matter.

[54] NS Power 2010 DSM Application, UARB Decision, NSUARB-NSPI-P-884(2), August 4, 2009, paragraph 66.

11.0 ICFI EVIDENCE

To assist in its analysis of the E1 DSM Plan, NS Power engaged ICFI to carry out a separate review and provide testimony. Attached hereto as Appendix A is a copy of the Direct Testimony of David Pickles, Senior Vice President for the Energy Efficiency Practice at ICFI.

12.0 CONCLUSION

From NS Power's perspective, the proposed E1 DSM Plan is neither cost-effective nor affordable for Nova Scotians. NS Power has no requirement for DSM over the Contract Period for capacity purposes or to comply with renewable electricity standards. Nevertheless, NS Power recognizes there is benefit to DSM over the long-term and supports its continuation at a lower investment level during the Contract Period.

In NS Power's view, DSM spending of approximately $22 million per year over the Contract Period would be in the best interests of Nova Scotia Power customers. This level of expenditure, in combination with other non-administrator energy saving initiatives, would achieve energy savings of approximately 100 GWh per year and enable NS Power to avoid adding any additional generation capacity until 2032 while reducing near-term rate pressure. The level and price of DSM as conceptualized by NS Power would be consistent with DSM spending in other Canadian jurisdictions and would ensure the greatest value for customers over the Contract Period while balancing near term affordability and long term savings potential.

Notwithstanding the level of DSM spending that is ultimately approved, any DSM plan proposed by E1 should be subject to the same rigour and scrutiny by the Board as a program or expenditure submitted by NS Power or any other public utility.

NS Power respectfully requests the Board:

1. Not approve the Application as filed by E1.

2. Direct E1 to design a DSM Plan with input from NS Power that would provide DSM spending of approximately $22 million and achieve savings of approximately 100 GWh per year over the Contract Period ("Revised 2016-18 DSM Plan").

3. Direct that the contract price to be paid by NS Power for the EECAs be allocated on an annual basis over the 3 year Contract Period. If E1 does not spend the full annual amount in a given year, it is to be deducted from the amount owing in the following year or refunded to customers.

4. Direct that a Board Decision on the allocation and recovery of costs of the Revised 2016-18 DSM Plan from NS Power be deferred until an Application is made by NS Power.

5. Not approve the establishment of a reserve fund as part of the DSM Plan for the Contract Period.

6. Not approve EI's request to change the cost-effectiveness testing methodology from TRC to PAC for subsequent DSM plans.

7. Direct E1 to screen on TRC and provide results by Measure, Program and Portfolio for the TRC, PAC and RBIM tests.

8. Direct E1 and NS Power to negotiate an agreement on the Revised 2016-2018 DSM Plan and finalize the Form of Agreement prior to resubmission to the Board for Approval.

9. Establish a standardized filing for future DSM applications in consultation with NS Power and other stakeholders

Direct Testimony of David Pickles

Senior Vice President

ICF International

Submitted to the

Nova Scotia Utility and Review Board

on behalf of

Nova Scotia Power

Date: April 10, 2015

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME.

A. My name is David K. Pickles. My business address is 7160 North Dallas Parkway, Suite 340, Plano, Texas 75024. I am employed by ICF International ("ICF"), as Senior Vice President.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING THIS TESTIMONY?

A. I am submitting this testimony to the Nova Scotia Utility and Review Board ("UARB") on behalf of Nova Scotia Power, Inc. ("NSP" or the "Company").

Q. PLEASE STATE YOUR EDUCATION, PROFESSIONAL AND WORK EXPERIENCE.

A. I am a 1986 graduate of the University of Wyoming with a Bachelor of Science Degree in Economics and a 1988 graduate of the University of Wyoming with a Master of Science Degree in Regulatory Economics. I have 25 years of experience in the planning, implementation, and evaluation of Demand Side Management ("DSM") programs. I have been employed by ICF for approximately ten years, and currently serve as Senior Vice President in the Energy Efficiency Practice. Prior to joining ICF, I was employed by: Navigant Consulting as Director in the energy efficiency practice; PHI Consulting, where I served as interim Chief Technology Officer for Honeywell's Energy Information Services business unit; Central and Southwest Utilities (now AEP) as Vice President of

Marketing, Development, and Operations for the unregulated energy services group; and Synergic Resources Corporation as a Director in the energy efficiency practice. I previously held positions as Utility Specialist and Senior Utility Analyst with the Iowa Consumer Advocates Office, and Utility Analyst II with the Iowa Utilities Board, where I was responsible for helping develop positions and testimony regarding energy efficiency and integrated resource planning. I have led the development of over 100 individual energy efficiency programs, including: program design, establishment of incentives, forecasting of participation, creation of marketing strategies, and estimation of implementation costs. I have also led the development of energy efficiency potential studies for utility clients in Arizona, Arkansas, Delaware, Florida, Hawaii, Illinois, Louisiana, Maryland, Michigan, Mississippi, North Carolina, South Carolina, Texas, Virginia, Washington, D.C., and Wisconsin. A statement of my background and experience is provided as Attachment A.

Q. PLEASE DESCRIBE ICF INTERNATIONAL.

A. Founded in 1969, ICF is a consulting and professional services firm supporting the energy, environmental, health, technology, and aviation sectors. Publicly traded (NASDAQ: ICFI) with over 5,500 staff and $1 billion in annual revenue in 2014, ICF currently implements more than 130 energy efficiency programs for 42 utilities in 28 states. ICF has also been the lead contractor for the Environmental Protection Agency's ("EPA")

ENERGY STAR® program since its inception and also supports the U.S. Department of Energy's Better Buildings and Commercial Building Alliance programs.

Q. WHAT ARE YOUR RESPONSIBILITIES AS SENIOR VICE PRESIDENT FOR ICF?

A. I manage ICF's delivery of regulatory policy and planning engagements, as well as ICF's energy efficiency business development activities.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE A REGULATORY COMMISSION?

A. Yes. I have testified before regulatory commissions in Arkansas, Iowa, Illinois, South Carolina, Virginia, Arizona, and Louisiana on issues related to energy efficiency program planning, design, and policy, and other ratemaking topics.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to summarize my review and provide recommendations with respect to the following issues:

- Sufficiency of the information provided by EfficiencyOne to permit the UARB, NSPI and stakeholders to make informed decisions with respect to the prudence of the programs.

- The reasonableness of the implementation costs associated with the programs.
- The adequacy of the range of programs, program designs, and spending levels considered by EfficiencyOne.
- The impacts of potential alternate levels of spending by EfficiencyOne.
- The appropriateness of the reporting standards and flexibility requested by EfficiencyOne.
- The suitability of performance targets and application of performance thresholds as proposed by EfficiencyOne.

Q. PLEASE SUMMARIZE THE PRIMARY FINDINGS AND RECOMMENDATIONS OF YOUR TESTIMONY?

A. I find that:

- The program information provided by EfficiencyOne is insufficient for regulatory approval and contract development, and I recommend that EfficiencyOne be directed to provide additional information;
- The reasonableness of the implementation costs has not been demonstrated and I recommend that EfficiencyOne be directed to provide additional evidence substantiating the costs;
- EfficiencyOne considered too narrow a range of progams and spending levels, and I recommend that EfficiencyOne be directed to assess a broader range of programs and spending levels with input from NSP;

- There exist potential alternate DSM portfolios which were not considered by EfficiencyOne, but that have potentially superior cost-effectiveness, rate impact, and other attributes, I recommend that EfficiencyOne be required to quantitatively evaluate such alternate portfolios;
- The reporting standards proposed are inadequate, and I recommend that EficiencyOne be required to provide more detailed and more frequent reporting; and
- The performance targets recommended by EfficiencyOne are too limited, and I recommend that additional targets be established.

These findings and recommendations are discussed in additional detail below.

Appropriateness of the Proposed DSM Program Portfolio

Q. HAVE YOU REVIEWED EFFICIENCYONE'S APPLICATION AND PROPOSED PORTFOLIO OF DSM PROGRAMS?

A. Yes, I have reviewed the Application and proposed programs and find three specific issues. First, the information necessary to approve the programs and a contract for implementation is incomplete. Specifically, there is insufficient information regarding the nature of the programs (qualifying measures, qualifying customers, incentive strategy, program

activities, budget detail, annual goals, etc.). Later in my testimony I identify the information that should be provided before the programs and a contract should be approved.

Second, to the extent that data is available, it suggests that some of the forecast program budgets may be excessive given the energy savings and services provided. I recommend that EfficiencyOne be required to demonstrate that its forecast costs are reasonable by: a) submitting for review the results of competitive bids received by EfficiencyOne, or b) by developing detailed program budgets and program implementation plans for review by NSP and the UARB.

Third, I find that EfficiencyOne did not consider a sufficient number of alternate scenarios reflecting a range of program attributes (by varying: incentive levels, participation rates, program types, program expenditures, measure mixes, energy savings, etc.). There are many different potential levels of DSM expenditure in Nova Scotia, each with its own energy saving, rate impact, affordability, equity, and risk attributes. In selecting its recommended spending level, I believe EfficiencyOne considered too narrow a range of program options and spending levels. I recommend that the EfficiencyOne plan be rejected, and that EfficiencyOne be directed to evaluate a broad range of alternatives and determine a more appropriate portfolio of programs.

Sufficiency of the Information Provided

Q. WHY DO YOU BELIEVE THAT INSUFFICIENT INFORMATION HAS BEEN PROVIDED WITH RESPECT TO THE PROGRAMS?

A. In order to assess the prudence of the activities and budget associated with each proposed program (and to enter into a contract providing for the implementation of that program), it is necessary to review the details of the program. As noted later in my testimony, EfficiencyOne provides only a very brief (averaging less than one page) narrative description of each program, and omits key items such as: incentive strategy, eligible measure descriptions, promotional plans, program activities, annual goals, staffing plans, and a detailed budget. Without these items, which, in my experience, are commonly required by regulators in other jurisdictions with third party implementers *before* approving such large expenditures, it is impossible to compare the programs to other programs and develop benchmarks demonstrating the reasonableness of the costs, nor is it possible to finalize an implementation contract that accurately describes the work to be performed. Later in my testimony, I provide a complete list of the information I recommend be submitted before approval of the programs and the contract by the UARB.

Reasonableness of the Proposed Costs

Q. WHY DO YOU BELIEVE THAT THE COSTS OF CERTAIN PROGRAMS MAY BE EXCESSIVE?

A. Given the limited information provided with respect to each program discussed above, it is difficult to make a determination that program costs are either too high or too low. However, to the extent that benchmarks are available, they suggest that EfficiencyOne's proposed programs may be more expensive than those of other DSM providers. Given this, I recommend that EfficiencyOne be required to provide additional evidence and demonstrate that its costs are reasonable or justify why it cannot deliver at a cost consistent with other Canadian jurisdictions and in line with their own 2014 reported costs.

Q. WHAT BENCHMARKS ARE YOU REFERRING TO?

A. Table 1 provides the residential portfolio cost in $/kWh for seven program administrators for 2013, along with the EfficiencyOne cost proposal for 2016-2018 (in bold). Appropriate conversions between US and Canadian dollars have been made, as have adjustments for inflation. Table 2 provides the same information for the non-residential portfolio.

Table 1. Residential DSM Portfolio Cost Benchmarks

Rank	State/ Province	Program Administrator	Data Type	Year	2016 CAD/ kWh
1	WI	Wisconsin Focus on Energy	Actual	2013	$0.12
2	ON	PowerStream	Actual	2013	$0.16
3	ME	Efficiency Maine	Actual	2013	$0.18
4	MB	Manitoba Hydro	Actual	2013	$0.23
5	ON	Hydro One	Actual	2013	$0.27
6	ON	Toronto Hydro	Actual	2013	$0.27
7	**NS**	**EfficiencyOne**	**Plan**	**2016-18**	**$0.31**
8	BC	BC Hydro	Actual	2013	$0.34

EfficiencyOne programs as modeled for 2016-2018 by Navigant.
Data for other administrators is net actual for PY2013
Source for other administrator data: ESource; Efficiency Maine

Table 2. Non-Residential DSM Portfolio Cost Benchmarks

Rank	State/ Province	Program Administrator	Data Type	Year	2016 CAD/ kWh
1	MB	Manitoba Hydro	Actual	2013	$0.07
2	WI	Wisconsin Focus on Energy	Actual	2013	$0.14
3	BC	BC Hydro	Actual	2013	$0.16
4	ME	Efficiency Maine	Actual	2013	$0.19
5	**NS**	**EfficiencyOne**	**Plan**	**2016-18**	**$0.25**
6	ON	PowerStream	Actual	2013	$0.30
7	ON	Toronto Hydro	Actual	2013	$0.30
8	ON	Hydro One	Actual	2013	$0.35

EfficiencyOne programs as modeled for 2016-2018 by Navigant.
Data for other administrators is net actual for PY2013
Source for other administrator data: ESource; Efficiency Maine

As shown in these tables, the EfficiencyOne residential portfolio ranks 7th out of eight portfolios, and the non-residential portfolio ranks 5th.

Table 3 provides the individual residential program costs in $/kWh for 39 residential programs provided by these administrators in 2013,

inclusive of the EfficiencyOne proposed costs for 2016-2018 (in bold). Table 4 provides the same information for 49 non-residential programs.

Table 3. Residential DSM Program Cost Benchmarks[1]

Rank	State/ Province	Program Administrator	Data Type	Program Name	Year	2016 CAD/ kWh
1	BC	BC Hydro	Actual	Residential Rate Structures	2013	$0.01
2	ON	Toronto Hydro	Actual	HVAC Incentives	2013	$0.04
3	WI	Wisconsin FOE	Actual	Residential Lighting and Appliance	2013	$0.04
4	ON	Hydro One	Actual	Conservation Instant Coupon Booklet	2013	$0.07
5	ME	Efficiency Maine	Actual	Residential Lighting Program	2013	$0.08
6	ON	Hydro One	Actual	HVAC Incentives	2013	$0.13
7	WI	Wisconsin FOE	Actual	Multifamily Direct Install	2013	$0.17
8	ME	Efficiency Maine	Actual	Refrigerator Recycling Programs	2013	$0.18
9	ON	Toronto Hydro	Actual	Appliance Retirement	2013	$0.18
10	MB	Manitoba Hydro	Actual	Refrigerator Retirement	2013	$0.19
11	MB	Manitoba Hydro	Actual	Home Insulation	2013	$0.21
12	**NS**	**EfficiencyOne**	**Plan**	**Efficient Product Rebates**	**2016-18**	**$0.22**
13	WI	Wisconsin FOE	Actual	Express Energy Efficiency	2013	$0.24
14	ON	Hydro One	Actual	Bi-Annual Retailer Event	2013	$0.24
15	WI	Wisconsin FOE	Actual	Appliance Recycling	2013	$0.25
16	MB	Manitoba Hydro	Actual	Water & Energy Saver	2013	$0.26
17	BC	BC Hydro	Actual	Refrigerator Buy-back	2013	$0.26
18	ON	Hydro One	Actual	Appliance Retirement	2013	$0.27
19	BC	BC Hydro	Actual	Consumer Electronics	2013	$0.30
20	WI	Wisconsin FOE	Actual	Multifamily Energy Savings	2013	$0.30
21	**NS**	**EfficiencyOne**	**Plan**	**Existing Residential**	**2016-18**	**$0.31**
22	MB	Manitoba Hydro	Actual	Lower Income Energy Efficiency	2013	$0.34
23	ON	Hydro One	Actual	Appliance Exchange	2013	$0.42
24	BC	BC Hydro	Actual	Renovation Rebate	2013	$0.42
25	ME	Efficiency Maine	Actual	Residential Appliances Program	2013	$0.45
26	**NS**	**EfficiencyOne**	**Plan**	**New Residential**	**2016-18**	**$0.49**
27	ON	Hydro One	Actual	Home Assistance	2013	$0.52
28	BC	BC Hydro	Actual	New Home	2013	$0.60
29	BC	BC Hydro	Actual	Behaviour	2013	$0.66
30	WI	Wisconsin FOE	Actual	New Homes	2013	$0.75
31	ON	Toronto Hydro	Actual	Home Assistance	2013	$0.98
32	ON	PowerStream	Actual	Home Assistance - Low Income	2013	$1.02
33	BC	BC Hydro	Actual	Appliances	2013	$1.14
34	ME	Efficiency Maine	Actual	Low Income Multifamily Electric Program	2013	$1.21
35	WI	Wisconsin FOE	Actual	Residential Rewards	2013	$1.49
36	WI	Wisconsin FOE	Actual	Home Performance with ES	2013	$2.04
37	WI	Wisconsin FOE	Actual	Home Heating Assistance	2013	$2.60
38	WI	Wisconsin FOE	Actual	Assisted Home Performance with ES	2013	$4.02
39	ON	Hydro One	Actual	Residential New Construction	2013	$13.27

[1] Certain portions of the data underlying this table are © E Source Companies LLC 2015 (E Source) and were obtained from E Source.

Table 4. Non-Residential DSM Program Cost Benchmarks

Rank	State/ Province	Program Administrator	Data Type	Program Name	Year	2016 CAD/ kWh
1	BC	BC Hydro	Actual	C&I Distribution Rate Structures	2013	$0.00
2	MB	Manitoba Hydro	Actual	Bioenergy Optimization	2013	$0.00
3	MB	Manitoba Hydro	Actual	Commercial New Buildings	2013	$0.03
4	MB	Manitoba Hydro	Actual	Performance Optimization	2013	$0.04
5	MB	Manitoba Hydro	Actual	Commercial Refrigeration	2013	$0.05
6	BC	BC Hydro	Actual	Industrial Load Displacement	2013	$0.10
7	ON	PowerStream	Actual	New Construction and Major Renovation Incentive	2013	$0.10
8	WI	Wisconsin FOE	Actual	Large Energy Users	2013	$0.10
9	MB	Manitoba Hydro	Actual	Commercial HVAC	2013	$0.13
10	MB	Manitoba Hydro	Actual	Commercial Earth Power	2013	$0.13
11	WI	Wisconsin FOE	Actual	Business Incentive	2013	$0.14
12	MB	Manitoba Hydro	Actual	Commercial Insulation	2013	$0.15
13	WI	Wisconsin FOE	Actual	Chain Stores and Franchises	2013	$0.15
14	ME	Efficiency Maine	Actual	Business Incentive Program	2013	$0.19
15	ON	PowerStream	Actual	Energy Manager	2013	$0.20
16	ME	Efficiency Maine	Actual	Large Customer Program	2014	$0.20
17	WI	Wisconsin FOE	Actual	Small Business Program	2013	$0.20
18	**NS**	**EfficiencyOne**	**Plan**	**Efficient Product Rebates**	**2016-2018**	**$0.20**
19	BC	BC Hydro	Actual	New Plant Design	2013	$0.21
20	**NS**	**EfficiencyOne**	**Plan**	**Custom Incentives**	**2016-2018**	**$0.24**
21	ON	PowerStream	Actual	Energy Audit	2013	$0.24
22	ON	PowerStream	Actual	Equipment Replacement Incentive Initiative - C&I	2013	$0.25
23	ON	Toronto Hydro	Actual	Energy Audit	2013	$0.25
24	ON	Toronto Hydro	Actual	Efficiency: Equipment Replacement	2013	$0.26
25	ON	Hydro One	Actual	Process & System Upgrades	2013	$0.27
26	ON	Hydro One	Actual	Efficiency: Equipment Replacement	2013	$0.28
27	MB	Manitoba Hydro	Actual	Commercial Lighting	2013	$0.29
28	BC	BC Hydro	Actual	Power Smart Partner - Transmission	2013	$0.32
29	WI	Wisconsin FOE	Actual	Retro Commissioning	2013	$0.35
30	ON	Hydro One	Actual	Direct Install Lighting	2013	$0.41
31	ON	Hydro One	Actual	Energy Manager	2013	$0.43
32	**NS**	**EfficiencyOne**	**Plan**	**Direct Installation**	**2016-2018**	**$0.46**
33	MB	Manitoba Hydro	Actual	Commercial Windows	2013	$0.46
34	BC	BC Hydro	Actual	Power Smart Partner	2013	$0.49
35	ON	PowerStream	Actual	Direct Install Lighting	2013	$0.50
36	BC	BC Hydro	Actual	New Construction	2013	$0.50
37	BC	BC Hydro	Actual	Power Smart Partner - Distribution	2013	$0.52
38	MB	Manitoba Hydro	Actual	Internal Retrofit	2013	$0.53
39	ON	Toronto Hydro	Actual	Energy Manager	2013	$0.59
40	BC	BC Hydro	Actual	Lead by Example	2013	$0.61
41	ON	Hydro One	Actual	New Construction and Major Renovation Incentive	2013	$0.72
42	ON	Toronto Hydro	Actual	Direct Install Lighting	2013	$0.75
43	ME	Efficiency Maine	Actual	Small Buisness Direct Install Program	2016	$1.12
44	ON	Toronto Hydro	Actual	New Construction and Major Renovation Incentive	2013	$1.23
45	WI	Wisconsin FOE	Actual	Renewable Energy Competitive Incentive	2013	$1.55
46	ME	Efficiency Maine	Actual	High Performance Schools Program	2015	$1.59
47	WI	Wisconsin FOE	Actual	Design Assistance	2013	$2.02
48	ON	Hydro One	Actual	Energy Audit	2013	$3.20
49	ON	PowerStream	Actual	Business Refrigeration Incentives	2013	$7.67

EfficiencyOne programs as modeled for 2016-2018 by Navigant.
Data for other programs is net actual for PY2013
Source for other administrator data: ESource; Efficiency Maine

As suggested by Tables 3 and 4, there exist different program types which are cheaper than the programs proposed by EfficiencyOne, and there are also programs of the same type proposed by EfficiencyOne which are provided at lower cost by other administrators.

While there may be differences between the programs included in the benchmark portfolios, and other valid and important differences which may explain the costs associated with the EfficiencyOne programs, these benchmarks make it clear that additional information is needed to justify the expense associated with the EfficiencyOne proposal.

Q. WHAT OTHER INFORMATION IS AVAILABLE TO BENCHMARK THE COST OF THE EFFICIENCYONE PROGRAMS?

A. Attachment B to my testimony provides a review of program costs for EfficiencyOne (previously Efficiency Nova Scotia Corporation or “ENSC”) and eight other organizations including:

- BC Hydro
- SaskPower
- Manitoba Hydro
- Ontario Independent Electricity System Operator
- Hydro Quebec
- New Brunswick Power
- Newfoundland Power and Newfoundland and Labrador Hydro
- Efficiency Maine

This review finds that:

- The EfficiencyOne portfolio ranks among the highest in DSM spending per capita and spending per customer
- EfficiencyOne has the most expensive programs in $ per first year kWh
- EfficiencyOne's actual spending and energy savings have varied significantly from planned values

For example, Table 5 summarizes actual and planned programs expenditures across Canada.

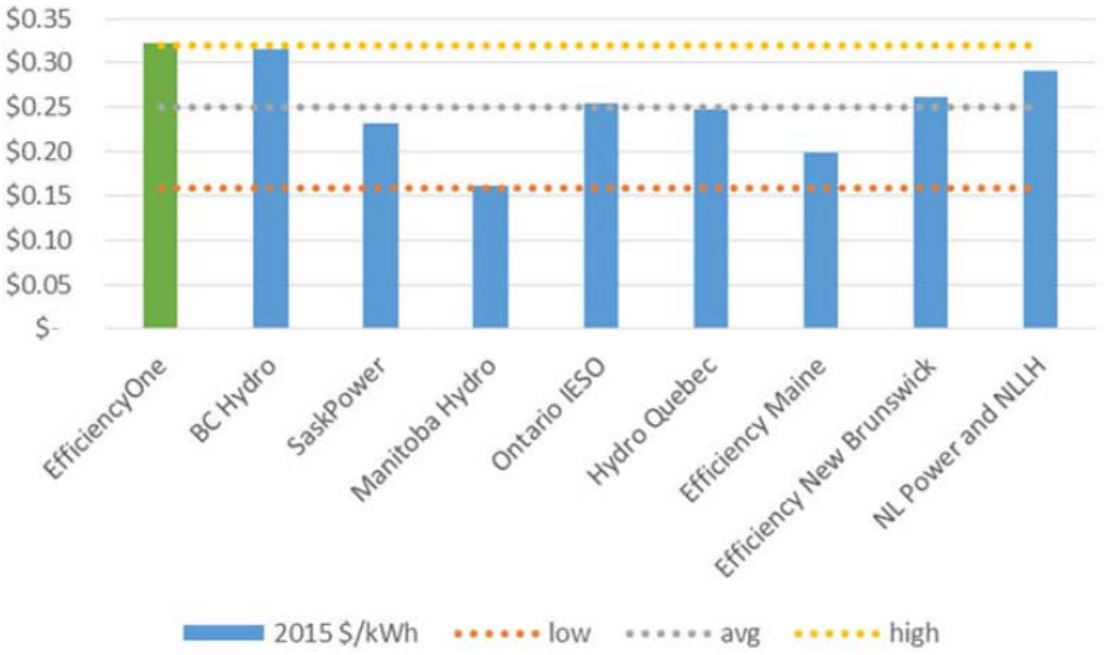
Table 5. Comparison of DSM Program Costs in Canada

		ACTUAL DSM SPEND		2015 PLAN DSM SPEND	
PROVINCE	YEAR	$DSM/CAPITA	$DSM/CUSTOMER	$DSM/CAPITA	$DSM/CUSTOMER
NOVA SCOTIA	2014	41.05	77.21	41.37	77.81
BRITISH COLUMBIA	2014	25.97	62.82	31.96	77.29
MANITOBA	2012	22.39	51.02	20.44	47.14
NEW BRUNSWICK	2013	22.07	47.51	24.54	52.71
ONTARIO	2013	19.67	55.52	22.57	63.72
QUEBEC	2014	14.61	28.97	16.43	32.59
SASKATCHEWAN	2013	13.92	30.74	8.89	19.96
NEWFOUNDLAND AND LABRADOR	2012	7.59	14.29	10.82	20.36

As shown in Table 5, planned 2015 spending by EfficiencyOne in Nova Scotia of $77.81/customer is the highest of all eight jurisdictions reviewed.

Figure 1 compares the 2015 planned cost of the programs ($/first year kWh) for the same jurisdictions, and shows EfficiencyOne to be the most expensive at $0.32 per kWh

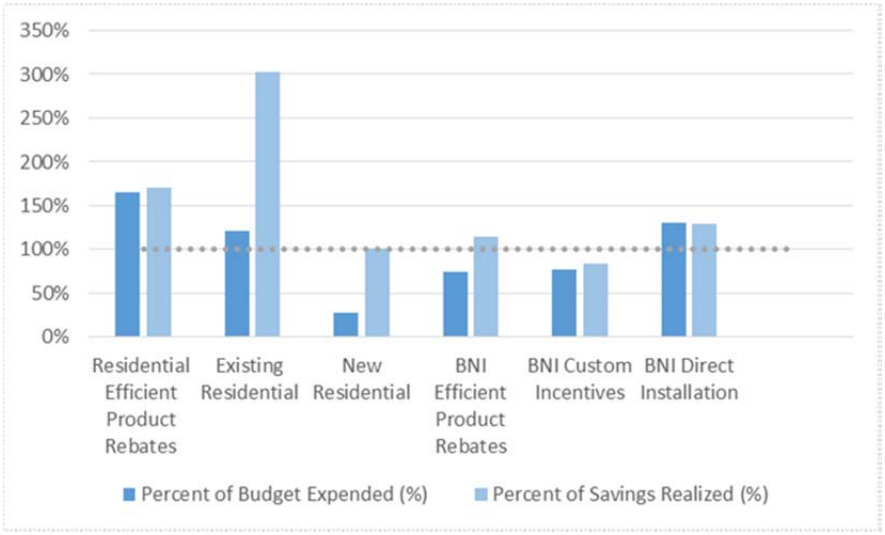
Figure 1. First Year Cost Comparison ($/kWh of Planned Savings)



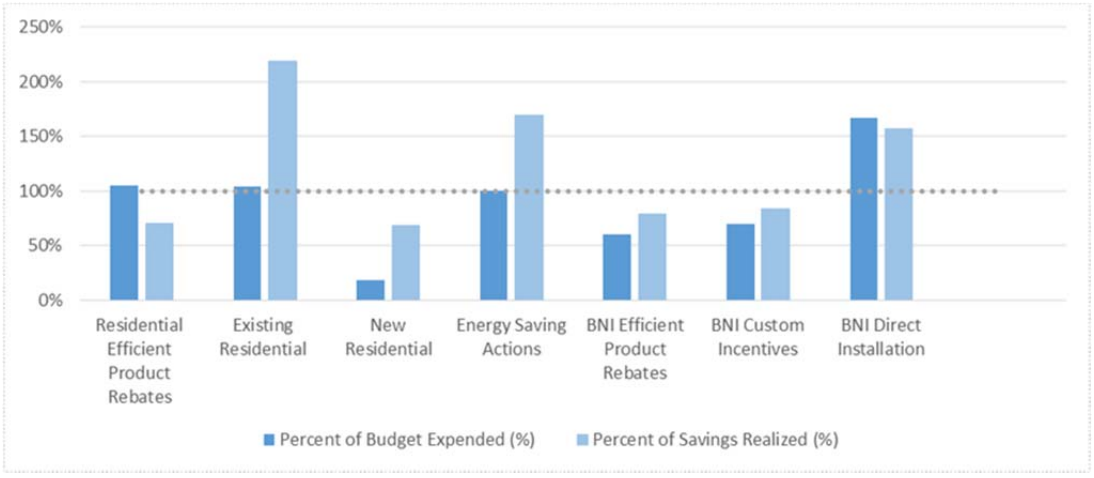
Finally, Figure 2 illustrates the variance between EfficiencyOne's planned and actual costs and savings for its 2013 and 2014 programs. For 2013 the actual program budgets varied between 27% and 165% of approved plan, and actual savings varied between 84% and 302% of approved plan. For 2014 the actual program budgets varied between 18% and 167% of approved plan, and actual program savings varied between 68% and 219% of approved plan.

Figure 2. Percentage Change from Approved to Actual $ and GWh

2013



2014



It appears from these benchmarks that EfficiencyOne's programs are the largest (per capita) and most expensive ($/kWH) of the Canadian administrators considered, and that they have often performed very differently than originally planned.

Q. HOW DO YOU RECOMMEND THE UARB PROCEED WITH RESPECT TO VALIDATING THE APPROPRIATENESS OF THE EFFICIENCYONE COST PROJECTIONS?

A. To the extent that EfficiencyOne intends to use subcontractors to deliver portions of its services, I recommend that EfficiencyOne be required to submit the results of its competitive procurement process to NSP and the UARB for review. To the extent that EfficiencyOne intends to deliver services using internal resources, I recommend that EfficiencyOne be required to: a) develop detailed scopes of work for those services, along with budget details, and b) benchmark those budgets against similar programs delivered by other administrators and demonstrate their reasonableness. I further recommend that EfficiencyOne be required to provide evidence that its cost and savings estimates are accurate and can be relied upon for budgeting and forecasting purposes.

Range of Scenarios Considered

Q. WHAT RANGE OF DSM PROGRAM TYPES DID EFFICIENCYONE CONSIDER?

A. According to Company IR-12(b) the only programs considered by EfficiencyOne were the six included in the final proposal, along with just three other programs. These other programs included the Home Energy Report program, a residential demand response program, and a business

demand response program. EfficiencyOne did not do any quantitative analysis of either demand response program, citing in part "…a lack of data or evidence on which to build assumptions for a program…[2]". EfficiencyOne did not perform a quantitative analysis of potential additional program types, including some of the low-cost programs identified in Tables 3 and 4, or other low-cost programs.

It is my opinion that EfficiencyOne should have considered and quantitatively analyzed a broader range of potential program types, especially low-cost programs, before limiting its selection to the proposed six programs.

Q. WHAT RANGE OF EXPENDITURES IN DSM PROGRAMS DID EFFICIENCYONE CONSIDER?

A. According to Company IR-12(c), only two levels of expenditure were considered by EfficiencyOne: a) an expenditure of approximately $50M per year, and b) the proposed expenditure of approximately $40M per year. It does not appear from the Application that EfficiencyOne analyzed potential expenditures in the range suggested by NSP.

It is my opinion that EfficiencyOne should also have considered lower levels of expenditure that have lesser impact on rates, along with different distributions of that expenditure across measures, current

[2] E1(NSPI) IR 12(c), March 27, 2015.

program types, and new programs in order to make the portfolio more cost-effective. This approach would support a quantitative analysis of the trade-offs between resource requirements, short-term and long-term considerations, construction of a balanced portfolio, affordability, and risk. While EfficiencyOne asserts that is has assessed these factors in developing its recommended portfolio, it has not done so in a quantitative fashion and entered it into evidence, thereby limiting NSP, intervenors and the UARB's ability to make informed decisions.

Q. IS IT COMMON FOR PLANNERS OF ENERGY EFFICIENCY PORTFOLIOS TO QUANTITATIVELY EVALUATE A WIDE RANGE OF POTENTIAL PROGRAMS AND EXPENDITURES?

A. In my experience, yes. Unless directed to spend a specific amount on specific programs, it is common for planners of such portfolios to consider a wide range of program types, designs, and expenditure levels. This typically involves development of several different scenarios which may reflect different incentive strategies, different distribution of funds across customer classes or types, and different perspectives with respect to other key assumptions. In my experience, this is not a particularly time consuming or burdensome task.

Q. COULD YOU PLEASE ILLUSTRATE THE CONSIDERATION OF ALTERNATE PROGRAM ASSUMPTIONS AND EXPENDITURE LEVELS?

A. Yes. In order to illustrate the potential impact of considering alternate policy and program assumptions, ICF and NSP developed alternate assumptions for four additional scenarios and used the ELRAM model provided by EfficiencyOne to generate new estimates of energy savings, demand savings, investment, and TRC ratio[3]. These scenarios include:

Scenario A: Which uses all EfficiencyOne's assumptions, with the exception that measures with a TRC of less than 1.0 are removed from participation. This results in the exclusion of 23 non-cost-effective measure types, and 152,397 individual participating measures from the analysis over the 2016-2018 time period. While the UARB has permitted the inclusion of non-cost-effective measures under certain conditions, I believe that EfficiencyOne has not made the case that any of the proposed non-cost-effective measures are appropriate, and certainly not that such a large number of non-cost-effective measures is necessary.

[3] Scenario C calculations did not use ELRAM to generate the new estimates, although it did rely on ELRAM output. Scenario C did not require modifying any inputs to the ELRAM model.

Scenario B: Which is the same as Scenario A and produces similar energy savings, with the exception that program implementation costs are allowed to vary plus or minus 20% relative to the EfficiencyOne assumptions. In addition incentive costs are allowed to vary between the EfficiencyOne assumed minimum and 100% of incremental cost (with the exception of incentives for solar which were allowed to float between the EfficiencyOne assumed minimum and 50% of incremental cost, and Fridge/Freezer recycling incentives which were allowed to range between specified dollar values). As noted previously, there is considerable uncertainty around the EfficiencyOne assumptions regarding program costs and incentive strategy due to lack of detail and documentation, and the benchmarking analysis presented above suggests that a sensitivity range of +/- 20% is reasonable.

With these assumptions now permitted to vary within a range (instead of being specified as a single point as modeled by EfficiencyOne) a range of participation rates and costs is developed using the ELRAM methodology and a distribution of potential outcomes is developed. The optimum value from this distribution (i.e., the least expensive) is chosen as the preferred portfolio for this scenario.

Scenario C: The “NS Power Alternate Scenario”, which was built by NS Power by grouping EfficiencyOne’s technology type or end-use category measures by their cost expressed in $ per first year kWh into “building blocks”, and then rank ordering them according to this cost. Starting with the least expensive block, additional blocks were added until the cost of the portfolio reached $22 million per year. An increase was made to the RES-HVAC/Shell category to address potential lost opportunities in the residential new home construction market. This increase included 4,600 MWh at a cost of $1.2 million, and is based on the 2014 Evaluation Report regarding new homes. The estimated cost of Enabling Strategies was reduced in proportion to the reduction in total program expenditures.

Scenario D: Which is the same as Scenario B, but permits a lower target energy savings (300 GWh) and demand savings (48 MW) goals, along with a lower expenditure level, by removing “floors” on participation that were imposed by the ELRAM model.

The output of ELRAM for these four scenarios, as well as for the EfficiencyOne proposal, are summarized in Table 6[4].

Table 6. Summary of Alternate DSM Scenarios

Scenario Name	Assumption Changes	Three Year Impacts			
		GWH	MW	$M	TRC
E1	None	405.9	62.5	$ 121.5	2.0
A	Eliminate TRC's < 1.0	387.0	59.8	$ 110.0	2.2
B	Eliminate TRC's < 1.0 Allow implemention costs to vary +/- 20% Allow incentive costs to vary from the E1 minimum Participation is estimated as a function of program cost, with goal ~ Scen. A	381.7	60.5	$ 107.9	2.2
C	NS Power Alternate Proposal	279.0	33.0	$ 65.4	3.2
D	Eliminate TRC's < 1.0 Allow implemention costs to vary +/- 20% Allow incentive costs to vary from the E1 minimum Participation is estimated as a function of program cost, with goal ~ 300GWh	300.8	46.3	$ 65.2	2.3

As shown in Table 6, the impact of eliminating the non-cost-effective measures (Scenario A) is to reduce the cost of the portfolio by $11.5M (~10%) while only reducing energy savings by approximately 5%. The TRC benefit cost ratio also improves from 2.0 to 2.2.

The impact of permitting reasonable variations in program costs and incentives (Scenario B) is to permit slightly lower energy savings and program costs relative to Scenario A.

The NS Power Alternate Scenario (Scenario C) provides 279 GWh and 33.0 MW of savings at a cost of $65.4 million. The impacts on a program-by-program basis are summarized in Table 7.

[4] Note that this analysis relies upon the participation forecasting algorithms within ELRAM and assumes that they accurately predict customer response to different program offerings and incentive levels.

Table 7. Summary of Scenario C (Company's Alternate Scenario) Impacts

Program Name	Cumulative Cost ($Millions)			Peak Demand (MW)			Cumulative (GWh)			TRC Ratio		
	E1	Case C	% Diff.	E1	Case C	% Diff.	E1	Case C	% Diff.	E1	Case C	% Diff.
RES-Appliance	*$ 5.06*	$ 5.06	0%	2.81	2.81	0%	18.39	18.39	0%	1.28	1.37	7%
RES-HVAC/Shell	$ 19.63	$ 3.60	-82%	13.81	3.60	-74%	51.07	13.80	-73%	1.51	2.88	90%
RES-Lighting	$ 11.88	$ -	-100%	7.90	-	-100%	37.14	-	-100%	3.78		-100%
RES-Plug Load	$ 6.80	$ 6.80	0%	-	-		41.86	41.86	0%	3.82	5.45	43%
RES-Water Heat	$ 4.11	$ -	-100%	2.35	-	-100%	13.38	-	-100%	1.09		-100%
RES-Package	*$ 6.02*	$ -	-100%	3.08	-	-100%	13.13	-	-100%	1.72		-100%
COM-Lighting	*$ 15.33*	$15.33	0%	8.38	8.38	0%	66.02	66.02	0%	1.88	2.48	32%
COM-Other	*$ 16.55*	$16.55	0%	8.99	8.99	0%	69.10	69.10	0%	2.78	3.84	38%
COM-HVAC	*$ 11.09*	$ -	-100%	5.08	-	-100%	26.77	-	-100%	1.08		-100%
COM-Motors	*$ 0.48*	$ 0.48	0%	0.35	0.35	0%	3.04	3.04	0%	3.51	4.85	38%
COM-Refrigeration	*$ 0.72*	$ 0.72	0%	1.09	1.09	0%	3.27	3.27	0%	2.55	3.18	25%
COM-Process	*$ 0.33*	$ 0.33	0%	0.41	0.41	0%	2.67	2.67	0%	2.74	3.77	37%
IND	*$ 12.56*	$12.56	0%	8.21	8.21	0%	60.10	60.10	0%	2.67	3.49	30%
TOTAL Programs	***$ 110.55***	**$61.43**	**-44%**	**62.46**	**33.84**	**-46%**	**405.93**	**278.25**	**-31%**	**2.40**	**3.20**	33%
Enabling Strategies	*$ 10.90*	$ 4.06	-63%									
Educ. and Outreach	$ 5.10											
Develop. & Research	$ 3.60											
Other	$ 2.20											
TOTAL w/Enab. Strat.	**$ 121.45**	**$65.48**	-46%	62.46	33.84	-46%	405.93	278.25	-31%			
1st Yr. Unit Cost $/kWh	$ 0.30	$ 0.24	-21%									

Finally, the impact of permitting lower levels of participation (Scenario D) and selecting a least-cost portfolio that meets a 300 GWh energy savings target is to permit spending of only $65.2M (54% of the EfficiencyOne proposal) to achieve 300.8 GWh of savings (74% of the EfficiencyOne proposal.) The results of this process on a program-by-program basis are provided in Table 8, and details of the specific adjustments are provided in Attachment C.

Table 8. Summary of Scenario D Impacts

Program Name	Cumulative Cost ($Millions)			Peak Demand (MW)			Cumulative (GWh)			TRC Ratio		
	E1	Case D	% Diff.	E1	Case D	% Diff.	E1	Case D	% Diff.	E1	Case D	% Diff.
Efficient Products (Res)	$ 7.83	$ 4.47	-43%	3.33	2.30	-31%	35.24	27.48	-22%	1.71	1.84	7%
Existing Residential	$ 40.34	$24.30	-40%	23.54	19.95	-15%	128.82	112.36	-13%	1.91	2.21	16%
New Residential	$ 5.33	$ 2.77	-48%	3.08	2.46	-20%	10.90	8.71	-20%	2.63	2.77	5%
Efficient Products (BNI)	$ 20.25	$ 7.60	-62%	15.80	9.73	-38%	99.70	60.36	-39%	2.15	2.18	2%
Custom Incentives	$ 24.74	$10.96	-56%	12.80	10.11	-21%	102.51	80.57	-21%	2.71	2.78	3%
Direct Install	$ 12.06	$ 4.20	-65%	3.55	1.77	-50%	26.33	11.31	-57%	1.06	1.69	60%
TOTAL Programs	***$ 110.55***	**$54.30**	**-51%**	**62.09**	**46.32**	**-25%**	**403.50**	**300.79**	**-25%**			
Enabling Strategies	*$ 10.90*	$10.90	0%									
TOTAL w/Enab. Strat.	**$ 121.45**	**$65.20**	-46%	62.09	46.32	-25%	403.50	300.79	-25%	2.02	2.30	14%
1st Yr. Unit Cost $/kWh	$ 0.30	$ 0.22	-28%									

It should be noted here that I am not asserting that any of the above scenarios are necessarily the most appropriate for Nova Scotia. Rather, this analysis demonstrates that under an alternate set of reasonable assumptions and policy decisions, the cost of the EfficiencyOne portfolio could be significantly lower than proposed and still provide meaningful energy and demand savings.

Q. HOW DO YOU RECOMMEND THE UARB PROCEED?

A. I recommend that EfficiencyOne be directed to engage with NSP to consider a broad range of program types and program expenditures, that consider trade-offs between various policy objectives in a quantitative manner wherever feasible.

The consideration and balancing of policy objectives (especially rate impact, equity between customer classes, short-run versus long-run resource needs, and the opportunity for all customers to participate in a

program over time) is, in my opinion, an important function of the utility and its regulator. The fact that different jurisdictions come to different conclusions with respect to these objectives is illustrated by the wide diversity of program budgets, energy savings, rate impacts, and program types across North America. It is my belief that the process proposed herein will help the UARB ensure that its perspectives on the balancing of these objectives is correctly and demonstrably reflected in the approved DSM portfolio, and that this process will help the UARB provide clear and substantiated direction regarding the appropriate cost, design, and goals of the DSM programs.

Contractual, Reporting, and Approval Requirements

Q. HAVE YOU REVIEWED EFFICIENCYONE'S PROPOSED "SUPPLY AGREEMENT FOR ELECTRICITY ENERGY EFFICIENCY AND CONSERVATION ACTIVITIES BETWEEN NOVA SCOTIA POWER INCORPORATED AND EFFICIENCYONE" (THE "AGREEMENT")?

A. Yes, I have reviewed the application and the proposed Agreement with respect to the following issues:

- Adequacy of the description of the contracted for scope of services,
- Sufficiency and timing of the reporting activities and corrective action planning,
- Appropriateness of the requested flexibility, and

- Presence of appropriate performance standards, remedies for underperformance, and the use of annual versus 3-year performance goals.

Q. DO YOU HAVE ANY PERSONAL EXPERIENCE NEGOTIATING CONTRACTS FOR THE PROVISION OF ENERGY EFFICIENCY PROGRAMS?

A. Yes. I have personally led contract negotiations for over 100 energy efficiency programs with a combined budget exceeding $US 1 Billion with more than 40 different electric utilities. I have also negotiated contracts with, or on behalf of, 15 of the largest energy efficiency program implementers in North America.

Q. PLEASE SUMMARIZE YOUR REVIEW OF THE EFFICIENCYONE PROPOSAL.

A. The EfficiencyOne proposal does not support the level of oversight, information, and management supervision necessary to ensure prudent delivery of the programs and is inconsistent with standard industry practice. In being responsible for both the reliability of the power system and ensuring that sufficient capacity is available and environmental compliance is achieved, NSP is relying on EfficiencyOne to deliver the programs as described, efficiently, on time, and on budget. Further, NSP wishes to ensure that its customers receive appropriate levels of service

from EfficiencyOne. To meet these objectives and be consistent with standard practice, greater detail regarding program activities, achievements, and costs is required on a much more frequent basis than proposed by EfficiencyOne. In addition, the autonomy and flexibility proposed by EfficiencyOne (as the implementer) is inappropriate and inconsistent with standard practice no matter what the level of reporting and oversight required by the regulator.

As discussed later in my testimony, I recommend that additional scope of work descriptions, reporting activities, approval processes, remedies, and performance requirements be established. Each of these recommendations is discussed below.

Adequacy of the Description of the Scope of Services

Q. WHAT DESCRIPTION OF THE PROPOSED PROGRAMS AND SCOPE OF WORK IS PROVIDED BY THE APPLICATION?

A. The most detailed description of the proposed programs is provided in Appendix A of the Application starting on page 7. However, the provided descriptions are very brief (averaging less than one page per program) and lack many of the details necessary to either: a) assess the appropriateness of the program design and budget, or b) track implementation of the program and ensure that promised program activities are being delivered.

For example, the program descriptions generally do not specify the list of qualifying measures, the required efficiency level, customer qualification standards, rebate strategy, delivery mechanism, marketing strategy, and other important attributes of the program. Such lack of detail makes it very difficult to determine exactly what EfficiencyOne intends to provide, and for NSP to administer the contract in a way that ensures that the programs are implemented as contracted. Similarly, the program descriptions do not provide anticipated participation and savings by year, which makes it impossible to track progress against goals until the end of the proposed three-year approval period (thereby potentially reducing the ability to make mid-course corrections).

Further, it does not appear that even high-level "category" budgets (and presumably the associated scope of work) have been developed for the programs. In response to Company Information Request 12(g)(viii), EfficiencyOne indicated that:

> *"The 2016-2018 DSM Resource Plan is not an implementation plan; detailed program budgets have not yet been developed."*

Similarly, in response to E1 (NSPI) IR-1(a), EfficiencyOne indicated that:

> *2016-2018 DSM implementation budgets, including an advertising budget, will be developed after receiving the UARB's Decision on the 2016-2018 DSM Resource Plan."*

I am not aware of any other jurisdiction that has approved programs on such limited information. And while some jurisdictions may approve programs without all of the details being finalized and submitted for review, these jurisdictions typically follow-up the approval with a detailed procurement and contracting process. This process results in a contract that spells out the deliverables, costs, and goals in great detail. The structure in Nova Scotia is somewhat unique, in that this step is missing since EfficiencyOne is both the exclusive franchise holder and implementation contractor and that no further contracting with NSP is anticipated. It is therefore important that the Agreement clearly set forth all the deliverables and expectations for the programs and EfficiencyOne's performance.

Q. WHAT INFORMATION DO YOU RECOMMEND EFFICIENCYONE BE REQUIRED TO PROVIDE TO SUPPORT EVALUATION OF THE PRUDENCE OF THE PROGRAMS AND DEVELOPMENT OF A CONTRACTUAL SCOPE OF WORK?

A. I recommend that at least the following be provided for each program:

- A description of the measures to be included in the program, including specification of the qualifying efficiency level(s) and assumed baseline technology

- A description of the incentive to be provided, including the dollar amount (or value of free/subsidized services if applicable), the recipient of the incentive (e.g., owner versus contractor), and any relevant conditions (e.g., a cap on the incentive amount) and any customer qualification restrictions, including justification as to the size of the incentive
- A description of the program logic model, identifying how the program intends to influence participants to select the covered energy efficient equipment
- A description of the target market, including size and key characteristics
- A description of any activities to recruit, support, monitor, and perform QA/QC on trade allies or other market participants
- A count of all major program activities/achievements/deliverables anticipated by year as applicable (e.g., number of trade allies recruited, number of trainings, etc.)
- A description of, and budget for, marketing and promotional activities
- A staffing plan, indicating number of FTEs and general position descriptions and responsibilities
- Annual energy and demand savings
- Annual participation by measure
- Annual budget detail, including at least the following categories: incentives (cash), incentives (free/discounted services), administration,

marketing, EM&V, QA/QC, application/incentive processing, IT, and other implementation services

- Customer service standards/metrics as may be applicable to each program type (e.g., rebate cycle time, rebate flaw rate, customer satisfaction, availability/timing of site visits)
- High-level EM&V plan

Q. ARE THE ABOVE REQUIREMENTS CONSISTENT WITH STANDARD PRACTICE?

A. Yes. In my experience, most of the above information is required in the majority of jurisdictions before regulators will approve the programs. Further, the above information is generally present in almost all implementation contracts that I have seen no matter what the level of regulatory oversight.

Sufficiency and Timing of the Reporting Activities and Corrective Actions

Q. HAVE YOU REVIEWED EFFICIENCYONE'S PROPOSED REPORTING?

A. Yes. EfficiencyOne proposes to provide:

- An Annual Progress Report (APR)
- Quarterly Meetings and Reports, and
- Evaluation Reports (impact evaluations annually and process evaluations on a rolling basis)

EfficiencyOne's Evidence (at pages 44 and 45) provides an overview of the proposed content of this reporting.

Q. DO YOU FIND EFFICIENCYONE'S REPORTING TO BE SUFFICIENT?

A. No. As with the need for a detailed scope work discussed above, EfficiencyOne's unique position as both planner and implementer of the programs requires that the reporting be more frequent and detailed in order to support appropriate regulatory oversight.

Q. WHAT SPECIFIC IMPROVEMENTS IN THE PROPOSED REPORTING DO YOU RECOMMEND?

A. As proposed by EfficiencyOne, the APR would include:

- A summary of the context, activities and milestones achieved in the prior year and include status of annual performance indicators
- A management discussion and analysis of any major discrepancies relative to the original plan's intent and forecasts
- A summary of the costs and savings for each program or target market area. If the total reported results fall below 75% of the original forecast for the program, EfficiencyOne will also file a corrective action plan

I recommend that the specific data elements of the APR be made explicit, and be expanded to include (in addition to the above and separately for each program):

- Participation (measure count) by measure and comparison to plan
- Participation (individual customer count) by customer type and by program
- Project/participant pipeline
- Energy (annual and lifetime) and demand savings by measure
- Detailed performance metrics for each program (see the discussion below)
- Expenditure by category and comparison to budget
- A description of customer and trade ally complaints, and discussion of resolution
- Benefit cost ratios (TRC, PAC, and RIM) for the year and program cycle to date
- Updated forecasts (participation, savings, and costs) for the next 12 months

Further, I would recommend that the above information be filed quarterly (with the exception of the benefit cost ratios, which should be filed annually). Indeed the data requirements above are based in part on the quarterly filing requirements of the Maryland Public Service Commission, and similar data requirements can be found in other U.S. states. This information is necessary on a quarterly basis so that NSP can accurately monitor “construction” of the DSM resource and identify any needed changes in a timely fashion.

I also recommend a requirement to develop and request approval of a corrective action plan if energy or demand savings fall below 85% of goal (instead of the 75% proposed), and that this requirement also operate on a quarterly basis. In my experience, any savings achievement less than 100% of goal is a serious problem, and savings shortfalls tend to snowball if not addressed quickly. The 85% threshold and a quarterly review should help avoid such problems and ensure that stakeholders understand and approve of any program or implementation changes.

Finally, in contrast to the EfficiencyOne proposal which appears to contemplate an “advisory” filing of any corrective action plans, I recommend that the UARB, with input from the DSM Advisory Group, approve, reject, or modify such plans since they will likely involve a deviation from the scope of work and performance requirements of the Agreement.

Appropriateness of the Requested Flexibility

Q. EFFICIENCYONE REQUESTS THE FLEXIBILITY TO MAKE SIGNIFICANT CHANGES TO THE APPROVED PLAN (INCLUDING ACTIONS SUCH AS ADDING A NEW PROGRAM, TERMINATING A PROGRAM, AND INCREASING/DECREASING SECTOR BUDGETS OR SAVINGS GOALS BY MORE THAN 25%) BY NOTIFYING THE UARB AND STAKEHOLDERS AS A PART OF THE ANNUAL REPORTING PROCESS (EFFICIENCYONE EVIDENCE, PAGE 44, LINE 28). IS THAT APPROPRIATE?

A. No. The lack of a required approval by NSP and the UARB would effectively give EfficiencyOne complete discretionary control over changes that could significantly affect the outcome, equity, rate impacts, and cost of the Plan, and potentially put at risk the DSM resources that NSP is relying upon to replace generation. I am not aware of any jurisdiction that gives to the implementer unilateral authority to make such significant changes to the programs. Indeed, most jurisdictions provide very little flexibility to change program designs, budget, or goals – and many provide no flexibility at all.

As with the corrective action plans, significant changes (including those identified by EfficiencyOne above) should be subject to review, approval, or modification by the UARB, with the input of the DSM Advisory Group, since the plans will almost certainly require deviation from the

terms of the Agreement. Further, I recommend against attaching the "program change" process to the APR process, since this may unnecessarily delay important revisions.

Q. HOW DO YOU SUGGEST THE NEED FOR FLEXIBILITY BE ADDRESSED?

A. I support the inclusion of a mechanism which provides flexibility during program implementation, and which does so in a timely and efficient manner. I suggest that such a process be triggered by any of the following requested actions:

- The addition or deletion of a measure that comprises more than 5% of the annual energy or demand savings of any program
- A revision to the incentive strategy that changes the annual incentive budget for any program by more than 5%
- Any modification that results in a change in annual program budget of more than 5%
- Any change that results in a change in annual program energy or demand savings of more than 5%

In the event that EfficiencyOne desires to propose such an action, it should be free to do so at any time by providing a request to the UARB with notification and an opportunity to object given to NSP, and by including all information supporting the desired action. The UARB should

be given a reasonable time (perhaps 30 calendar days) to accept, reject, or request additional information regarding the action. Any action request not responded to within 30 days should be deemed approved.

Performance Standards, Annual vs. 3-year Goals, and Remedies

Q. WHAT PERFORMANCE TARGETS DOES EFFICIENCYONE PROPOSE TO ESTABLISH FOR THE PROPOSED PROGRAMS?

A. EfficiencyOne proposes two “Performance Targets”: 1) cumulative annual portfolio energy savings, and 2) cumulative annual portfolio demand savings. In both cases “cumulative annual” means the annual energy(demand) saved as measured at the end of the three year period 2016-2018 for all programs combined. EfficiencyOne proposes that it be deemed to have met its performance requirement if it meets 90% of these two targets. EfficiencyOne also proposes to annually file information regarding other “Program Indicators”, including:

- Incremental (each year’s) demand and energy savings
- Savings over the lifetime of the measure
- Total ratepayer benefits
- Total spending, and
- Customer satisfaction.

These indicators would be at the portfolio level, for informational purposes only, and would not be used to formally assess performance.

Q. DO YOU BELIEVE THAT THE PROPOSED PERFORMANCE TARGETS ARE SUFFICIENT?

A. No. I recommend the following improvements to the targets:

- Shortening the energy and demand portfolio performance targets to a one year time horizon (Annual Incremental) instead of the three years (Cumulative Annual) as proposed
- Adding portfolio Annual Spending (specifically, not exceeding the approved annual budget) as a Performance Target

I also recommend adding program level reporting on all metrics as Performance Indicators, as well as program specific measures of customer satisfaction and customer service, including items such as rebate cycle time, data quality, and timeliness of program operations and on-site inspections (depending on the final nature of the programs chosen). Table 9 compares these modifications to the EfficiencyOne proposal.

Table 9. Comparison of Performance Targets and Indicators

Reporting Level	Performance Metric	Unit	E1	ICF
Portfolio	Energy Savings			
	Annual Incremental (each year)	GWh	○	●
	Cumulative Annual (over 3 years)	GWh	●	●
	Lifetime Savings	GWh	○	○
	Peak Demand Savings			
	Annual Incremental (each year)	MW	○	●
	Cumulative Annual (over 3 years)	MW	●	●
	Other Indicators			
	Total Ratepayer Benefits	$M	○	○
	Total Spending	$M	○	●
	Customer Satisfaction	%	○	○
Program	Energy Savings			
	Annual Incremental (each year)	GWh	n/a	○
	Cumulative Annual (over 3 years)	GWh	n/a	○
	Lifetime Savings	GWh	n/a	○
	Peak Demand Savings			
	Annual Incremental (each year)	MW	n/a	○
	Cumulative Annual (over 3 years)	MW	n/a	○
	Other Indicators			
	Total Ratepayer Benefits	$M	n/a	○
	Total Spending	$M	n/a	○
	Customer Satisfaction	%	n/a	○
	Program Specific Customer Servic	Various	n/a	○

○ Metric Used as a reported Annual Performance Indicator (no "target")

● Metric Used as a Performance Target

Q. WHY ARE THESE MODIFICATIONS NECESSARY?

A. The shortening of time horizon to reflect annual savings achievement is necessary because the three-year time horizon proposed does not permit evaluation of EfficiencyOne's satisfaction of the performance requirement until after the first quarter of 2019. This is too late to assist EfficiencyOne with modifications to improve the performance of the programs, or in the

extreme, to recommend termination of the contract and seek authorization from the UARB to either build the missing capacity, seek the savings from another DSM supplier, or take other action. Note that for the ten jurisdictions included in the detailed, case-by-case assessment discussed in EfficiencyOne's Evidence Appendix G (the review of DSM Performance Indicators by Dunsky Energy Consulting) the majority use annual (as opposed to multi-year) performance targets. And, in my experience, the use of annual performance targets is much more common than the use of multi-year targets.

Further, the addition of "budget spend" as a performance target is important to ensure that funds are not moved between program years without proper consideration and approval.

Lastly, while I do not recommend that program level metrics be used as performance targets, the monitoring of the annual performance of individual programs is important to ensure efficiency of delivery and program design, and equity between customer classes. Therefore, it is appropriate to include program level metrics as Performance Indicators.

Q. DO YOU HAVE ANY RECOMMENDATIONS REGARDING APPLICATION OF THE PERFORMANCE THRESHOLDS?

A. Yes. I agree with EfficiencyOne that a reasonable Performance Threshold for EfficiencyOne would be 90% of any Performance Target. However, I

also suggest that failure to meet such a target should be construed as a potential default under the Agreement, and that failure to cure that default in a satisfactory time period or to develop and make acceptable progress on a corrective action plan, should be grounds for consideration by the UARB of termination or modification of the Agreement.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

David Pickles — ICF International

SENIOR VICE PRESIDENT

EDUCATION

Master of Science Degree in Regulatory Economics, University of Wyoming, Laramie, Wyoming, 1988
Bachelor of Science Degree in Economics, University of Wyoming, Laramie, Wyoming, 1986

EXPERIENCE OVERVIEW

Mr. Pickles serves as a Senior Vice President for the Energy Efficiency Practice, where he is responsible for project execution, business development, and management. Mr. Pickles has over twenty five years experience as a regulator, utility senior executive, and industry consultant focused on energy efficiency. Experienced with energy efficiency program design and management, product assessment and business planning, marketing, operations, rate making, and regulatory policy he has helped numerous pubic and private sector clients evaluate and implement over 100 individual energy efficiency programs and testified as an expert witness on over 20 occasions.

PROJECT EXPERIENCE

ENERGY EFFICIENCY PROGRAMS, POLICY, AND IMPLEMENTATION

For a confidential Southwestern electric utility, provided a detailed assessment of DSM cost recovery mechanisms including financial modeling of alternative DSM cost recovery, lost margin, and shareholder incentive mechanisms.

For Entergy, provided an overview of energy efficiency shareholder incentive and lost margin recovery mechanisms, developed regulatory filing documents and represented the company in stakeholder and regulatory meetings.

For the Maryland Energy Administration, provided an analysis of DSM program cost recovery and rate making practices, including assessment of potential models and utility oversight practices.

For, Hawaii Electric Light Company, provided screening of potential DSM programs and rate designs, detailed cost-effectiveness analysis, program design and implementation guidelines, review of cost recovery and incentive mechanisms, and preparation of regulatory filing documents.

For Arizona Public Service, provided testimony regarding the appropriate recovery of DSM program cost, lost margins, and shareholder incentives.

For Oncor and CenterPoint provided DSM cost recovery and shareholder incentives programs design for submission to the Public Utility Commission of Texas.

For SCANA, provided DSM potential analysis and testimony regarding the ability of DSM to defer the need for a nuclear power plant.

Developed DSM program filings (including DSM potential, detailed program designs, regulatory filing and benchmarking documents) for the Southern Maryland Electric Cooperative.

Developed DSM program filings (including DSM potential, detailed program designs, regulatory filing and benchmarking documents) for the electric and gas service territories of We Energies (Wisconsin).

For Progress Energy Carolinas, developed a DSM market potential study in North and South Carolina.

Drafted the energy efficiency chapters of Texas state energy plan on behalf of the Texas Governor's Office.

Developed DSM program filings (including DSM potential, detailed program designs, regulatory filing and benchmarking documents, and full implementation services) for Baltimore Gas and Electric.

Facilitated the efforts of the North American Energy Standards Board to develop ANSI certified standards for DSM planning and evaluation.

Supported the State of Delaware in the analysis and introduction of a Sustainable Energy Utility.

For Delmarva Power and Light, estimated achievable DSM savings potential over a 25 year planning horizon and prepared the IRP filing, answered data requests, and participated in regulatory proceedings.

For Potomac Energy Power Company, developed three-year DSM implementation plans for service territories in Maryland and the District of Columbia. Assistance included evaluating programs for cost effectiveness by accounting for customer counts, demographics, and avoided costs unique to each territory and assisting in the preparation of budget estimates and forecasting of participation and load impacts. Prepared regulatory filing documents and participated in hearings before the Maryland Public Service Commission.

For Exelon, Mr. Pickles provided detailed energy efficiency program design guidelines and implementation plans for a commercial lighting rebate program and a residential air conditioning tune-up program.

For Maui Electric, Mr. Pickles provided DSM program screening, cost effectiveness evaluation, and program design and implementation guidelines.

For Centerior DSM Collaborative Mr. Pickles provided a review and analysis of the structure and procedures of a diverse collaborative, developing recommendations for process improvements.

For Iowa-Illinois Gas & Electric, reviewed all DSM implementation activities. Mr. Pickles analyzed Iowa-Illinois' implementation activities for consistency with administrative rules and regulatory expectations.

For Peoples Natural Gas, developed an energy efficient customer financing program. Provided program design and analysis for a customer financing program in multiple states, including program design, solicitation of banks and other financial institutions, contract negotiation, and implementation procedures.

For a consortium of utilities, including: Consolidated Edison, Southern Indiana Gas and Electric, Tucson Electric, and Hawaiian Electric, reviewed energy efficiency financing programs. Included an analysis of the structure and risk profiles of potential financing techniques, a best practices review of the financing programs of other utilities and other industries, market research including conjoint analysis, and development of program design recommendations.

Assessed energy efficiency new business opportunities, including financing and leasing. Assisted in the market research (focus groups, conjoint survey) and managed a project to determine competitive activities in financing, new business planning methodologies, and forecasted profitability for new business ventures.

For Florida Power Corp, developed a DSM financing program including financial structure and process flows.

For Carolina Power and Light, surveyed energy efficiency financing programs. Provided a survey and best practices review of utility financing programs.

For a confidential Midwestern utility, assessed the potential for customer financing programs to provide customer acceptance consistent with that of simple subsidies and rebates. This project included an analysis of the DSM and marketing goals of the utility, an analysis of the change in economic benefit under financing, a review of acceptance experienced by other utilities, and recommendations for program design.

For multiple clients, prepared an analysis of innovative DSM in a competitive environment. Mr. Pickles provided a summary and analysis of innovative approaches to allocating and collecting the economic costs of DSM programs from program participants and non-participants. This project includes a survey of all state regulatory commissions and selected utilities, and a comparative analysis of rate impacts, effectiveness and equity.

For Wisconsin Public Service, Mr. Pickles provided a comparative analysis of DSM rebate and DSM loan programs to assess the ability of each to address regulatory goals and to identify the optimal design elements of DSM financing programs.

For Indiana Municipal Power Agency, assessed the rate and revenue impacts of DSM programs. Mr. Pickles provided revisions to IMPA's DSM programs, and provided detailed analysis of the timing and level of rate impacts and revenue fluctuations.

For Hawaii Electric Company, provided a screening of various potential energy efficiency rate designs (including time-of-use rates, interruptible rates, and stand-by generation rates.) Based on the results, Mr. Pickles developed detailed rate designs and implementation plans for the selected rates, and prepared regulatory filings.

For Guam Power Authority, provided an analysis and design of avoided cost based time-of-use and interruptible rates. Mr. Pickles designed and evaluated TOU rates for all customer classes and large customer interruptible rates based on application of avoided costs.

NEW BUSINESS AND PRODUCT PLANNING

In more than 10 assignments for energy and utility companies, Mr. Pickles performed new product ideation, characterization, screening, business model creation, market assessment, business plan creation, and provided varying levels of support in obtaining funding, negotiating joint ventures, creating operating plans, identifying acquisition targets, and related start-up activities.

For, Electric Power Research Institute (EPRI) provided an analysis of potential new revenue opportunities for electric utilities. Principal author of the EPRI report *New Service Opportunities for Electric Utilities.*

For a large utility holding company, helped redefine the product development and funding process, developing new standards and procedures for business model assessment and new enterprise management.

For Commonwealth Edison, Mr. Pickles provided an analysis and market potential screening for a wide range revenue and load growth technologies and programs.

For a confidential client, Mr. Pickles developed an assessment of new business opportunities. Performed market research (focus groups, conjoint survey) and managed a project to determine competitive activities in non-traditional service, to assess new business planning methodologies, and forecast profitability for new business ventures.

For a large municipal energy organization, provided an overview of the market potential and business requirements for a wide range of new products and services. Created an operating framework for the selected new venture and helped identify and negotiate with a joint venture partner.

For Ameren, Mr. Pickles provided a redesign of their new business development process and investment decision making process. He established decision criteria, stage gates, hurdle rates and standards for investment. He also institutionalized this process by assessing two potential new products, performed due diligence and participated in senior management evaluation process of acquisitions.

For a private equity fund, provided an assessment of their investment in an energy management outsourcing company and recommended a revised business model and infrastructure.

For a large real estate investment trust, Mr. Pickles represented senior management in negotiations with a utility to form a joint venture to provide facilities management outsourcing. He assessed core capabilities, contract structure, allocations of risk, control, dissolution, and related issues.

For a confidential utility, conceived and introduced a new product offering involving energy equipment ownership, maintenance, and energy supply. Developed an innovative program wherein price is indexed to measures of customer profitability. Established procedures for managing risk and for sharing benefits of retail access with customers while retaining rights to commodity supply.

For a utility affiliate, developed and introduced end-use pricing (chauffage) program. Obtained $50 million equity commitment from holding company for customer premise equipment and negotiated two such contracts. Integrated energy rights marketing into such contracts providing for agency rights over energy supply.

For a confidential real-estate holding company, established strategy for entering energy services business and performed target identification and acquisition analysis of energy service and energy information companies. Also determined bid price(s) and negotiation strategy.

For a consortium of utilities, managed a multiclient study of customer financing programs, including an analysis of the structure and risk profiles of potential financing techniques, a best practices review of the financing programs of other utilities and other industries, market research including conjoint analysis, and development of program design recommendations.

For a confidential utility Client, developed a business plan for two-way customer communications, CATV, telephony, and other information services in conjunction with utility service. This project included an analysis of the costs and operational savings of potential system configurations, customer acceptance, and related items.

For a confidential client, participated in the valuation and development of a revised business model and growth plan for an energy service subsidiary. Assessed strategic issues (such as product line, sectors, etc.) and tactical issues (e.g., cash management, pricing, etc.) Provided assessment of energy information and automation markets, distributed generation, and related products. Developed new management and staffing structure.

For a water heater manufacturer, developed a business plan for a turn-key financing program. Developed a water heater financing/leasing program to be offered nationally in conjunction with participating utilities. This project included program design, role of financial institutions, marketing approach, and related tasks.

For a utility affiliate, developed integration and bidding strategy for combining commodity supply (in deregulated markets), performance contracting, financing, consolidated billing, and energy information services. Managed the development of joint bids with power marketing subsidiary and secured contracts.

DEAL FLOW & DUE DILIGENCE

For a private equity fund, provided an investigation of potential investments in energy sector technology and outsourcing ventures. Provided business assessment and development, market research, deal structuring, and start-up services.

For a large holding company, prepared for entry into the electrical contracting business. Developed business model, identified acquisition targets, performed valuation and due diligence, participated in negotiations, and developed integration and operations procedures.

For a $600 million venture capital investment fund, provided energy sector investment advice and deal-flow. Provided analyses of energy markets and business plans. Developed investment processes, provided analysis of management teams, and supported due-diligence and deal structuring. Assisting portfolio companies with start-up issues and keiretsu relationships.

For an investment bank, obtained additional investors for spin-out of an energy and home automation subsidiary. Reviewed Offering Memorandum, solicited investors in the U.S. and Europe, and helped structure the deal.

For a confidential client, provided identification of potential acquisition targets, profiling, analysis of potential synergies, assessment of integration issues, recommended deal terms.

For a utility, defined the approach and led a client team in an assessment of a potential acquisition. Activities included analysis of management team, process mapping, competitive analysis, development of comparables and deal structure, strategic review, due diligence (legal, HR, IT), customer interviews, and related activities.

For a large energy sector investment advisor, assisted in the establishment of a new fund to acquire distressed energy sector assets. Assessed potential strategic partners, market potential, fund structures, and acquisition targets.

BUSINESS UNIT EXECUTIVE MANAGEMENT

Led turn around team for a $100M/year struggling energy services business. Performed valuation, management assessment, developed new strategic plan, assessed business processes and funds management. Developed new processes for guarantee management and bonding and assessed growth path and ability to make and integrate acquisitions.

Led turn around team for a $30M/year energy services businesses. Developed new value propositions, marketing plan, sales processes, and contracting procedures. Prepared business plan and developed partners and equity sources for an MBO.

For a confidential utility client, conceived and led a 16-member team in the development of a business plan, securing of funding, development, and introduction of an advanced energy information system. Negotiated profit sharing venture with leading information technology provider and brought product from concept to commercial availability in 11 months.

For a private Internet company, determined all aspects of an aggregation and building portal designed to create purchasing communities for the occupants of large office and multi-family buildings. Raised funding, negotiated venture capital agreements, set requirements, oversaw development, and supervised sales.

OPERATIONS

For a confidential energy client, determined market channel strategy and negotiated sales alliances and distributorships with several companies, including power marketers, one of the nation's largest property management companies, a telecommunications company specializing in the office building market, and an electrical contractor. Established wholesale and shared margin relationships.

For a confidential energy client, developed all aspects of corporate marketing strategy including print, television and radio. Introduced disciplined market research into business planning and operations process. Pioneered use of conjoint studies and competitive intelligence in establishing pricing. Introduced observational market research for purposes of identifying new product opportunities.

Determined wholesale marketing strategy and identified competitive targets for the economic development and wholesale marketing rates of a confidential client. This project included a high level analysis of approximately 400 potential targets based upon prices currently paid, the cost structure of their current supplier, potential receptiveness to energy services, and other criteria.

For a utility affiliate, established channel strategy and led negotiations with the world's largest manufacturer of HVAC equipment to co-market energy information systems both domestically and abroad. Relationship includes integration of complementary information systems and co-branding.

For a confidential client, established branding strategy and led negotiations with the world's largest manufacturer of building controls to private label energy systems in certain market segments. Relationship provides for extensive support services (implementation, training, and operations), profit sharing, market exclusivity, and product co-development.

For a utility affiliate, oversaw transition of previously regulated National Account Managers to unregulated business. Developed training program and established code of conduct. Developed market based compensation structures.

For a utility affiliate, developed, in conjunction with an investment bank, bidding strategy and acquisition analysis of large independent energy service company. Extended framework to perform ongoing shareholder value analysis of the acquirer and used this model to establish business planning guidelines.

For a utility affiliate, recruited and trained sales staff from outside the utility industry, set and administered sales goals and methods. Oversaw the development of a lead identification, sales tracking, and contact management system.

For a utility affiliate, led team of business analysts and attorneys in development of contracts for performance contracting, energy information services, chauffage, distributorships, joint ventures, and other business structures.

EMPLOYMENT HISTORY

ICF International	Senior Vice President	2010-date
ICF Consulting	Vice President	2004-2010
Navigant Consulting	Director, Market Strategy	2000-2003
PHI Management Consultants/Honeywell	Principal, Chief Technology Officer	1999–2000
EnerShop, Subsidiary of Central & South West Services	Vice President Marketing, Development, and Operations (Officer)	1996–1999
Synergic Resources Corporation	Director, Pricing & Product Development	1992 - 1995
Iowa Office of Consumer Advocate/Iowa Utilities Board	Utility Specialist/Senior Analyst .	1988-1992

Review of Nova Scotia's Energy Savings Portfolio

April 8, 2015

Submitted to:
Nova Scotia Power

Submitted by:
ICF International
300-1090 Homer Street
Vancouver, British Columbia V6B 2W9

Tel: +1 778.375.2347
Fax: +1 778.375.2301
canada@icfi.com

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Table of Contents

1 Introduction

1.1 Purpose

The following report reviews Efficiency Nova Scotia's energy savings portfolio in the context of other electricity demand side management (DSM) portfolios in the region with a focus on Canada. The report is intended to assist Nova Scotia Power Incorporated (NSPI) in their pursuit of DSM.

1.2 Background

Through the "Electricity Efficiency and Conservation Restructuring (2014) Act", which amended the Public Utilities Act (Nova Scotia) ("Act"), the design and implementation of DSM programs have now become the responsibility of a franchise holder, effective January 1, 2015. Efficiency Nova Scotia Corporation (ENSC) has formed a new corporation and holds the franchise in the 2015 transition year. Section 79C(2) of the Act states that:

"A franchise

a) gives the franchise holder the exclusive right to supply Nova Scotia Power Incorporated with reasonably available, cost-effective electricity efficiency and conservation activities for the purpose of this Act;
b) is for a term of nine years ending December 31st in the ninth year of the franchise;
c) is subject to any terms or conditions specified by the Minister in the grant of the franchise; and
d) may be terminated by the Minister for a breach of a term or condition specified by the Minister in the grant of the franchise, for a failure by the franchise holder to achieve a performance requirement established by the Board pursuant to subsection 79M(1) or 79R(4) or if the agreement between the franchise holder and Nova Scotia Power Incorporated is terminated by the Board pursuant to clause 79N(2)(c)."[1]

"In 2015 only, the legislation limits the dollar amount that may be 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 (clause 79R(1)). The costs NSPI 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 (clauses 79R(2) & (3))."[2]

1.3 Context and Limitations

The unique nature of DSM programs (given utilities and program administrators with differing objectives, between individual programs within a single program administrator, between outwardly similar programs at different program administrators, and between program administrator DSM programs and customer facing programs at utilities) makes identifying performance metrics and best practices difficult. Differences in the design of the programs (e.g., measures they promote, incentive strategy used, customer demographics, regulatory environment, cost-effectiveness fundamentals and maturity of the program) make constructing peer groups a complex process.

Important context has been provided to reflect differences in a utility's accounting and reporting practices, weather zone, regulatory environment, budget constraints, or other factors, however, the metrics have not been adjusted from what is publically available and the research presented in this report does not account for all the differences.

[1] Public Utilities Act (Nova Scotia), Accessed February 16, 2015.
[2] Efficiency Nova Scotia Corporation, Evidence of ENSC as DSM Administrator, filed May 30, 2014.

1.4 Organization of this Report

Following the outline of *Scope* (Section 2) and *Approach* (Section 3), this report presents the summary *Results of the Research* (Section 4) and closes with a *Discussion of Efficiency Nova Scotia's Energy savings Portfolio* (Section 5).

1.5 Summary of Insights

- The ENSC portfolio ranks highest on the list of jurisdictions reviewed for DSM spend per capita and per customer.
- ENSC has the highest first year cost per kWh of energy savings of the jurisdictions reviewed.
- Within a subset of comparators that took a lifetime view, ENSC again has some of the highest cost per kWh offerings.
- Of the Canadian jurisdictions reviewed, Nova Scotia is the leader in DSM energy savings as a portion of energy sales.
- Of the Canadian jurisdictions reviewed, second only to BC, Nova Scotia is planning to spend the most on electrical DSM relative to their energy sales.
- In 2014, only 8% of DSM costs were recovered from the industrial sector, despite having a much larger percentage of sales.
- Although ENSC's BNI (commercial) programs may be accessed by industrial customers, there are no targeted industrial program offerings despite Nova Scotia's 2015-2040 Demand Side Management (DSM) Potential Study identifying industrial savings in 2015 as being the most cost effective of the three sectors.[3]
- ENSC offers one of the most comprehensive DSM portfolios in the country. The proposed mix or DSM activities in 2015 leverages a diverse mix of approaches, channels and partners and includes enabling strategies. Part of this diversity includes program elements that are more costly than NSP's fuel costs average. A more focused portfolio could be more cost effective.
- There is significant variance of actual performance relative to the approved plan for some programs. Depending on the constraints of a system and the volume and measure life of the program savings in question, large variances may negatively affect an electric system's planning process.

2 Scope

The following DSM program administrators were chosen for research. While mostly Canadian administrators were chosen, Efficiency Maine was added due to proximity to NS. A cross section of sizes, maturities, regulatory environments and geographies were considered.

- Efficiency Nova Scotia
- BC Hydro
- SaskPower
- Manitoba Hydro
- Ontario – Independent Electricity System Operator (IESO)[4]
- Hydro Quebec
- New Brunswick Power
- Newfoundland Power and Newfoundland and Labrador Hydro
- Efficiency Maine

[3] Nova Scotia 2015-2040 Demand Side Management (DSM) Potential Study, http://www.efficiencyns.ca/wp-content/uploads/2014/07/2014.01.14-DSM-Potential-Study.pdf, Accessed January 30, 2015

[4] IESO works collaboratively with local distribution companies and other partners to deliver conservation programs throughout Ontario.

The following data points were researched for each of the DSM program administrators listed above:

- Utility Sales
- Year of last IRP
- Number of Customers
- Population
- Year DSM was initiated
- DSM Savings
- DSM Spend
- History of DSM results
- Potential Energy Savings
- Total DSM Costs
- Program Portfolio Sector Breakdown
- Measure Life
- Performance

Note that a complete data set was not found for any one DSM program implementer due to the limitation on public availability of information.

3 Approach

Publically available information was used in the collection of the desired data. Researchers primarily drew from the regions':

- DSM Plan,
- Integrated Resource Plan (IRP),
- Resource Option Report,
- Revenue Rate Application,
- Service Plan,
- Annual Reports,
- Potential Study, and
- Utility and DSM program implementer websites.

Additionally, some meta-studies and other reports were also consulted. Appendix B presents a complete list of reference documents.

4 Results of the Research

The following exhibits present a consolidated view of the research findings:

- Exhibit 1: DSM Program Administrator Actual and Planned $DSM/capita and $DSM/customer
- Exhibit 2: 2015 First Year Cost Comparison ($/kWh of Planned Savings)
- Exhibit 3: Program Cost Effectiveness ($/kWh)
- Exhibit 4: DSM Portfolio Measure Lives (Years)
- Exhibit 5: 2015 Planned DSM Energy Savings as a portion of Domestic Electricity Revenue (GWh)
- Exhibit 6: 2015 Planned DSM Spend as a portion of Domestic Electricity Revenue ($Million)
- Exhibit 7: 2015 Sector Breakdown of the Program Implementer Costs Associated with DSM Energy Savings Relative to the Energy Use
- Exhibit 8: A Categorization of DSM Program Offerings Across Jurisdictions

Detailed profile information on each of the chosen DSM administrators can be found in Appendix A. Nova Scotia's DSM portfolio is discussed in the context of the research throughout, but more specifically in Section 5. Notes are provided throughout for context and to detail any assumptions made.

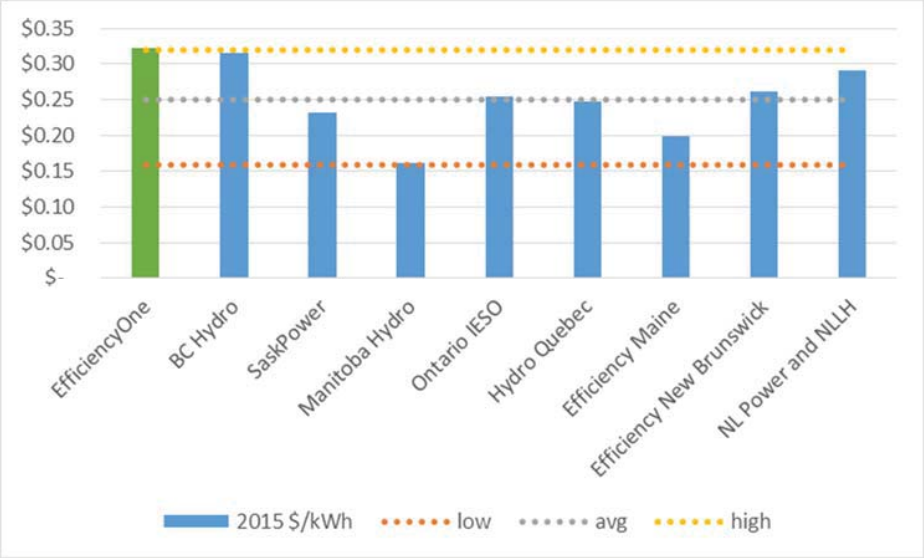
Exhibit 1 below shows the differences in the actual spend per capita and per customer as well as the differences in the 2015 planned spend per capita and per customer. In each, we would expect to see some differences as the average sales will be different for a variety of reasons including: differences in avoided costs, end-use market share for electricity, climate, average customer size, and traditional local practice. The DSM expenditure per capita and per customer in Nova Scotia is higher than the other jurisdictions reviewed.

Exhibit 1: DSM Program Administrator Actual and Planned $DSM/capita and $DSM/customer[5,6,7]

	ACTUAL DSM SPEND			2015 PLAN DSM SPEND	
PROVINCE	YEAR	$DSM/CAPITA	$DSM/CUSTOMER	$DSM/CAPITA	$DSM/CUSTOMER
NOVA SCOTIA	2014	41.05	77.21	41.37	77.81
BRITISH COLUMBIA	2014	25.97	62.82	31.96	77.29
MANITOBA	2012	22.39	51.02	20.44	47.14
NEW BRUNSWICK	2013	22.07	47.51	24.54	52.71
ONTARIO	2013	19.67	55.52	22.57	63.72
QUEBEC	2014	14.61	28.97	16.43	32.59
SASKATCHEWAN	2013	13.92	30.74	8.89	19.96
NEWFOUNDLAND AND LABRADOR	2012	7.59	14.29	10.82	20.36

Exhibit 2 shows first year costs for 2015. The spending in the year is divided by the savings in the first full year. Note that this metric does not incorporate measure life, and that care should be taken when comparing portfolio $/kWh where the portfolios have different measure lives.

Exhibit 2: 2015 First Year Cost Comparison ($/kWh of Planned Savings)[8,9, 10]



A better representation of the cost per kWh would factor in the program administrator's discount rate and consider the average measure life of the various measures that comprise the program or portfolio. Information on this view was limited to ENSC, BC Hydro, and Efficiency Maine and is presented in Exhibit 3. Within each, it is reasonable to expect differences in accounting practices. ENSC refers to this metric as the "unit cost". BC Hydro presents a "net levelized cost". Efficiency Maine refers to the "lifetime" cost and most notably includes participant costs. Within this group of comparators, ENSC again has some of the highest cost per kWh offerings. Additional information about the portfolio level measure lives are noted in Exhibit 4 where available. An average line, which has been weighted according to the planned energy savings in 2015, has been added to the chart in grey. The lower limit is represented by an orange line. The upper limit is represented by a yellow line.

[5] 2014 customers were used in the calculations with the exception of program implementers in these provinces of Quebec, Newfoundland, New Brunswick and Saskatchewan, where 2013 was used.
[6] Population figures correspond to the year of DSM spend. 2014 population figures were used in the 2015 plan calculations.
[7] Ontario's plan for 2015 – 2020 was divided evenly over the six years for the purposes of comparison.
[8] DSM Plan for Efficiency New Brunswick presents cumulative energy savings over a three year period (2014/15-2016/17). Similarly, the DSM Plans for Ontario local distribution companies is presented for a six year period (2015 – 2020).
[9] The DSM Plan for Manitoba Hydro includes electricity and gas savings. Only the electricity DSM has been considered in this report.
[10] EfficiencyOne and Efficiency Maine have not been included in the calculation of the average.

Exhibit 3: Program Cost Effectiveness ($/kWh)[11,12]

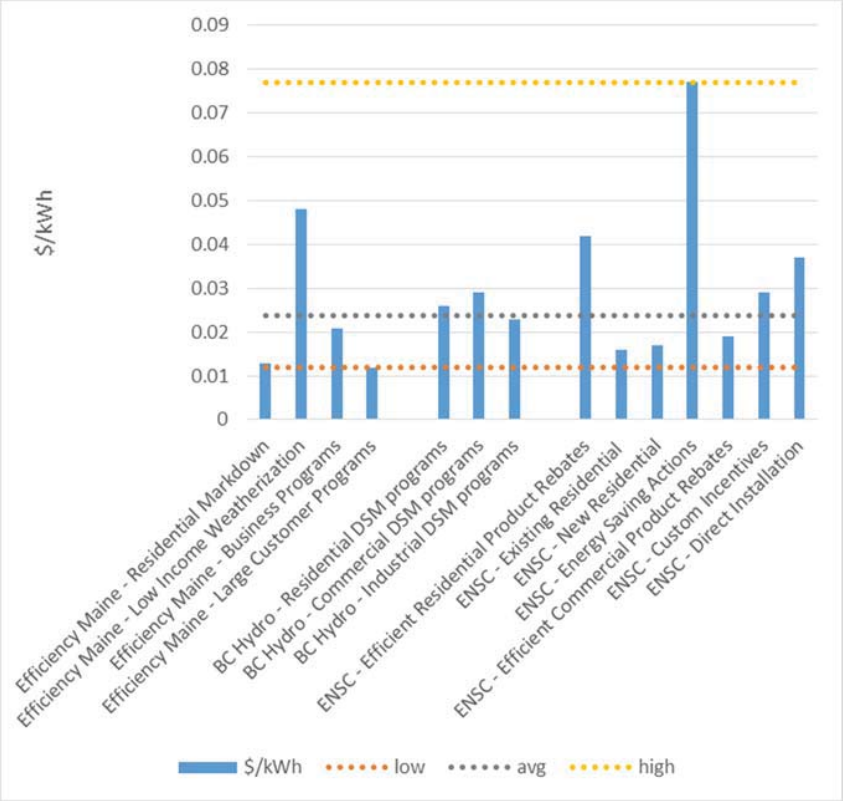
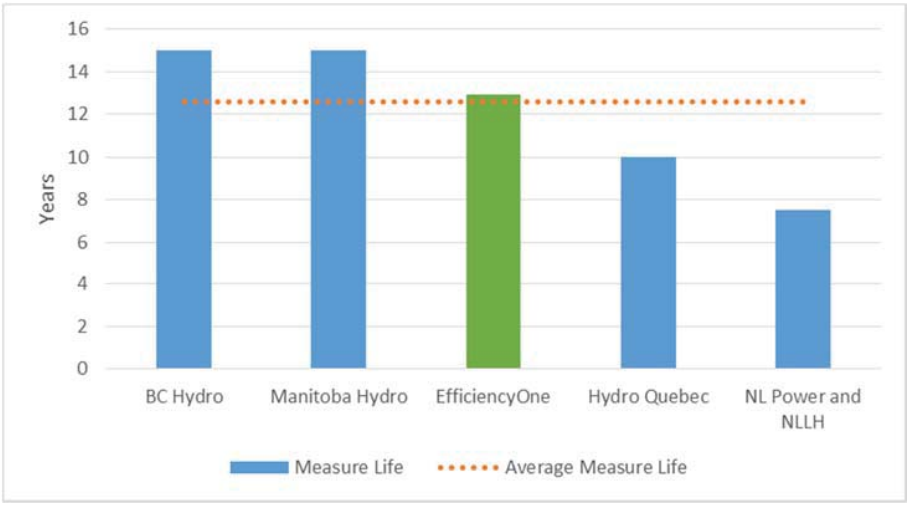


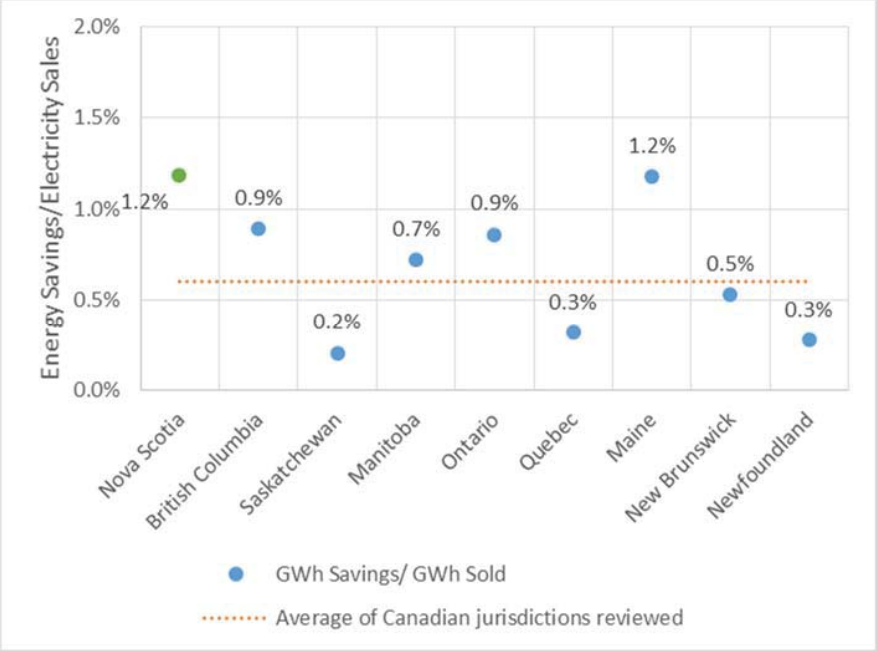
Exhibit 4: DSM Portfolio Measure Life (Years)[13]



[11] Efficiency Nova Scotia has not been included in the calculation of the average.
[12] The Levelized value for BC Hydro is taken from the *2014* Report on DSM Activities.
[13] Efficiency Nova Scotia has not been included in the calculation of the average.

Exhibits 5 and 6 present the 2015 planned DSM energy savings as a portion of energy sales and the 2015 planned DSM expenditure as a portion of energy sales respectively.[14] Of the Canadian jurisdictions reviewed, Nova Scotia is the leader in DSM energy savings as a portion of energy sales. Second only to BC Hydro, Nova Scotia is planning to spend the most on DSM relative to their energy sales.

Exhibit 5: 2015 Planned DSM Energy Savings as a portion of Domestic Electricity Sales (GWh)[15,16,17]



[14] We expect some variation in energy sales due to differences in rates, end-use market share for electricity, climate, average customer size, and traditional local practice. Energy savings may vary with the maturity of the DSM portfolio, target market for the DSM programs being offered, the price of electricity relative to incentives being offered and the conservation culture of the region. DSM spend may vary with the maturity of the programs being offered, the policy and legislation in effect, the avoided cost and the conservation culture of the region.

[15] This exhibit uses electricity sales from the most recent year reported.

[16] DSM Plan for Efficiency New Brunswick presents cumulative energy savings over a three year period (2014/15-2016/17). Similarly, the DSM Plan for Ontario is presented for a six year period (2015 – 2020).

[17] Efficiency Nova Scotia has not been included in the calculation of the average.

Exhibit 6: 2015 Planned DSM Spend as a portion of Domestic Electricity Revenue ($Million)[18,19,20]

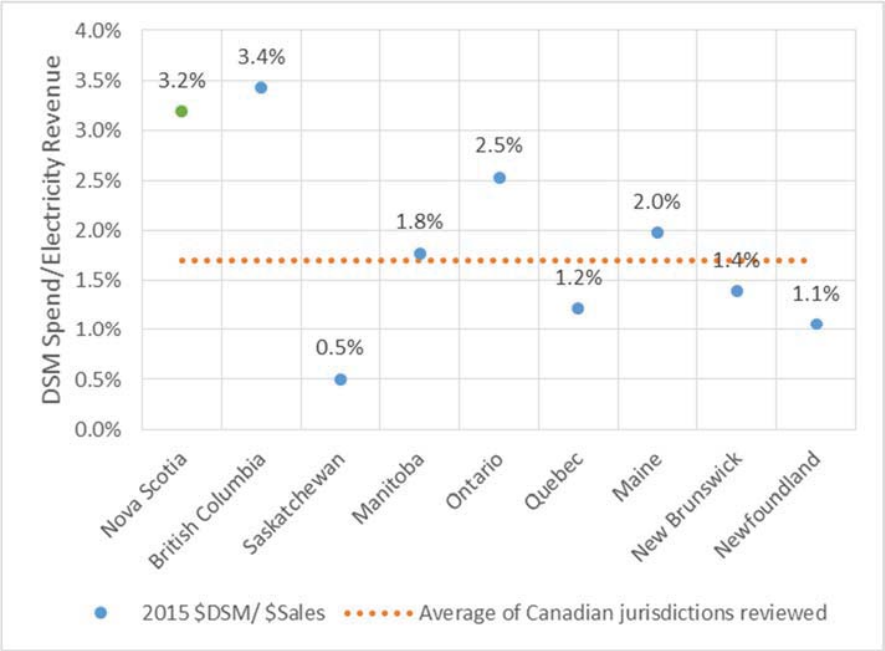
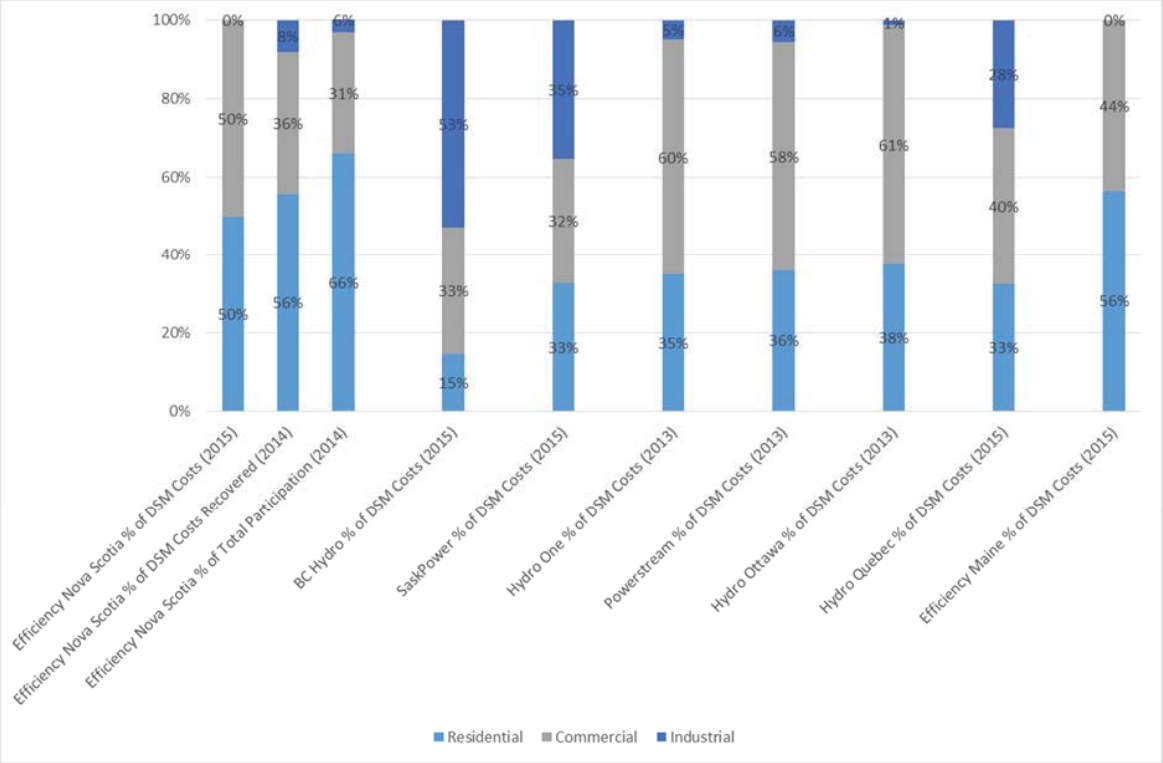


Exhibit 7 presents the breakdown of how DSM costs are allocated amongst the sectors in 2015. While Nova Scotia's industrial customers may participate in ENSC's business, non-profit, and institutional (BNI) programs, DSM funds are not specifically allocated to the industrial sector. Energy savings from industrial customers are typically some of the most cost effective. In 2014, only 8% of DSM costs were recovered from this sector, despite having a much larger percentage of sales. Of all ENSC DSM program participants, only 6% were industrial customers. From the information available it cannot be determined what portion of industrial customers are participating in the BNI programs. The technical knowledge and custom approach that best serves industrial customers generally requires different resources than what is required for BNI. A combined BNI and industrial offering may be affecting participation.

[18] This exhibit uses electricity sales from the most recent year reported.
[19] DSM Plan for Efficiency New Brunswick presents cumulative energy savings over a three year period (2014/15-2016/17). Similarly, the DSM Plan for Ontario is presented for a six year period (2015 – 2020).
[20] EfficiencyOne and Efficiency Maine have not been included in the calculation of the average.

Exhibit 7: 2015 Sector Breakdown of the Program Implementer Costs Associated with DSM Energy Savings



In Exhibit 8, the programs offered by the various DSM program administrators across jurisdictions have been grouped into categories based on their descriptions. The right most column of Exhibit 8 presents the percentage of administrators offering a program in that category amongst those in scope of this review. Note that Efficiency Nova Scotia's BNI programs are offered to both Commercial and Industrial Customers. It appears that ENSC offers one of the most comprehensive DSM portfolios in the country. ENSC's program offerings are more numerous than most Canadian jurisdictions. This may be a factor contributing to the higher average cost of first year's savings in Nova Scotia.

Exhibit 8: A Categorization of DSM Program Offerings across Jurisdictions[21,22]

	BC Hydro	SaskPower	Manitoba Hydro	Ontario (IESO)	Hydro Quebec	NB Power	NL Power/ NLLH	Efficiency Maine	Efficiency Nova Scotia	Percentage of Total
Residential										
Prescriptive	●	●	●	●	●	●	●	●	●	100%
Existing Home				●		●			●	25%
New Home	●			●	●	●			●	50%
Low Income	●		●	●	●			●	●	63%
Appliance Retirement	●	●	●	●	●			●	●	75%
In-Home Feedback	●									13%
Behavioural	●				●			●	●	38%
Demand Response				●						13%
Commercial										
Custom	●	●	●	●	●		●	●	●	88%
Prescriptive	●	●	●	●	●	●	●	●	●	100%
Existing Building		●		●		●		●	●	50%
New Construction	●		●	●	●	●			●	63%
Direct Install				●				●	●	25%
Behavioural	●							●		25%
Demand Response				●						13%
Industrial										
Custom	●	●	●	●	●	●	●		●	88%
Demand Response	●	●		●						38%
Monitoring, Tracking and Reporting	●			●					●	25%
Program Count	*13*	*7*	*7*	*15*	*9*	*7*	*4*	*9*	*14*	

The most common programs across the country are, in decreasing order:

- Residential and Commercial Prescriptive (100%)
- Commercial and Industrial Custom (88%)
- Residential Appliance Retirement (75%)
- Residential Low Income (63%)
- Commercial New Construction (63%)

Other programs offered by ENS, but not offered by the majority of jurisdictions:

- Residential New Home (50%)
- Commercial Existing Building (50%)
- Residential Behavioural (38%)[23]
- Residential Existing Home (25%)
- Commercial Direct Install (25%)
- Industrial Monitoring, Tracking and Reporting (25%)

[21] Percentage of Total does not include ENSC.
[22] The Ontario IESO framework is referenced in this exhibit. Not all LDC's offer the full complement of programming.
[23] EfficiencyOne has not proposed this program for 2016 – 2018.

- Residential In-Home Feedback (13%)

5 Discussion of Efficiency Nova Scotia's Energy Savings Portfolio

Ratepayer-funded DSM programs have been delivered to Nova Scotia's electricity customers since 2008. The first three years of programming were administered by NSPI and, in late 2010, responsibility for program delivery was transferred to Efficiency Nova Scotia Corporation (ENSC). ENSC, now EfficiencyOne, is a third-party entity created by the Government of Nova Scotia that works with electricity customers to ensure that cost effective electricity savings are made available.

This section has the following subsections:

- History of Results
- Programs and Pricing

5.1 History of Results

Nova Scotia began increasing its investment in DSM program delivery in 2008. In the first year of program activity the reported annual savings were 42 GWh, and by 2013[24], when program activities had fully ramped up, cumulative savings had reached 611GWh. Cumulative energy and demand savings are shown in Exhibits 9 and 10 following.

[24] This is the latest year for which 3rd party evaluated program results were available.

Exhibit 9: Cumulative Energy Savings from DSM Program Administrator (MWh)[25]

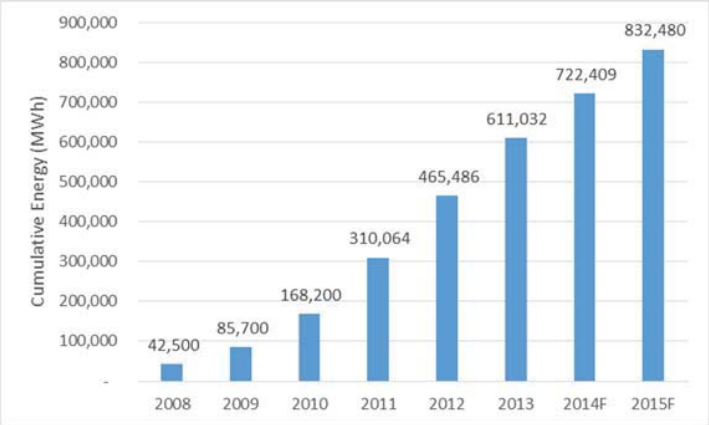


Exhibit 10: Cumulative Demand Savings from DSM Program Administrator (kW)[26]

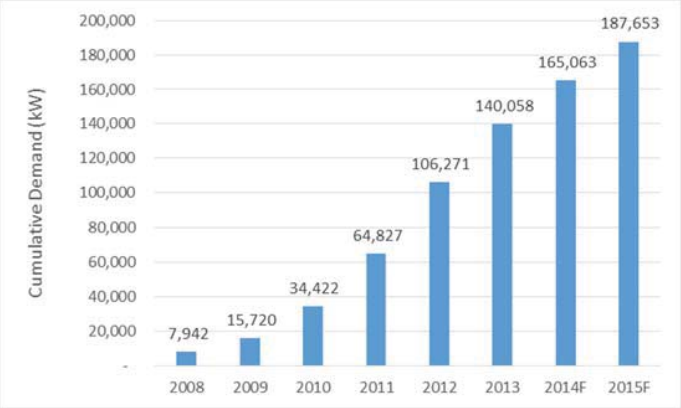


Exhibit 11 below shows that as Nova Scotia's energy portfolio is maturing, the utility cost of saved energy has increased alongside the energy savings proportional to electricity sales.

[25] Nova Scotia Power Inc (NSPI) 10 Year System Outlook Report, June 27, 2014.
[26] Nova Scotia Power Inc (NSPI) 10 Year System Outlook Report, June 27, 2014.

Exhibit 11: Electricity Savings as a Percentage of Electricity Sales for Nova Scotia's Past Programs and Related Cost[27,28]

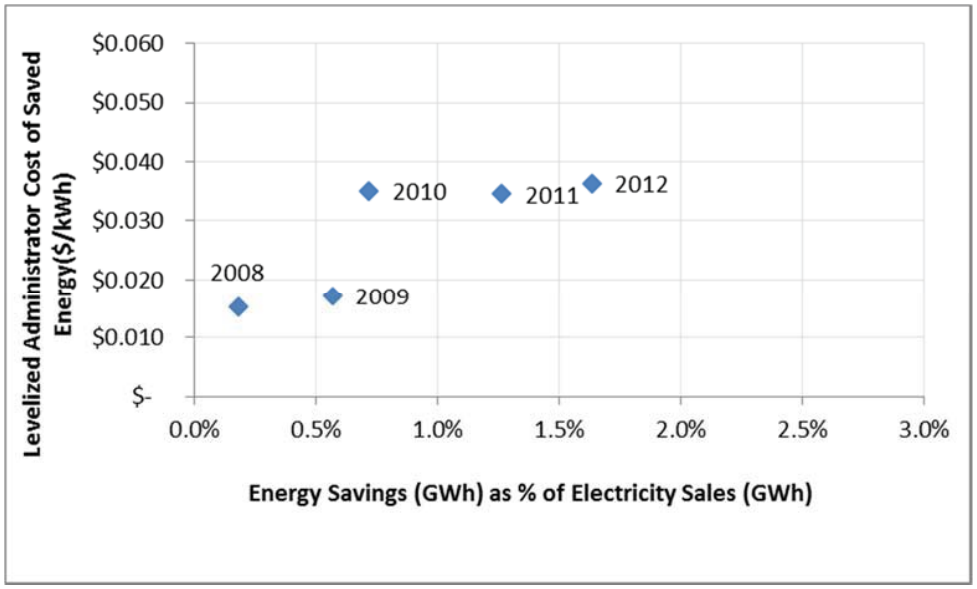
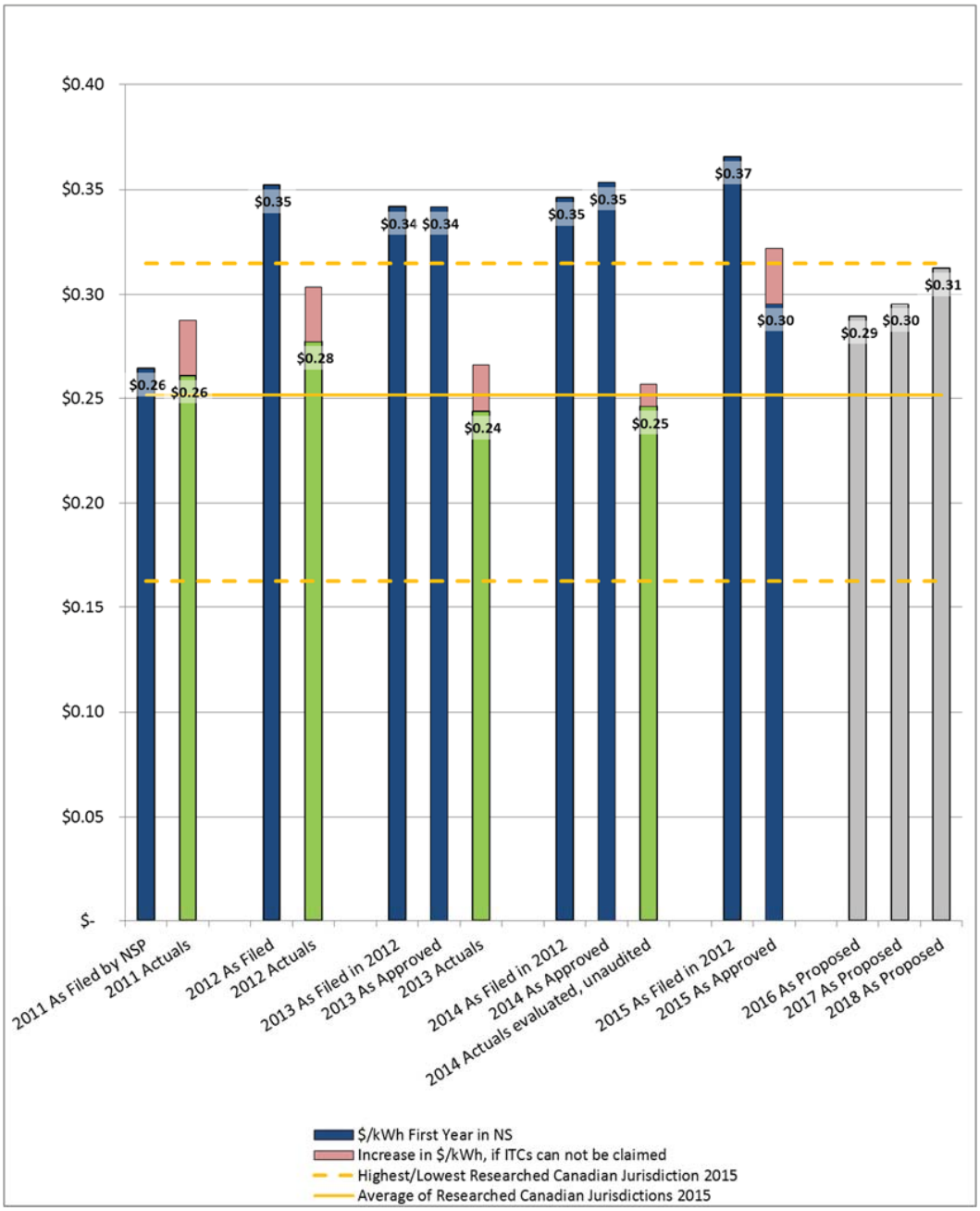


Exhibit 12 compares the costs of installed DSM in Nova Scotia ($/kWh) at various stages of plan, approval, and actual over the past four years as well as proposed projections for 2016 – 2018[29]. In each year, Nova Scotia's cost of installed DSM has been higher than is typically seen in other Canadian jurisdictions.

[27] Costs are expressed in Canadian Dollars.
[28] Market Trends for the Supply & Demand of Electricity in Nova Scotia, http://energy.novascotia.ca/sites/default/files/files/Electricity-Review-NS-DOE-Market-Trends-Report.pdf, May 30, 2014.
[29] Econoler for Efficiency Nova Scotia Corporation, 2012 DSM Evaluation Reports — Final Report, March 22, 2013.
Econoler for Efficiency Nova Scotia Corporation, Evaluation of 2011 DSM Programs – Executive Summary, February 23, 2013.
Efficiency Nova Scotia Corporation, 2013 DSM Cost Recovery Rider (DCRR), October 1, 2012.
Efficiency Nova Scotia Corporation, Evidence of ENSC as DSM Administrator in the Matter of an Application to Approve Efficiency Nova Scotia Corporation's Electricity Demand Side Management (DSM) Plan for 2012, February 28, 2011.
Efficiency Nova Scotia Corporation, Evidence of ENSC As DSM Administrator in the Matter of an Application to Approve Efficiency Nova Scotia Corporation's Electricity Demand Side Management (DSM) Plan for 2013-2015, February 27, 2012.
Efficiency Nova Scotia Corporation, Evidence of ENSC As DSM Administrator in the Matter of An Application to Approve Efficiency Nova Scotia Corporation's Electricity Demand Side Management (DSM) Plan for 2015, May 14, 2014.
Efficiency Nova Scotia, Q2 Demand Side Management Report, 2012 Quarter Two Activity for the period April 1 to June 30, 2014, August 13, 2014.
Efficiency Nova Scotia, Q2 Demand Side Management Report, 2013 Quarter Two Activity for the period April 1 to June 30, 2014, August 7, 2014.
Efficiency Nova Scotia, Q2 Demand Side Management Report, 2014 Quarter Two Activity for the period April 1 to June 30, 2014, August 27, 2014.
EfficiencyOne, Evidence of Efficiency One as the Holder of the Efficiency Nova Scotia Franchise in the Matter of an Application pursuant to Subsection 79J(3) of the Public Utilities Act for Approval of the 2016-2018 Supply Agreement for Electricity Efficiency and Conservation Activities, February 27, 2015.
H. Gil Peach & Associates/Scan America, Savings Verification Study of the DSM Administrator's 2010 Demand Side Management Programs, March, 2011.
H. Gil Peach & Associates/Scan America, Savings Verification Study of the DSM Administrator's 2011 Demand Side Management Programs, March, 2012

Exhibit 12: Costs of Installed DSM in Nova Scotia ($/kWh)[30]



Nova Scotia Power Incorporated, Evidence of NSPI as Interim DSM Administrator in the Matter of An Application to Approve Nova Scotia's Electricity Demand Side Management Plan for 2011, February 26, 2010.
Todd Williams, Stu Slote, Gary Cullen (Navigant). Nova Scotia 2015-2040 Demand Side Management (DSM) Potential Study, January 7, 2014.
Verification Review of Program Year 2013 Evaluation Results – Report for the Nova Scotia Utilities and Review Board. H. Gil Peach, John Mitchell, June 5, 2013.
[30] ITC = Input Tax Credit

In 2014, Efficiency Nova Scotia's DSM portfolio realized 14 GWh of more energy savings than planned for $8.5 Million fewer dollars spent. [31] A breakdown of the performance by program is shown in Exhibits 13 and 14. There is significant variance of actual performance relative to the plan for some programs (eg. In 2014, the Existing Residential program realized 220% of the planned savings, the expenditure for New Residential was just 18% of plan, BNI Direct Installation's expenditure was 167% of plan). Depending on the constraints of a system and the volume and measure life of the program savings in question, large variances may negatively affect an electric system's planning process.

Exhibit 13: 2013 Percentage Change from Approved to Actual (for $ and GWh)[32]

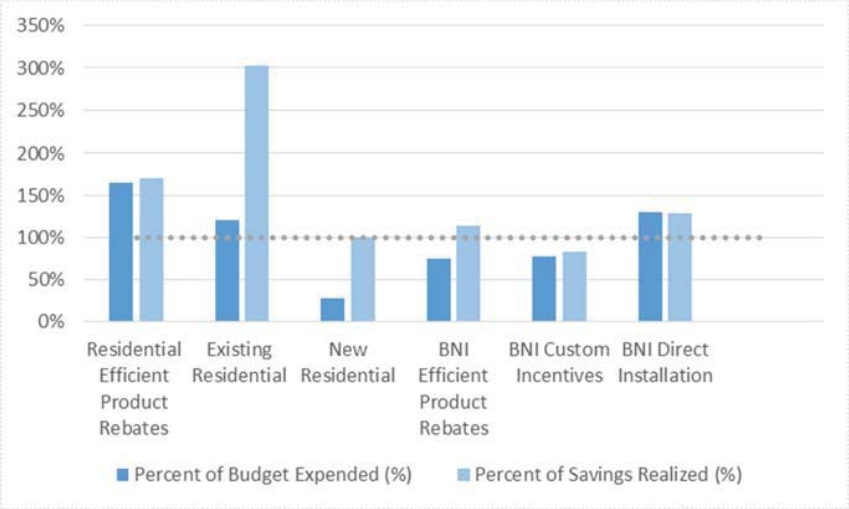
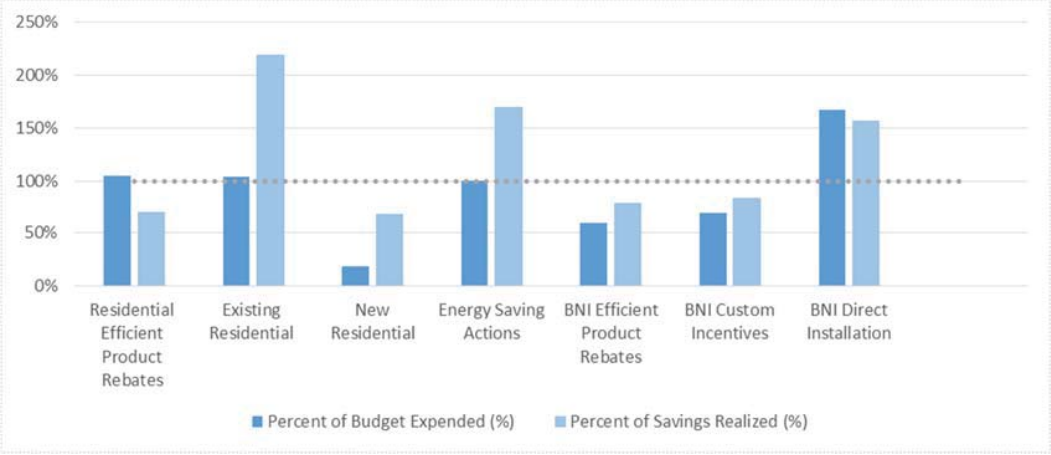


Exhibit 14: 2014 Percentage Change from Approved to Actual (for $ and GWh)[33]



[31] 2016-2018 EECA Supply Agreement Application Evidence and Appendices A-J (3), February 27, 2015

[32] Ibid.

[33] Ibid.

5.2 Programs and Pricing

The proposed mix or DSM activities in 2015 leverages a diverse mix of approaches, channels and partners and includes "enabling strategies".

ENSC's DSM portfolio includes residential and business, non-profit, and institutional (BNI) programs:

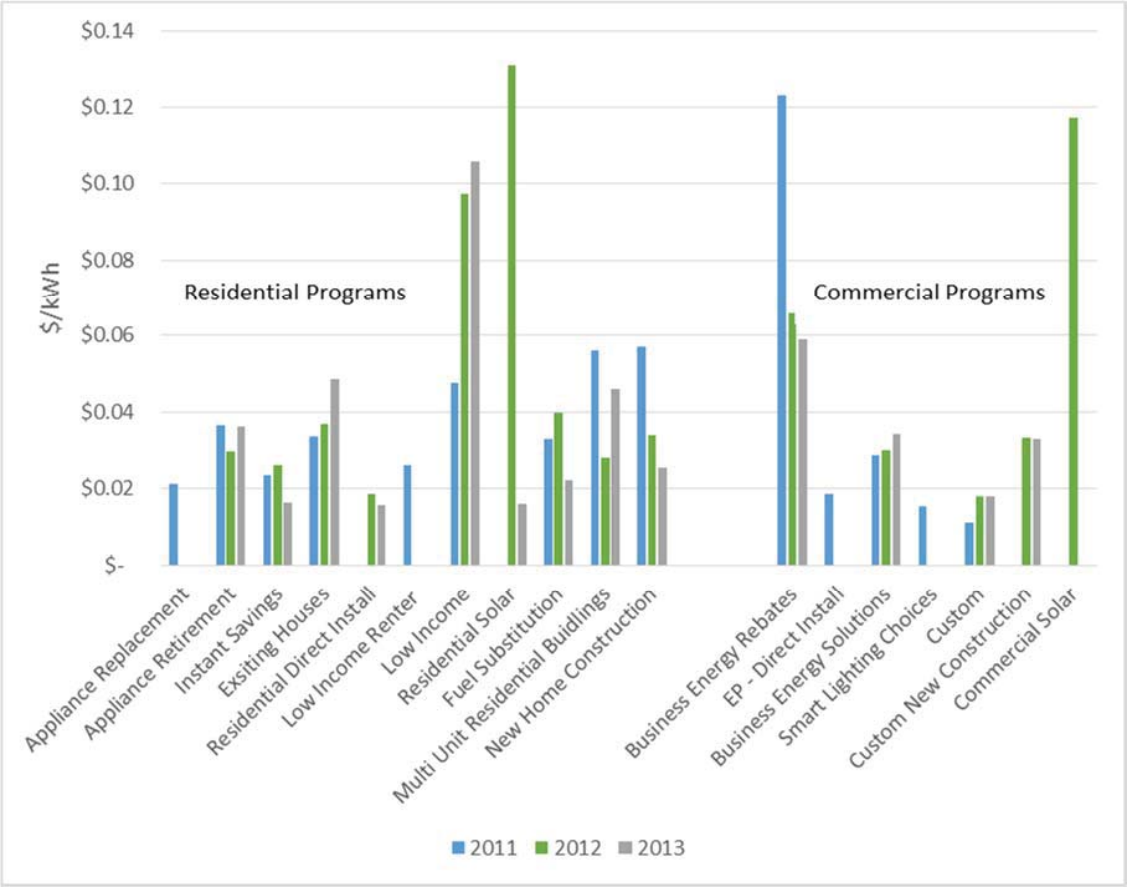
Residential[34]	BNI[35]
▪ Efficient Product Rebates (includes components marketed as Instant Savings and Appliance Retirement); ▪ Existing Residential (includes components marketed as Residential Direct Install, Solar, Home Energy Assessment, Green Heat and Multi-Unit Residential Buildings); ▪ New Residential (includes the service marketed as New Home Construction); ▪ Energy Saving Actions (includes the program marketed as Home Energy Report).	▪ Efficient Product Rebates (marketed as Business Energy Rebates); ▪ Custom Incentives (includes the components marketed as Custom Retrofit and BNI New Construction); ▪ Direct Installation (marketed as Business Energy Solutions).

ENSC's portfolio offers one of the most comprehensive DSM portfolios in Canada. ENSC's planned portfolio is 31% residential and 69% commercial.[36] Although ENSC's BNI (commercial) programs may be accessed by industrial customers, there are no targeted industrial program offerings despite Nova Scotia's 2015-2040 Demand Side Management (DSM) Potential Study identifying industrial savings in 2015 as being the most cost effective of the three sectors.[37]

The ENSC portfolio ranks highest on the list of jurisdictions reviewed for DSM spend per capita and per customer and also appears to have the highest DSM expenditure relative to savings. Exhibit 15 shows the verified cost per kilowatt-hour of ENSC's programs over the past three years.

[34] Nova Scotia 2013 - 2015 DSM Plan, http://www.efficiencyns.ca/wp-content/uploads/2013/03/ENSC-2013-2015-Plan-Complete-Version.pdf
[35] Ibid
[36] Nova Scotia 2015 DSM Plan M06247 Decision. Based on energy savings.
[37] Nova Scotia 2015-2040 Demand Side Management (DSM) Potential Study, http://www.efficiencyns.ca/wp-content/uploads/2014/07/2014.01.14-DSM-Potential-Study.pdf, Accessed January 30, 2015

Exhibit 15: $/kWh Lifetime Comparison of ENSC's Programs 2011 - 2013[38]

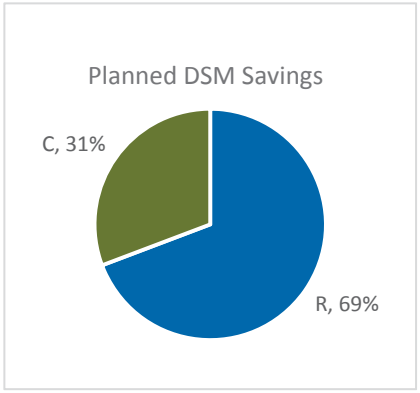


Detailed cost effectiveness test results are needed to assess the effectiveness of measures within programs and programs within portfolios. In order for due diligence to be satisfied, one must look at the benefit cost ratios for individual measures and programs prior to bundling. Additionally, information on the assumptions for net to gross ratios and a categorized breakdown of program implementation costs are needed to produce a complete opinion. However, a more focused portfolio could be more cost effective.

[38] Evaluation History Data provided to NS Power by ENSC 2014-11-26

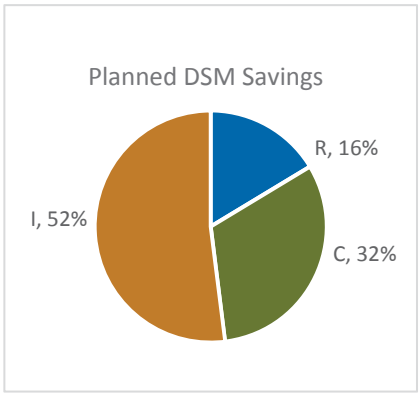
Appendix A DSM Program Implementer Profiles

Efficiency Nova Scotia

Business Structure	Franchise	
DSM Funding Mechanism	DSM Cost Recovery Rate, Rate Smoothing Adjustment	
	**Population Served** 942,700	**Number of Customers** 501,200
	Year DSM Started 2008	**Last year of IRP** 2014
	▪ Residential ▪ Efficient Product Rebates ▪ Existing Residential ▪ New Residential ▪ Energy Saving Actions	▪ Commercial ▪ Efficient Product Rebates ▪ Custom Incentives ▪ Direct Installation
Utility Sales (2013)	$1,225 Million[39]	10,410 GWh[40]
DSM Plan (2015)	$ 39 Million[41]	121 GWh[42]
Actual $DSM (2014)	$51.66/capita	$97.17/customer
Plan $DSM (2015)	$41.37/capita	$77.81/customer
DSM Plan Savings (2015)/Sales (2013)	1.1%	
DSM Plan First Year Cost (2015)	$0.32/kWh	

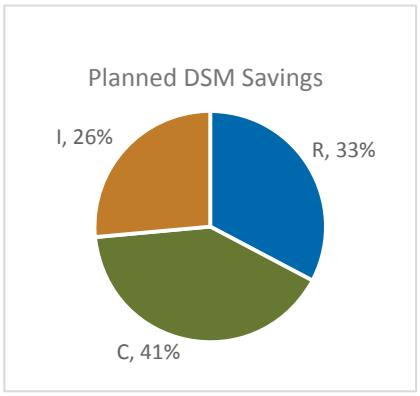
[39] ENSC Financial Practices and Cost Allocation Presentation 2014 11 04
[40] Nova Scotia Power email from Nicole Cadek, FW: Most recent publically available sales actuals, February 5, 2015
[41] Efficiency Nova Scotia Corporation, Evidence of ENSC As DSM Administrator – Revised July 3, 2014
[42] Nova Scotia 2015 DSM Plan M06247 Decision

BC Hydro

Business Structure	Crown Corporation	
DSM Funding Mechanism	Deferred for future rate recovery	
	**Population Served** 4,631,302	**Number of Customers** 1,914,788[43]
	Year DSM Started 1989, 2008[44]	**Last year of IRP** 2013
	▪ Residential ▪ Refrigerator Buy-Back ▪ Lighting Appliances Electronics ▪ New Home ▪ Smart Meter Infrastructure In-Home Feedback ▪ Low Income	▪ Commercial ▪ Power Smart Partner and Product Incentive Program (PIP) ▪ New Construction ▪ Lead By Example ▪ Industrial ▪ Power Smart Partner – Transmission ▪ Power Smart Partner – Distribution ▪ Load Displacement
Utility Sales (2014)	$ 4,319 Million[45]	53,018 GWh[46]
DSM Plan (2015)	$ 148 Million[47]	470 GWh[48]
Actual $DSM (2014)	$25.97/capita	$62.82/customer
Plan $DSM (2015)	$31.96/capita	$77.29/customer
DSM Plan Savings (2015)/Sales (2014)	0.9%	
DSM Plan First Year Cost (2015)	$0.31/kWh	

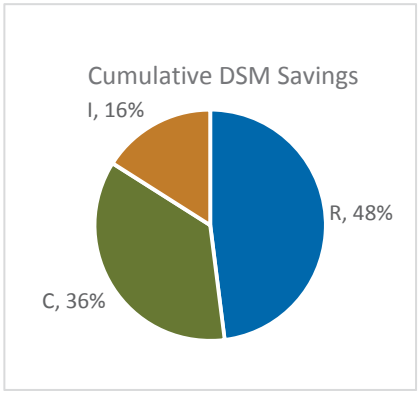
[43] BC Hydro Quick Facts, https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/accountability-reports/financial-reports/annual-reports/bc-hydro-annual-report-quick-facts-june-2014.pdf, accessed January 28, 2015.
[44] Following the 2007 Long Term Acquisition Plan (LTAP), BC Hydro reset the reporting of energy savings.
[45] BC Hydro Quick Facts, https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/accountability-reports/financial-reports/annual-reports/bc-hydro-annual-report-quick-facts-june-2014.pdf, accessed January 28, 2015.
[46] Ibid.
[47] BC Hydro F2015 to F2016 Revenue Requirements Rate Application, https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/revenue-requirements/RRRA-2015-2016-main.pdf, accessed January 19, 2015.
[48] BC Hydro Service Plan 2014/15 - 2016/17, http://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/regulatory-planning-documents/service-plans/bchydro-service-plan-2014-15-2016-17.pdf, accessed January 28, 2015.

SaskPower

Business Structure	Crown Corporation	
DSM Funding Mechanism	Rate Recovery	
	**Population Served** 1,106,200	**Number of Customers** 500,922
	Year DSM Started 2008	**Last year of IRP** Internal Process
	▪ Residential ▪ Lighting ▪ Appliance ▪ Plug Load ▪ HVAC ▪ Geothermal ▪ EnerGuide ▪ Retail Partner	▪ Commercial ▪ EPC ▪ Lighting ▪ HVAC ▪ Geothermal ▪ Municipal ▪ Parking Lot ▪ Refrigeration ▪ Industrial ▪ Optimization
Utility Sales (2014)	$1,995 Million[49]	21,111 GWh[50]
DSM Plan (2015)	$10 Million[51]	43 GWh[52]
Actual $DSM (2013)	$13.92/capita	$30.74/customer
Plan $DSM (2015)	$8.89/capita	$19.96/customer
DSM Plan Savings (2015)/Sales (2014)	0.2%	
DSM Plan First Year Cost (2015)	$0.23/kWh	

[49] Final Independent Report for the Saskatchewan Rate Review Panel on SaskPower's 2014-2016 Rate Plan, Forkast Consulting, 2014
[50] SaskPower 2014, 2015, 2016 Rate Review, http://www.saskratereview.ca/images/docs/SaskPower2013/minimum-filing-requirements.pdf, Accessed January 23, 2015
[51] Final Independent Report for the Saskatchewan Rate Review Panel on SaskPower's 2014-2016 Rate Plan, Forkast Consulting, 2014
[52] Ibid.

Manitoba Hydro

Business Structure	Crown Corporation	
DSM Funding Mechanism	Profits on export, rates targeted at customers who participate.	
 [53]	**Population Served** 1,282,000	**Number of Customers** 555,800
	Year DSM Started 1989	**Last year of IRP** 2012/2013

	▪ Residential
	  ▪ Low-Income
	  ▪ Insulation
	  ▪ Water and Energy Saver
	  ▪ Refrigeration Retirement
	▪ Industrial
	  ▪ Performance Optimization
		▪ Commercial
		  ▪ Lighting
		  ▪ Building Envelope
		  ▪ BE - Insulation
		  ▪ Commercial Earth
		  ▪ Chillers
		  ▪ CO2 Sensors
		  ▪ Custom
		  ▪ Building Optimization
		  ▪ New Building
		  ▪ Refrigeration
		  ▪ Kitchen Appliance

Utility Sales[54] (2014)	$1,475 Million[55]	22,400 GWh[56]
DSM Plan (2015)	$26.2 Million[57]	161 GWh[58]
Actual $DSM (2012)	$22.39/capita	$51.02/customer
Plan $DSM (2015)	$20.44/capita	$47.14/customer
DSM Plan Savings (2015)/Sales (2014)	0.7%	
DSM Plan First Year Cost (2015)	$0.16/kWh	

[53] Planned DSM Savings by sector was not available.
[54] Electricity
[55] Manitoba Power 63rd Annual Report, http://www.hydro.mb.ca/corporate/ar/2013/publish/63rd%20Annual%20Report/files/assets/common/downloads/publication.pdf, Accessed January 23, 2015
[56] Ibid.
[57] Manitoba Power 2013-2016 Power Smart Plan, http://www.hydro.mb.ca/projects/development_plan/bc_documents/documents/appendix_4.2_2013_2016_power_smart_plan.pdf, Accessed January 23, 2015
[58] Ibid.

Ontario - Independent Electricity System Operator (IESO)

Business Structure	"IESO works collaboratively with local distribution companies and other partners to deliver conservation programs throughout Ontario"[59]	
DSM Funding Mechanism	Systems benefit charge	
Population Served	13,550,900[60]	**Number of Customers** 4,800,000[61]
Year DSM Started		**Last year of IRP** n/a
	▪ Residential (saveONenergy at home) ▪ Heating & Cooling Incentive ▪ Peaksaver Plus® ▪ Coupons ▪ Fridge & Freezer Pickup ▪ Exchange Event ▪ Buying a New Home ▪ Industrial ▪ Demand Response ▪ Retrofit Program ▪ High Performance New Construction ▪ Process and Systems	▪ Business (saveONenergy for business) ▪ Demand Response ▪ Small Business Lighting ▪ Retrofit Program ▪ Unitary AC Incentive ▪ Compressed Air Incentive ▪ Lighting Incentive ▪ VFD Incentive ▪ Motors Incentive ▪ Peaksaver Plus® ▪ Audit Funding ▪ Existing Building Commissioning ▪ High Performance New Construction ▪ Process and Systems ▪ Training & Support ▪ New Home Construction ▪ Social and Assisted Housing
Utility Revenues (2014)	~12,064 Million[62]	139,693GWh[63]
DSM Plan (2015-2020)	$1,835 Million[64]	7,000 GWh[65]
Actual $DSM (2012)	$19.67/capita	$55.52/customer
Plan $DSM (2015)	$22.57/capita	$63.72/customer
DSM Plan Savings (2015)/Sales (2014)	0.9%	
DSM Plan First Year Cost (2015)	$0.25/kWh	

[59] IESO, Conservation, http://www.ieso.ca/Pages/Conservation/default.aspx, Accessed February 13, 2015.

[60] Statistics Canada, http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo02a-eng.htm, Accessed January 28, 2015

[61] Renewing Ontario's Electricity Distribution Sector: Putting the Consumer First, http://www.energy.gov.on.ca/en/ldc-panel/, Accessed February 13, 2015.

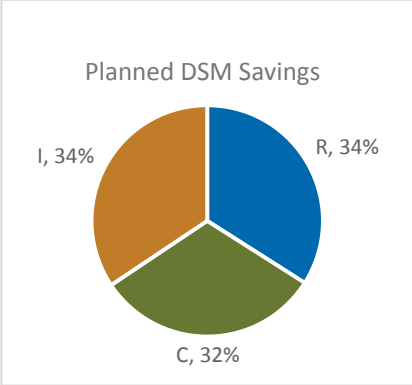
[62] Calculated from the average c/kWh and sales with global adjustment, http://www.ieso.ca/Pages/Power-Data/Price.aspx, http://www.ieso.ca/Pages/Ontario%27s-Power-System/Electricity-Pricing-in-Ontario/Global-Adjustment.aspx.

[63] IESO, Forecasts & 18-Month Outlooks, http://www.ieso.ca/Pages/Participate/Reliability-Requirements/Forecasts-&-18-Month-Outlooks.aspx '18-Month Outlook - Tables', Accessed February 13, 2015.

[64] Ontario Power Authority LDC CDM Target and Budget Allocations, Final v1 - October 10, 2014, http://www.powerauthority.on.ca/sites/default/files/conservation/LDC%20CDM%20Targets%20and%20Budgets_10312014.pdf

[65] Ibid.

Hydro Quebec

Business Structure	Crown Corporation	
DSM Funding Mechanism	Rate Recovery	
	**Population Served** 8,154,000	**Number of Customers** 4,142,000
	Year DSM Started 2013	**Last year of IRP** Not Available
	▪ Residential ▪ Awareness Energy Wise ▪ Specific Programs ▪ Low Income ▪ Program	▪ Commercial ▪ QIEEB ▪ Other programs ▪ Industrial ▪ Small and Medium ▪ Large
Utility Sales (2013)	$11,085 Million[66]	173,276 GWh[67]
DSM Plan (2015)	$135 Million[68]	546 GWh[69]
Actual $DSM (2014)	$14.61/capita	$28.97/customer
Plan $DSM (2015)	$16.43/capita	$32.59/customer
DSM Plan Savings (2015)/Sales (2014)	0.3%	
DSM Plan First Year Cost (2015)	$0.25/kWh	

[66] Hydro Quebec 2013 Annual Report, http://www.hydroquebec.com/publications/en/annual_report/pdf/annual-report-2013.pdf
[67] Ibid.
[68] Hydro-Québec Distribution Files 2015–2016 Rate Application with the Régie de l'énergie, http://news.hydroquebec.com/en/press-releases/613/hydro-quebec-distribution-files-20152016-rate-application-with-the-regie-de-lenergie/
[69] Plan Gobal En Efficacity Energetique Budget 2015, http://publicsde.regie-energie.qc.ca/projets/282/DocPrj/R-3905-2014-B-0038-Demande-Piece-2014_08_01.pdf, Accessed January 30, 2015

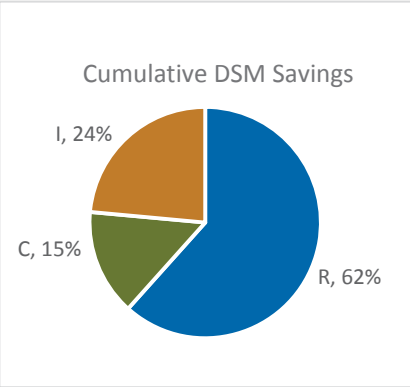
Efficiency New Brunswick

Business Structure	Crown Corporation	
DSM Funding Mechanism	Rate Recovery	
Sector Level Breakdown of DSM Not Available	**Population Served** 753,900	**Number of Customers** 351,000
	Year DSM Started 2012	**Last year of IRP** 2014

	▪ Residential
	  ▪ Existing Buildings
	  ▪ New Homes
	  ▪ Capacity Building
	▪ Industrial
	  ▪ Large Industrial Program
	  ▪ Capital Projects
	  ▪ Energy Management Information Systems
	  ▪ Results
	  ▪ Small and Medium Industrial Program
	  ▪ Capacity Building
		▪ Commercial
		  ▪ Energy Smart Commercial Buildings Retrofit
		  ▪ Start Smart New Commercial Buildings Incentive Program
		  ▪ Energy Modelling
		  ▪ Core Performance Guide
		  ▪ Capacity Building

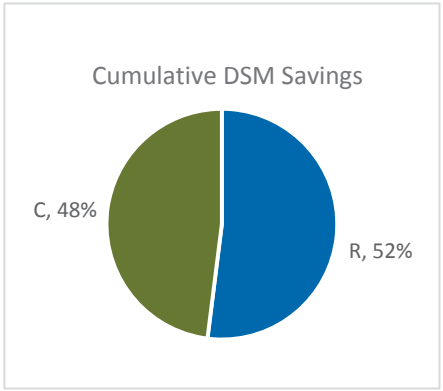
Utility Sales (2013)	1,328 Million[70]	13,388 GWh[71]
DSM Plan (2015)	$18.5 Million[72]	Not Available[73]
Actual $DSM (2013)	$22.07/capita	$47.51/customer
Plan $DSM (2015)	$24.54/capita	$52.71/customer
DSM Plan Savings (2015)/Sales (2014)	0.5%	
DSM Plan First Year Cost (2015)	$0.26/kWh	

[70] New Brunswick Power 2013 - 2014 Annual Report, http://www.nbpower.com/html/en/about/publications/annual/2014_Annual_Report_EN.pdf
[71] Ibid.
[72] 2014/15-2016/17 ELECTRICITY EFFICIENCY PLAN, http://www2.gnb.ca/content/dam/gnb/Departments/en/pdf/Publications/EfficiencyPlanExecutiveSummary.pdf
[73] The 2014/15-2016/17 Energy Efficient Plan prepared for the New Brunswick Department of Energy and Mines presents cumulative energy savings over a three year period.

Newfoundland		
Business Structure	Private	
DSM Funding Mechanism	Rate Recovery	
	**Population Served** 510,000	**Number of Customers** 256,000
	Year DSM Started 2009	**Last year of IRP** In progress
	▪ Residential ▪ Insulation ▪ E* Window ▪ Thermostat ▪ Isolated Systems ▪ Small Technologies ▪ Heat Recovery Ventilator ▪ Block Heater Timers	▪ Commercial ▪ Commercial Lighting ▪ Isolated Systems ▪ Business Efficiency ▪ Industrial ▪ Industrial Energy Efficiency
Nalcor Power Utility Sales (2013)	$543 Million [74]	7,178 GWh[75]
DSM Plan (2015)	$6 Million[76]	20 GWh[77]
Actual $DSM (2012)	$7.59/capita	$14.49/customer
Plan $DSM (2015)	$10.82/capita	$20.36/customer
DSM Plan Savings (2015)/Sales (2014)	0.3%	
DSM Plan First Year Cost (2015)	$0.29/kWh	

[74] Naclor Energy, 2013 Business and Financial Report, http://www.nalcorenergy.com/uploads/file/Nalcor%202013%20Annual%20Report(1).pdf, Accessed February 26, 2015.
[75] Ibid.
[76] Newfoundland Five Year Energy Conservation Plan 2012 - 2016, http://www.pub.nl.ca/applications/NLH2013GRA/files/rfi/IN-NLH-009.pdf, Accessed January 27, 2015. Note that this is a joint plan between Newfoundland Power and Newfoundland and Labrador Hydro
[77] Ibid.

Efficiency Maine

Business Structure	Independent Administrator governed by a stakeholder Board of Trustees with oversight from the Maine Public Utilities Commission.	
DSM Funding Mechanism	System Benefits Charge	
	**Population Served** 1,328,000	**Number of Customers** 261,228
	Year DSM Started 2009	**Last year of IRP**
	▪ Residential ▪ Residential Appliances ▪ Low Income ▪ Retail Lighting Program	▪ Commercial ▪ Business Incentive ▪ Large Customer ▪ Small Business DI
Utility Sales (2012)	$1,366[78]	11,561 GWh[79]
DSM Plan (2015)	$27 Million[80]	136 GWh[81]
DSM Plan Savings (2015)/Sales (2014)	1.2%	
DSM Plan First Year Cost (2015)	$0.20/kWh	

[78] Energy Information Administration, Maine Electricity Profile 2012, Table 8. Retail sales, revenue, and average retail price by sector, 1990-2012, http://www.eia.gov/electricity/state/maine/, Accessed February 4, 2015
[79] Ibid,
[80] Triennial Plan of the Efficiency Maine Trust 2014 – 2016, http://www.efficiencymaine.com/docs/TriPlan2-11-26-2012.pdf, Accessed January 29, 2015
[81] Ibid.

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Measure Level Results for Baseline E1 and Optimized Case D Scenarios

	Program Type	Sub-Program	Measure	Model	Building Type	End Use Category	Stock Treatment	Demand (kW)	Energy (MWh)	Total Impl. Cost ($)
1	Business Energy Rebates	Business Energy Rebates	Daylighting Controls	Baseline E1	COM	COM-Lighting	Office	10	140	23301
2	Business Energy Rebates	Business Energy Rebates	Daylighting Controls	Optimized Case D	COM	COM-Lighting	Office	4	54	8862
3			Percentage Difference					-62%	-62%	-62%
4	Business Energy Rebates	Business Energy Rebates	Integrated Dual Enthalpy Economizer Controls	Baseline E1	COM	COM-HVAC	Office	941	1381	211643
5	Business Energy Rebates	Business Energy Rebates	Integrated Dual Enthalpy Economizer Controls	Optimized Case D	COM	COM-HVAC	Office	741	1087	101555
6			Percentage Difference					-21%	-21%	-52%
7	Business Energy Rebates	Business Energy Rebates	LED Exit Sign-End of Life replacement	Baseline E1	COM	COM-Lighting	Office	0	4	718
8	Business Energy Rebates	Business Energy Rebates	LED Exit Sign-End of Life replacement	Optimized Case D	COM	COM-Lighting	Office	0	3	310
9			Percentage Difference					-27%	-27%	-57%
10	Business Energy Rebates	Business Energy Rebates	LED Exterior Fixtures-End of Life replacement	Baseline E1	COM	COM-Lighting	Office	19	84	12495
11	Business Energy Rebates	Business Energy Rebates	LED Exterior Fixtures-End of Life replacement	Optimized Case D	COM	COM-Lighting	Office	17	73	6648
12			Percentage Difference					-13%	-13%	-47%
13	Business Energy Rebates	Business Energy Rebates	LED Lamps-End of Life	Baseline E1	COM	COM-Lighting	Office	2	16	2752
14	Business Energy Rebates	Business Energy Rebates	LED Lamps-End of Life	Optimized Case D	COM	COM-Lighting	Office	2	16	2632
15			Percentage Difference					1%	1%	-4%
16	Business Energy Rebates	Business Energy Rebates	LED Lamps-Retrofit (dual baseline)	Baseline E1	COM	COM-Lighting	Office	7	61	7924
17	Business Energy Rebates	Business Energy Rebates	LED Lamps-Retrofit (dual baseline)	Optimized Case D	COM	COM-Lighting	Office	7	64	7900
18			Percentage Difference					4%	4%	0%
19	Business Energy Rebates	Business Energy Rebates	LED Linear Replacement Lamps	Baseline E1	COM	COM-Lighting	Office	78	684	143753
20	Business Energy Rebates	Business Energy Rebates	LED Linear Replacement Lamps	Optimized Case D	COM	COM-Lighting	Office	69	603	105968
21			Percentage Difference					-12%	-12%	-26%
22	Business Energy Rebates	Business Energy Rebates	LED Low Bay Fixture	Baseline E1	COM	COM-Lighting	Office	116	1016	326850
23	Business Energy Rebates	Business Energy Rebates	LED Low Bay Fixture	Optimized Case D	COM	COM-Lighting	Office	86	753	191989
24			Percentage Difference					-26%	-26%	-41%
25	Business Energy Rebates	Business Energy Rebates	Lighting Controls - Occupancy Sensors	Baseline E1	COM	COM-Lighting	Office	14	190	31636
26	Business Energy Rebates	Business Energy Rebates	Lighting Controls - Occupancy Sensors	Optimized Case D	COM	COM-Lighting	Office	9	119	8983
27			Percentage Difference					-37%	-37%	-72%
28	Business Energy Rebates	Business Energy Rebates	Photoluminescent Exit Sign	Baseline E1	COM	COM-Lighting	Office	1	5	984
29	Business Energy Rebates	Business Energy Rebates	Photoluminescent Exit Sign	Optimized Case D	COM	COM-Lighting	Office	0	4	445
30			Percentage Difference					-26%	-26%	-55%
31	Business Energy Rebates	Business Energy Rebates	Refrigerated Vending Machine Controller	Baseline E1	COM	COM-Refrigeration	Office	20	29	2618
32	Business Energy Rebates	Business Energy Rebates	Refrigerated Vending Machine Controller	Optimized Case D	COM	COM-Refrigeration	Office	20	29	2035
33			Percentage Difference					0%	0%	-22%
34	Business Energy Rebates	Business Energy Rebates	Relamp/Reballast-Retrofit (dual baseline)	Baseline E1	COM	COM-Lighting	Office	220	1923	251912
35	Business Energy Rebates	Business Energy Rebates	Relamp/Reballast-Retrofit (dual baseline)	Optimized Case D	COM	COM-Lighting	Office	53	464	26673
36			Percentage Difference					-76%	-76%	-89%
37	Business Energy Rebates	Business Energy Rebates	T8 Dimmable Stairwell Lighting	Baseline E1	COM	COM-Lighting	Office	1	17	4167
38	Business Energy Rebates	Business Energy Rebates	T8 Dimmable Stairwell Lighting	Optimized Case D	COM	COM-Lighting	Office	1	10	868
39			Percentage Difference					-42%	-42%	-79%
40	Business Energy Rebates	Business Energy Rebates	Variable Frequency Drives	Baseline E1	COM	COM-Motors	Office	50	439	57758
41	Business Energy Rebates	Business Energy Rebates	Variable Frequency Drives	Optimized Case D	COM	COM-Motors	Office	45	394	26818
42			Percentage Difference					-10%	-10%	-54%
43	Business Energy Rebates	Business Energy Rebates	Air Tanks for Load / No-Load Screw Compressors (10 – 40 hp)	Baseline E1	COM	COM-Process	Other Commercial	228	1355	110695
44	Business Energy Rebates	Business Energy Rebates	Air Tanks for Load / No-Load Screw Compressors (10 – 40 hp)	Optimized Case D	COM	COM-Process	Other Commercial	233	1384	90758
45			Percentage Difference					2%	2%	-18%
46	Business Energy Rebates	Business Energy Rebates	Cycling Refrigerated Air Dryers (≤ 300 CFM capacity)	Baseline E1	COM	COM-Process	Other Commercial	12	109	7364
47	Business Energy Rebates	Business Energy Rebates	Cycling Refrigerated Air Dryers (≤ 300 CFM capacity)	Optimized Case D	COM	COM-Process	Other Commercial	12	108	5009
48			Percentage Difference					-1%	-1%	-32%

49	Business Energy Rebates	Business Energy Rebates	Dairy Scroll Compressor	Baseline E1	COM	COM-Other	Other Commercial	1	12	2302
50	Business Energy Rebates	Business Energy Rebates	Dairy Scroll Compressor	Optimized Case D	COM	COM-Other	Other Commercial	2	22	5512
51			Percentage Difference					79%	79%	139%
52	Business Energy Rebates	Business Energy Rebates	Daylighting Controls	Baseline E1	COM	COM-Lighting	Other Commercial	7	91	15996
53	Business Energy Rebates	Business Energy Rebates	Daylighting Controls	Optimized Case D	COM	COM-Lighting	Other Commercial	3	38	6628
54			Percentage Difference					-59%	-59%	-59%
55	Business Energy Rebates	Business Energy Rebates	Double Heat Pad	Baseline E1	COM	COM-Other	Other Commercial	1	13	3014
56	Business Energy Rebates	Business Energy Rebates	Double Heat Pad	Optimized Case D	COM	COM-Other	Other Commercial	1	10	832
57			Percentage Difference					-23%	-23%	-72%
58	Business Energy Rebates	Business Energy Rebates	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Baseline E1	COM	COM-Refrigeration	Other Commercial	7	68	10743
59	Business Energy Rebates	Business Energy Rebates	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Optimized Case D	COM	COM-Refrigeration	Other Commercial	7	65	8774
60			Percentage Difference					-4%	-4%	-18%
61	Business Energy Rebates	Business Energy Rebates	ENERGY STAR®, CEE Tier 2 or CEE Tier 3 Commercial Clothes Washer	Baseline E1	COM	COM-Other	Other Commercial	16	144	33467
62	Business Energy Rebates	Business Energy Rebates	ENERGY STAR®, CEE Tier 2 or CEE Tier 3 Commercial Clothes Washer	Optimized Case D	COM	COM-Other	Other Commercial	11	95	10174
63			Percentage Difference					-34%	-34%	-70%
64	Business Energy Rebates	Business Energy Rebates	Evaporator Fan Motor Controls for Walk-In Freezers and Coolers	Baseline E1	COM	COM-Refrigeration	Other Commercial	31	45	11967
65	Business Energy Rebates	Business Energy Rebates	Evaporator Fan Motor Controls for Walk-In Freezers and Coolers	Optimized Case D	COM	COM-Refrigeration	Other Commercial	22	33	6608
66			Percentage Difference					-28%	-28%	-45%
67										
68	Business Energy Rebates	Business Energy Rebates	Fluorescent T5 and HPT8 Fixtures (4 FT) lamps-Retrofit (dual baseline	Baseline E1	COM	COM-Lighting	Other Commercial	18	148	185360
69										
70	Business Energy Rebates	Business Energy Rebates	Heat Reclaimer Unit	Baseline E1	COM	COM-Other	Other Commercial	1	6	888
71	Business Energy Rebates	Business Energy Rebates	Heat Reclaimer Unit	Optimized Case D	COM	COM-Other	Other Commercial	1	5	447
72			Percentage Difference					-12%	-12%	-50%
73	Business Energy Rebates	Business Energy Rebates	Humidity-Based Door Heater Controls for Reach-In Coolers and Freez	Baseline E1	COM	COM-Refrigeration	Other Commercial	83	121	11347
74	Business Energy Rebates	Business Energy Rebates	Humidity-Based Door Heater Controls for Reach-In Coolers and Freez	Optimized Case D	COM	COM-Refrigeration	Other Commercial	83	121	9078
75			Percentage Difference					0%	0%	-20%
76	Business Energy Rebates	Business Energy Rebates	HVAC Hotel Occupancy Sensor	Baseline E1	COM	COM-HVAC	Other Commercial	48	71	15968
77	Business Energy Rebates	Business Energy Rebates	HVAC Hotel Occupancy Sensor	Optimized Case D	COM	COM-HVAC	Other Commercial	37	54	9425
78			Percentage Difference					-24%	-24%	-41%
79	Business Energy Rebates	Business Energy Rebates	Integrated Dual Enthalpy Economizer Controls	Baseline E1	COM	COM-HVAC	Other Commercial	1277	1873	287102
80	Business Energy Rebates	Business Energy Rebates	Integrated Dual Enthalpy Economizer Controls	Optimized Case D	COM	COM-HVAC	Other Commercial	1005	1474	137764
81			Percentage Difference					-21%	-21%	-52%
82	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Freezer Display Cases	Baseline E1	COM	COM-Refrigeration	Other Commercial	4	7	1905
83	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Freezer Display Cases	Optimized Case D	COM	COM-Refrigeration	Other Commercial	2	4	374
84			Percentage Difference					-46%	-46%	-80%
85	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Walk-In Freezers	Baseline E1	COM	COM-Refrigeration	Other Commercial	7	10	2077
86	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Walk-In Freezers	Optimized Case D	COM	COM-Refrigeration	Other Commercial	5	7	668
87			Percentage Difference					-35%	-35%	-68%
88	Business Energy Rebates	Business Energy Rebates	LED Exit Sign-End of Life replacement	Baseline E1	COM	COM-Lighting	Other Commercial	1	5	974
89	Business Energy Rebates	Business Energy Rebates	LED Exit Sign-End of Life replacement	Optimized Case D	COM	COM-Lighting	Other Commercial	0	4	420
90			Percentage Difference					-27%	-27%	-57%
91	Business Energy Rebates	Business Energy Rebates	LED Exterior Fixtures-End of Life replacement	Baseline E1	COM	COM-Lighting	Other Commercial	26	114	16950
92	Business Energy Rebates	Business Energy Rebates	LED Exterior Fixtures-End of Life replacement	Optimized Case D	COM	COM-Lighting	Other Commercial	23	99	9018
93			Percentage Difference					-13%	-13%	-47%
94	Business Energy Rebates	Business Energy Rebates	LED High Bay Fixture	Baseline E1	COM	COM-Lighting	Other Commercial	989	8157	2141615
95	Business Energy Rebates	Business Energy Rebates	LED High Bay Fixture	Optimized Case D	COM	COM-Lighting	Other Commercial	678	5594	744118
96			Percentage Difference					-31%	-31%	-65%
97	Business Energy Rebates	Business Energy Rebates	LED Lamps-End of Life	Baseline E1	COM	COM-Lighting	Other Commercial	5	38	4667
98	Business Energy Rebates	Business Energy Rebates	LED Lamps-End of Life	Optimized Case D	COM	COM-Lighting	Other Commercial	5	38	4399
99			Percentage Difference					1%	1%	-6%
100	Business Energy Rebates	Business Energy Rebates	LED Lamps-Retrofit (dual baseline)	Baseline E1	COM	COM-Lighting	Other Commercial	17	142	14329
101	Business Energy Rebates	Business Energy Rebates	LED Lamps-Retrofit (dual baseline)	Optimized Case D	COM	COM-Lighting	Other Commercial	18	148	13791
102			Percentage Difference					4%	4%	-4%
103	Business Energy Rebates	Business Energy Rebates	LED Linear Replacement Lamps	Baseline E1	COM	COM-Lighting	Other Commercial	103	850	192491

104	Business Energy Rebates	Business Energy Rebates	LED Linear Replacement Lamps	Optimized Case D	COM	COM-Lighting	Other Commercial	89	733	139016
105			Percentage Difference					-14%	-14%	-28%
106	Business Energy Rebates	Business Energy Rebates	LED Low Bay Fixture	Baseline E1	COM	COM-Lighting	Other Commercial	154	1274	438242
107	Business Energy Rebates	Business Energy Rebates	LED Low Bay Fixture	Optimized Case D	COM	COM-Lighting	Other Commercial	111	919	250407
108			Percentage Difference					-28%	-28%	-43%
109	Business Energy Rebates	Business Energy Rebates	LED Refrigeration Strip Lighting-End of Life replacement	Baseline E1	COM	COM-Lighting	Other Commercial	17	140	26314
110	Business Energy Rebates	Business Energy Rebates	LED Refrigeration Strip Lighting-End of Life replacement	Optimized Case D	COM	COM-Lighting	Other Commercial	14	113	14384
111			Percentage Difference					-19%	-19%	-45%
112	Business Energy Rebates	Business Energy Rebates	Lighting Controls - Occupancy Sensors	Baseline E1	COM	COM-Lighting	Other Commercial	19	247	28457
113	Business Energy Rebates	Business Energy Rebates	Lighting Controls - Occupancy Sensors	Optimized Case D	COM	COM-Lighting	Other Commercial	16	204	11833
114			Percentage Difference					-17%	-17%	-58%
115	Business Energy Rebates	Business Energy Rebates	Night Covers for 3' Refrigerated Display Cases	Baseline E1	COM	COM-Refrigeration	Other Commercial	5	46	11732
116	Business Energy Rebates	Business Energy Rebates	Night Covers for 3' Refrigerated Display Cases	Optimized Case D	COM	COM-Refrigeration	Other Commercial	3	29	3649
117			Percentage Difference					-37%	-37%	-69%
118	Business Energy Rebates	Business Energy Rebates	Photoluminescent Exit Sign	Baseline E1	COM	COM-Lighting	Other Commercial	1	6	1335
119	Business Energy Rebates	Business Energy Rebates	Photoluminescent Exit Sign	Optimized Case D	COM	COM-Lighting	Other Commercial	1	5	604
120			Percentage Difference					-26%	-26%	-55%
121	Business Energy Rebates	Business Energy Rebates	Refrigerated Vending Machine Controller	Baseline E1	COM	COM-Refrigeration	Other Commercial	27	39	3552
122	Business Energy Rebates	Business Energy Rebates	Refrigerated Vending Machine Controller	Optimized Case D	COM	COM-Refrigeration	Other Commercial	27	39	2761
123			Percentage Difference					0%	0%	-22%
124	Business Energy Rebates	Business Energy Rebates	Relamp/Reballast-Retrofit (dual baseline)	Baseline E1	COM	COM-Lighting	Other Commercial	317	2611	343363
125	Business Energy Rebates	Business Energy Rebates	Relamp/Reballast-Retrofit (dual baseline)	Optimized Case D	COM	COM-Lighting	Other Commercial	75	622	35837
126			Percentage Difference					-76%	-76%	-90%
127	Business Energy Rebates	Business Energy Rebates	Single Heat Pad	Baseline E1	COM	COM-Other	Other Commercial	1	13	1760
128	Business Energy Rebates	Business Energy Rebates	Single Heat Pad	Optimized Case D	COM	COM-Other	Other Commercial	1	12	779
129			Percentage Difference					-8%	-8%	-56%
130	Business Energy Rebates	Business Energy Rebates	Strip Curtains for 3' Open Refrigerated Display Cases	Baseline E1	COM	COM-Refrigeration	Other Commercial	17	169	11935
131	Business Energy Rebates	Business Energy Rebates	Strip Curtains for 3' Open Refrigerated Display Cases	Optimized Case D	COM	COM-Refrigeration	Other Commercial	17	171	7828
132			Percentage Difference					1%	1%	-34%
133	Business Energy Rebates	Business Energy Rebates	T8 Dimmable Stairwell Lighting	Baseline E1	COM	COM-Lighting	Other Commercial	3	37	6181
134	Business Energy Rebates	Business Energy Rebates	T8 Dimmable Stairwell Lighting	Optimized Case D	COM	COM-Lighting	Other Commercial	2	29	1919
135			Percentage Difference					-23%	-23%	-69%
136	Business Energy Rebates	Business Energy Rebates	Variable Frequency Drives	Baseline E1	COM	COM-Motors	Other Commercial	70	613	78937
137	Business Energy Rebates	Business Energy Rebates	Variable Frequency Drives	Optimized Case D	COM	COM-Motors	Other Commercial	63	554	37139
138			Percentage Difference					-10%	-10%	-53%
139	Business Energy Rebates	Business Energy Rebates	Variable Speed Drive for Kitchen exhaust fans (Demand Controlled V	Baseline E1	COM	COM-Motors	Other Commercial	19	170	56122
140	Business Energy Rebates	Business Energy Rebates	Variable Speed Drive for Kitchen exhaust fans (Demand Controlled V	Optimized Case D	COM	COM-Motors	Other Commercial	9	76	6858
141			Percentage Difference					-55%	-55%	-88%
142	Business Energy Rebates	Business Energy Rebates	Variable Speed Drive Screw Compressors (10 - 40 hp)	Baseline E1	COM	COM-Process	Other Commercial	41	362	33614
143	Business Energy Rebates	Business Energy Rebates	Variable Speed Drive Screw Compressors (10 - 40 hp)	Optimized Case D	COM	COM-Process	Other Commercial	40	349	22068
144			Percentage Difference					-3%	-3%	-34%
145	Business Energy Rebates	Business Energy Rebates	VSD for Milk Vacuum Pump	Baseline E1	COM	COM-Other	Other Commercial	9	78	7816
146	Business Energy Rebates	Business Energy Rebates	VSD for Milk Vacuum Pump	Optimized Case D	COM	COM-Other	Other Commercial	9	77	4196
147			Percentage Difference					-1%	-1%	-46%
148	Business Energy Rebates	Business Energy Rebates	Zero Energy Doors for Reach-In Coolers and Freezers	Baseline E1	COM	COM-Refrigeration	Other Commercial	8	76	9882
149	Business Energy Rebates	Business Energy Rebates	Zero Energy Doors for Reach-In Coolers and Freezers	Optimized Case D	COM	COM-Refrigeration	Other Commercial	8	77	9048
150			Percentage Difference					1%	1%	-8%
151	Business Energy Rebates	Business Energy Rebates	Zero-Energy Livestock Waterers	Baseline E1	COM	COM-Other	Other Commercial	2	14	2660
152	Business Energy Rebates	Business Energy Rebates	Zero-Energy Livestock Waterers	Optimized Case D	COM	COM-Other	Other Commercial	1	12	919
153			Percentage Difference					-17%	-17%	-65%
154	Business Energy Rebates	Business Energy Rebates	Commercial Electric Griddle	Baseline E1	COM	COM-Other	Retail	25	223	50758
155	Business Energy Rebates	Business Energy Rebates	Commercial Electric Griddle	Optimized Case D	COM	COM-Other	Retail	19	163	13830
156			Percentage Difference					-27%	-27%	-73%
157	Business Energy Rebates	Business Energy Rebates	Daylighting Controls	Baseline E1	COM	COM-Lighting	Retail	12	136	23519
158	Business Energy Rebates	Business Energy Rebates	Daylighting Controls	Optimized Case D	COM	COM-Lighting	Retail	5	56	9611

159			Percentage Difference					-59%	-59%	-59%
160	Business Energy Rebates	Business Energy Rebates	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Baseline E1	COM	COM-Refrigeration	Retail	10	97	15370
161	Business Energy Rebates	Business Energy Rebates	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Optimized Case D	COM	COM-Refrigeration	Retail	9	93	12554
162			Percentage Difference					-4%	-4%	-18%
163	Business Energy Rebates	Business Energy Rebates	ENERGY STAR® Commercial Electric Convection Oven	Baseline E1	COM	COM-Other	Retail	15	128	34787
164	Business Energy Rebates	Business Energy Rebates	ENERGY STAR® Commercial Electric Convection Oven	Optimized Case D	COM	COM-Other	Retail	10	85	7887
165			Percentage Difference					-34%	-34%	-77%
166	Business Energy Rebates	Business Energy Rebates	ENERGY STAR® Ice Making Head	Baseline E1	COM	COM-Refrigeration	Retail	11	109	19898
167	Business Energy Rebates	Business Energy Rebates	ENERGY STAR® Ice Making Head	Optimized Case D	COM	COM-Refrigeration	Retail	8	76	6374
168			Percentage Difference					-30%	-30%	-68%
169	Business Energy Rebates	Business Energy Rebates	ENERGY STAR® Remote Condensing Head/Split System Ice Maker	Baseline E1	COM	COM-Refrigeration	Retail	13	126	30479
170	Business Energy Rebates	Business Energy Rebates	ENERGY STAR® Remote Condensing Head/Split System Ice Maker	Optimized Case D	COM	COM-Refrigeration	Retail	8	74	6986
171			Percentage Difference					-41%	-41%	-77%
172	Business Energy Rebates	Business Energy Rebates	ENERGY STAR® Self Contained Ice Maker	Baseline E1	COM	COM-Refrigeration	Retail	0	2	477
173	Business Energy Rebates	Business Energy Rebates	ENERGY STAR® Self Contained Ice Maker	Optimized Case D	COM	COM-Refrigeration	Retail	1	14	2481
174			Percentage Difference					522%	522%	420%
175	Business Energy Rebates	Business Energy Rebates	Evaporator Fan Motor Controls for Walk-In Freezers and Coolers	Baseline E1	COM	COM-Refrigeration	Retail	45	65	17113
176	Business Energy Rebates	Business Energy Rebates	Evaporator Fan Motor Controls for Walk-In Freezers and Coolers	Optimized Case D	COM	COM-Refrigeration	Retail	32	47	9435
177			Percentage Difference					-28%	-28%	-45%
178	Business Energy Rebates	Business Energy Rebates	Full Size Commercial Hot Food Holding Cabinet	Baseline E1	COM	COM-Other	Retail	38	335	36641
179	Business Energy Rebates	Business Energy Rebates	Full Size Commercial Hot Food Holding Cabinet	Optimized Case D	COM	COM-Other	Retail	36	315	19363
180			Percentage Difference					-6%	-6%	-47%
181	Business Energy Rebates	Business Energy Rebates	Glass Door Commercial Refrigerator	Baseline E1	COM	COM-Refrigeration	Retail	9	93	17681
182	Business Energy Rebates	Business Energy Rebates	Glass Door Commercial Refrigerator	Optimized Case D	COM	COM-Refrigeration	Retail	10	101	19864
183			Percentage Difference					9%	9%	12%
184	Business Energy Rebates	Business Energy Rebates	Half Size Commercial Hot Food Holding Cabinet	Baseline E1	COM	COM-Other	Retail	13	113	19405
185	Business Energy Rebates	Business Energy Rebates	Half Size Commercial Hot Food Holding Cabinet	Optimized Case D	COM	COM-Other	Retail	13	113	18342
186			Percentage Difference					0%	0%	-5%
187	Business Energy Rebates	Business Energy Rebates	Humidity-Based Door Heater Controls for Reach-In Coolers and Freez	Baseline E1	COM	COM-Refrigeration	Retail	120	173	16234
188	Business Energy Rebates	Business Energy Rebates	Humidity-Based Door Heater Controls for Reach-In Coolers and Freez	Optimized Case D	COM	COM-Refrigeration	Retail	120	173	12988
189			Percentage Difference					0%	0%	-20%
190	Business Energy Rebates	Business Energy Rebates	Integrated Dual Enthalpy Economizer Controls	Baseline E1	COM	COM-HVAC	Retail	313	2680	410769
191	Business Energy Rebates	Business Energy Rebates	Integrated Dual Enthalpy Economizer Controls	Optimized Case D	COM	COM-HVAC	Retail	247	2110	197104
192			Percentage Difference					-21%	-21%	-52%
193	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Freezer Display Cases	Baseline E1	COM	COM-Refrigeration	Retail	7	9	2725
194	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Freezer Display Cases	Optimized Case D	COM	COM-Refrigeration	Retail	4	5	535
195			Percentage Difference					-46%	-46%	-80%
196	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Walk-In Freezers	Baseline E1	COM	COM-Refrigeration	Retail	10	15	2972
197	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Walk-In Freezers	Optimized Case D	COM	COM-Refrigeration	Retail	7	9	956
198			Percentage Difference					-35%	-35%	-68%
199	Business Energy Rebates	Business Energy Rebates	LED Exit Sign-End of Life replacement	Baseline E1	COM	COM-Lighting	Retail	1	7	1394
200	Business Energy Rebates	Business Energy Rebates	LED Exit Sign-End of Life replacement	Optimized Case D	COM	COM-Lighting	Retail	1	5	601
201			Percentage Difference					-27%	-27%	-57%
202	Business Energy Rebates	Business Energy Rebates	LED Exterior Fixtures-End of Life replacement	Baseline E1	COM	COM-Lighting	Retail	37	163	24251
203	Business Energy Rebates	Business Energy Rebates	LED Exterior Fixtures-End of Life replacement	Optimized Case D	COM	COM-Lighting	Retail	32	142	12902
204			Percentage Difference					-13%	-13%	-47%
205	Business Energy Rebates	Business Energy Rebates	LED High Bay Fixture	Baseline E1	COM	COM-Lighting	Retail	1581	11724	3066143
206	Business Energy Rebates	Business Energy Rebates	LED High Bay Fixture	Optimized Case D	COM	COM-Lighting	Retail	1087	8058	1068345
207			Percentage Difference					-31%	-31%	-65%
208	Business Energy Rebates	Business Energy Rebates	LED Lamps-End of Life	Baseline E1	COM	COM-Lighting	Retail	7	50	6466
209	Business Energy Rebates	Business Energy Rebates	LED Lamps-End of Life	Optimized Case D	COM	COM-Lighting	Retail	7	51	6108
210			Percentage Difference					1%	1%	-6%
211	Business Energy Rebates	Business Energy Rebates	LED Lamps-Retrofit (dual baseline)	Baseline E1	COM	COM-Lighting	Retail	21	157	17392
212	Business Energy Rebates	Business Energy Rebates	LED Lamps-Retrofit (dual baseline)	Optimized Case D	COM	COM-Lighting	Retail	22	163	17050
213			Percentage Difference					4%	4%	-2%

214	Business Energy Rebates	Business Energy Rebates	LED Linear Replacement Lamps	Baseline E1	COM	COM-Lighting	Retail	170	1260	276880
215	Business Energy Rebates	Business Energy Rebates	LED Linear Replacement Lamps	Optimized Case D	COM	COM-Lighting	Retail	148	1097	201677
216			Percentage Difference					-13%	-13%	-27%
217	Business Energy Rebates	Business Energy Rebates	LED Low Bay Fixture	Baseline E1	COM	COM-Lighting	Retail	254	1882	630028
218	Business Energy Rebates	Business Energy Rebates	LED Low Bay Fixture	Optimized Case D	COM	COM-Lighting	Retail	185	1373	364085
219			Percentage Difference					-27%	-27%	-42%
220	Business Energy Rebates	Business Energy Rebates	LED Refrigeration Strip Lighting-End of Life replacement	Baseline E1	COM	COM-Lighting	Retail	27	200	37648
221	Business Energy Rebates	Business Energy Rebates	LED Refrigeration Strip Lighting-End of Life replacement	Optimized Case D	COM	COM-Lighting	Retail	22	162	20580
222			Percentage Difference					-19%	-19%	-45%
223	Business Energy Rebates	Business Energy Rebates	Lighting Controls - Occupancy Sensors	Baseline E1	COM	COM-Lighting	Retail	29	333	40109
224	Business Energy Rebates	Business Energy Rebates	Lighting Controls - Occupancy Sensors	Optimized Case D	COM	COM-Lighting	Retail	23	268	16016
225			Percentage Difference					-20%	-20%	-60%
226	Business Energy Rebates	Business Energy Rebates	Multi Tank Conveyor Dishwasher with Booster (High Temp)	Baseline E1	COM	COM-Other	Retail	64	562	48834
227	Business Energy Rebates	Business Energy Rebates	Multi Tank Conveyor Dishwasher with Booster (High Temp)	Optimized Case D	COM	COM-Other	Retail	64	558	36530
228			Percentage Difference					-1%	-1%	-25%
229	Business Energy Rebates	Business Energy Rebates	Multi-Tank Conveyor Commercial Dish Washer (Low Temp)	Baseline E1	COM	COM-Other	Retail	36	311	33491
230	Business Energy Rebates	Business Energy Rebates	Multi-Tank Conveyor Commercial Dish Washer (Low Temp)	Optimized Case D	COM	COM-Other	Retail	36	313	30505
231			Percentage Difference					1%	1%	-9%
232	Business Energy Rebates	Business Energy Rebates	Night Covers for 3' Refrigerated Display Cases	Baseline E1	COM	COM-Refrigeration	Retail	5	50	16156
233	Business Energy Rebates	Business Energy Rebates	Night Covers for 3' Refrigerated Display Cases	Optimized Case D	COM	COM-Refrigeration	Retail	3	27	4214
234			Percentage Difference					-46%	-46%	-74%
235	Business Energy Rebates	Business Energy Rebates	Photoluminescent Exit Sign	Baseline E1	COM	COM-Lighting	Retail	1	9	1910
236	Business Energy Rebates	Business Energy Rebates	Photoluminescent Exit Sign	Optimized Case D	COM	COM-Lighting	Retail	1	7	864
237			Percentage Difference					-26%	-26%	-55%
238	Business Energy Rebates	Business Energy Rebates	Refrigerated Vending Machine Controller	Baseline E1	COM	COM-Refrigeration	Retail	39	56	5082
239	Business Energy Rebates	Business Energy Rebates	Refrigerated Vending Machine Controller	Optimized Case D	COM	COM-Refrigeration	Retail	39	56	3950
240			Percentage Difference					0%	0%	-22%
241	Business Energy Rebates	Business Energy Rebates	Relamp/Reballast-Retrofit (dual baseline)	Baseline E1	COM	COM-Lighting	Retail	504	3736	490883
242	Business Energy Rebates	Business Energy Rebates	Relamp/Reballast-Retrofit (dual baseline)	Optimized Case D	COM	COM-Lighting	Retail	120	891	51351
243			Percentage Difference					-76%	-76%	-90%
244	Business Energy Rebates	Business Energy Rebates	Single Tank Conveyor Dishwasher with Booster (High Temp)	Baseline E1	COM	COM-Other	Retail	34	301	23710
245	Business Energy Rebates	Business Energy Rebates	Single Tank Conveyor Dishwasher with Booster (High Temp)	Optimized Case D	COM	COM-Other	Retail	34	300	14959
246			Percentage Difference					0%	0%	-37%
247	Business Energy Rebates	Business Energy Rebates	Single Tank Door Dishwasher with Booster (High Temp)	Baseline E1	COM	COM-Other	Retail	34	295	29680
248	Business Energy Rebates	Business Energy Rebates	Single Tank Door Dishwasher with Booster (High Temp)	Optimized Case D	COM	COM-Other	Retail	32	284	15954
249			Percentage Difference					-4%	-4%	-46%
250	Business Energy Rebates	Business Energy Rebates	Single-Tank Conveyor Dishwasher (Low Temp)	Baseline E1	COM	COM-Other	Retail	34	301	25359
251	Business Energy Rebates	Business Energy Rebates	Single-Tank Conveyor Dishwasher (Low Temp)	Optimized Case D	COM	COM-Other	Retail	34	298	14850
252			Percentage Difference					-1%	-1%	-41%
253	Business Energy Rebates	Business Energy Rebates	Single-Tank Door Type Dishwasher (Low Temp)	Baseline E1	COM	COM-Other	Retail	33	291	33833
254	Business Energy Rebates	Business Energy Rebates	Single-Tank Door Type Dishwasher (Low Temp)	Optimized Case D	COM	COM-Other	Retail	32	278	15667
255			Percentage Difference					-4%	-4%	-54%
256	Business Energy Rebates	Business Energy Rebates	Solid Door Commercial Freezer	Baseline E1	COM	COM-Refrigeration	Retail	1	13	3392
257	Business Energy Rebates	Business Energy Rebates	Solid Door Commercial Freezer	Optimized Case D	COM	COM-Refrigeration	Retail	1	9	1069
258			Percentage Difference					-35%	-35%	-68%
259	Business Energy Rebates	Business Energy Rebates	Solid Door Commercial Refrigerator	Baseline E1	COM	COM-Refrigeration	Retail	2	16	3023
260	Business Energy Rebates	Business Energy Rebates	Solid Door Commercial Refrigerator	Optimized Case D	COM	COM-Refrigeration	Retail	1	14	2304
261			Percentage Difference					-9%	-9%	-24%
262	Business Energy Rebates	Business Energy Rebates	Standard Capacity Commercial Electric Fryers	Baseline E1	COM	COM-Other	Retail	19	169	45621
263	Business Energy Rebates	Business Energy Rebates	Standard Capacity Commercial Electric Fryers	Optimized Case D	COM	COM-Other	Retail	12	106	13729
264			Percentage Difference					-37%	-37%	-70%
265	Business Energy Rebates	Business Energy Rebates	Strip Curtains for 3' Open Refrigerated Display Cases	Baseline E1	COM	COM-Refrigeration	Retail	24	241	17077
266	Business Energy Rebates	Business Energy Rebates	Strip Curtains for 3' Open Refrigerated Display Cases	Optimized Case D	COM	COM-Refrigeration	Retail	25	244	11201
267			Percentage Difference					1%	1%	-34%
268	Business Energy Rebates	Business Energy Rebates	T8 Dimmable Stairwell Lighting	Baseline E1	COM	COM-Lighting	Retail	4	50	8731

269	Business Energy Rebates	Business Energy Rebates	T8 Dimmable Stairwell Lighting	Optimized Case D	COM	COM-Lighting	Retail	3	37	2590
270			Percentage Difference					-25%	-25%	-70%
271	Business Energy Rebates	Business Energy Rebates	Three Quarter Size Commercial Hot Food Holding Cabinet	Baseline E1	COM	COM-Other	Retail	18	161	27662
272	Business Energy Rebates	Business Energy Rebates	Three Quarter Size Commercial Hot Food Holding Cabinet	Optimized Case D	COM	COM-Other	Retail	17	145	19803
273			Percentage Difference					-10%	-10%	-28%
274	Business Energy Rebates	Business Energy Rebates	Under Counter Commercial Dishwasher (Low Temp)	Baseline E1	COM	COM-Other	Retail	37	327	19018
275	Business Energy Rebates	Business Energy Rebates	Under Counter Commercial Dishwasher (Low Temp)	Optimized Case D	COM	COM-Other	Retail	38	329	13167
276			Percentage Difference					1%	1%	-31%
277	Business Energy Rebates	Business Energy Rebates	Under Counter Dishwasher with Booster (High Temp)	Baseline E1	COM	COM-Other	Retail	25	219	16507
278	Business Energy Rebates	Business Energy Rebates	Under Counter Dishwasher with Booster (High Temp)	Optimized Case D	COM	COM-Other	Retail	25	216	9549
279			Percentage Difference					-1%	-1%	-42%
280	Business Energy Rebates	Business Energy Rebates	Variable Frequency Drives	Baseline E1	COM	COM-Motors	Retail	90	789	110025
281	Business Energy Rebates	Business Energy Rebates	Variable Frequency Drives	Optimized Case D	COM	COM-Motors	Retail	79	692	49279
282			Percentage Difference					-12%	-12%	-55%
283	Business Energy Rebates	Business Energy Rebates	Variable Speed Drive for Kitchen exhaust fans (Demand Controlled V	Baseline E1	COM	COM-Motors	Retail	25	217	69789
284	Business Energy Rebates	Business Energy Rebates	Variable Speed Drive for Kitchen exhaust fans (Demand Controlled V	Optimized Case D	COM	COM-Motors	Retail	10	89	10569
285			Percentage Difference					-59%	-59%	-85%
286	Business Energy Rebates	Business Energy Rebates	Zero Energy Doors for Reach-In Coolers and Freezers	Baseline E1	COM	COM-Refrigeration	Retail	11	109	14139
287	Business Energy Rebates	Business Energy Rebates	Zero Energy Doors for Reach-In Coolers and Freezers	Optimized Case D	COM	COM-Refrigeration	Retail	11	111	12945
288			Percentage Difference					1%	1%	-8%
289	Business Energy Rebates	Business Energy Rebates	Air Tanks for Load / No-Load Screw Compressors (10 – 40 hp)	Baseline E1	COM	COM-Process	School	88	521	113948
290	Business Energy Rebates	Business Energy Rebates	Air Tanks for Load / No-Load Screw Compressors (10 – 40 hp)	Optimized Case D	COM	COM-Process	School	73	433	75021
291			Percentage Difference					-17%	-17%	-34%
292	Business Energy Rebates	Business Energy Rebates	Air-Entraining Air Nozzles (up to 14CFM at 100 psi)	Baseline E1	COM	COM-Process	School	14	81	13297
293	Business Energy Rebates	Business Energy Rebates	Air-Entraining Air Nozzles (up to 14CFM at 100 psi)	Optimized Case D	COM	COM-Process	School	12	70	4541
294			Percentage Difference					-14%	-14%	-66%
295	Business Energy Rebates	Business Energy Rebates	Cycling Refrigerated Air Dryers (≤ 300 CFM capacity)	Baseline E1	COM	COM-Process	School	5	40	6314
296	Business Energy Rebates	Business Energy Rebates	Cycling Refrigerated Air Dryers (≤ 300 CFM capacity)	Optimized Case D	COM	COM-Process	School	4	33	3077
297			Percentage Difference					-16%	-16%	-51%
298	Business Energy Rebates	Business Energy Rebates	Daylighting Controls	Baseline E1	COM	COM-Lighting	School	1	168	27669
299	Business Energy Rebates	Business Energy Rebates	Daylighting Controls	Optimized Case D	COM	COM-Lighting	School	0	28	4632
300			Percentage Difference					-83%	-83%	-83%
301	Business Energy Rebates	Business Energy Rebates	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Baseline E1	COM	COM-Refrigeration	School	10	97	15320
302	Business Energy Rebates	Business Energy Rebates	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Optimized Case D	COM	COM-Refrigeration	School	9	93	12513
303			Percentage Difference					-4%	-4%	-18%
304	Business Energy Rebates	Business Energy Rebates	Evaporator Fan Motor Controls for Walk-In Freezers and Coolers	Baseline E1	COM	COM-Refrigeration	School	43	65	17066
305	Business Energy Rebates	Business Energy Rebates	Evaporator Fan Motor Controls for Walk-In Freezers and Coolers	Optimized Case D	COM	COM-Refrigeration	School	31	47	9423
306			Percentage Difference					-28%	-28%	-45%
307	Business Energy Rebates	Business Energy Rebates	Humidity-Based Door Heater Controls for Reach-In Coolers and Freez	Baseline E1	COM	COM-Refrigeration	School	114	172	16181
308	Business Energy Rebates	Business Energy Rebates	Humidity-Based Door Heater Controls for Reach-In Coolers and Freez	Optimized Case D	COM	COM-Refrigeration	School	114	172	12945
309			Percentage Difference					0%	0%	-20%
310	Business Energy Rebates	Business Energy Rebates	Integrated Dual Enthalpy Economizer Controls	Baseline E1	COM	COM-HVAC	School	234	2671	409426
311	Business Energy Rebates	Business Energy Rebates	Integrated Dual Enthalpy Economizer Controls	Optimized Case D	COM	COM-HVAC	School	184	2103	196460
312			Percentage Difference					-21%	-21%	-52%
313	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Freezer Display Cases	Baseline E1	COM	COM-Refrigeration	School	6	9	2716
314	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Freezer Display Cases	Optimized Case D	COM	COM-Refrigeration	School	3	5	533
315			Percentage Difference					-46%	-46%	-80%
316	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Walk-In Freezers	Baseline E1	COM	COM-Refrigeration	School	10	15	2963
317	Business Energy Rebates	Business Energy Rebates	Intelligent (Electronic) Defrost Control For Walk-In Freezers	Optimized Case D	COM	COM-Refrigeration	School	6	9	953
318			Percentage Difference					-35%	-35%	-68%
319	Business Energy Rebates	Business Energy Rebates	LED Exit Sign-End of Life replacement	Baseline E1	COM	COM-Lighting	School	1	7	1389
320	Business Energy Rebates	Business Energy Rebates	LED Exit Sign-End of Life replacement	Optimized Case D	COM	COM-Lighting	School	1	5	599
321			Percentage Difference					-27%	-27%	-57%
322	Business Energy Rebates	Business Energy Rebates	LED Exterior Fixtures-End of Life replacement	Baseline E1	COM	COM-Lighting	School	37	162	24172
323	Business Energy Rebates	Business Energy Rebates	LED Exterior Fixtures-End of Life replacement	Optimized Case D	COM	COM-Lighting	School	32	142	12860

324			Percentage Difference					-13%	-13%	-47%
325	Business Energy Rebates	Business Energy Rebates	LED High Bay Fixture	Baseline E1	COM	COM-Lighting	School	1509	11708	3056974
326	Business Energy Rebates	Business Energy Rebates	LED High Bay Fixture	Optimized Case D	COM	COM-Lighting	School	1038	8055	1066394
327			Percentage Difference					-31%	-31%	-65%
328	Business Energy Rebates	Business Energy Rebates	LED Lamps-End of Life	Baseline E1	COM	COM-Lighting	School	14	108	20592
329	Business Energy Rebates	Business Energy Rebates	LED Lamps-End of Life	Optimized Case D	COM	COM-Lighting	School	14	109	19727
330			Percentage Difference					1%	1%	-4%
331	Business Energy Rebates	Business Energy Rebates	LED Lamps-Retrofit (dual baseline)	Baseline E1	COM	COM-Lighting	School	57	443	59555
332	Business Energy Rebates	Business Energy Rebates	LED Lamps-Retrofit (dual baseline)	Optimized Case D	COM	COM-Lighting	School	60	463	59644
333			Percentage Difference					4%	4%	0%
334	Business Energy Rebates	Business Energy Rebates	LED Linear Replacement Lamps	Baseline E1	COM	COM-Lighting	School	164	1274	276571
335	Business Energy Rebates	Business Energy Rebates	LED Linear Replacement Lamps	Optimized Case D	COM	COM-Lighting	School	144	1113	202140
336			Percentage Difference					-13%	-13%	-27%
337	Business Energy Rebates	Business Energy Rebates	LED Low Bay Fixture	Baseline E1	COM	COM-Lighting	School	245	1901	629188
338	Business Energy Rebates	Business Energy Rebates	LED Low Bay Fixture	Optimized Case D	COM	COM-Lighting	School	179	1392	365272
339			Percentage Difference					-27%	-27%	-42%
340	Business Energy Rebates	Business Energy Rebates	LED Refrigeration Strip Lighting-End of Life replacement	Baseline E1	COM	COM-Lighting	School	26	199	37525
341	Business Energy Rebates	Business Energy Rebates	LED Refrigeration Strip Lighting-End of Life replacement	Optimized Case D	COM	COM-Lighting	School	21	162	20513
342			Percentage Difference					-19%	-19%	-45%
343	Business Energy Rebates	Business Energy Rebates	Lighting Controls - Occupancy Sensors	Baseline E1	COM	COM-Lighting	School	1	202	36155
344	Business Energy Rebates	Business Energy Rebates	Lighting Controls - Occupancy Sensors	Optimized Case D	COM	COM-Lighting	School	1	118	9402
345			Percentage Difference					-42%	-42%	-74%
346	Business Energy Rebates	Business Energy Rebates	Night Covers for 3' Refrigerated Display Cases	Baseline E1	COM	COM-Refrigeration	School	6	56	13545
347	Business Energy Rebates	Business Energy Rebates	Night Covers for 3' Refrigerated Display Cases	Optimized Case D	COM	COM-Refrigeration	School	4	37	4430
348			Percentage Difference					-35%	-35%	-67%
349	Business Energy Rebates	Business Energy Rebates	No-Loss Drains (Timed drains are not eligible)	Baseline E1	COM	COM-Process	School	8	70	6306
350	Business Energy Rebates	Business Energy Rebates	No-Loss Drains (Timed drains are not eligible)	Optimized Case D	COM	COM-Process	School	8	68	3408
351			Percentage Difference					-2%	-2%	-46%
352	Business Energy Rebates	Business Energy Rebates	Photoluminescent Exit Sign	Baseline E1	COM	COM-Lighting	School	1	9	1903
353	Business Energy Rebates	Business Energy Rebates	Photoluminescent Exit Sign	Optimized Case D	COM	COM-Lighting	School	1	7	861
354			Percentage Difference					-26%	-26%	-55%
355	Business Energy Rebates	Business Energy Rebates	Relamp/Reballast-Retrofit (dual baseline)	Baseline E1	COM	COM-Lighting	School	607	4708	616483
356	Business Energy Rebates	Business Energy Rebates	Relamp/Reballast-Retrofit (dual baseline)	Optimized Case D	COM	COM-Lighting	School	147	1137	65401
357			Percentage Difference					-76%	-76%	-89%
358	Business Energy Rebates	Business Energy Rebates	Strip Curtains for 3' Open Refrigerated Display Cases	Baseline E1	COM	COM-Refrigeration	School	24	241	17021
359	Business Energy Rebates	Business Energy Rebates	Strip Curtains for 3' Open Refrigerated Display Cases	Optimized Case D	COM	COM-Refrigeration	School	25	243	11164
360			Percentage Difference					1%	1%	-34%
361	Business Energy Rebates	Business Energy Rebates	T8 Dimmable Stairwell Lighting	Baseline E1	COM	COM-Lighting	School	0	29	7946
362	Business Energy Rebates	Business Energy Rebates	T8 Dimmable Stairwell Lighting	Optimized Case D	COM	COM-Lighting	School	0	16	1523
363			Percentage Difference					-45%	-45%	-81%
364	Business Energy Rebates	Business Energy Rebates	Variable Frequency Drives	Baseline E1	COM	COM-Motors	School	93	811	110470
365	Business Energy Rebates	Business Energy Rebates	Variable Frequency Drives	Optimized Case D	COM	COM-Motors	School	82	718	50207
366			Percentage Difference					-11%	-11%	-55%
367	Business Energy Rebates	Business Energy Rebates	Variable Speed Drive Screw Compressors (10 - 40 hp)	Baseline E1	COM	COM-Process	School	15	131	34772
368	Business Energy Rebates	Business Energy Rebates	Variable Speed Drive Screw Compressors (10 - 40 hp)	Optimized Case D	COM	COM-Process	School	10	85	13817
369			Percentage Difference					-35%	-35%	-60%
370	Business Energy Rebates	Business Energy Rebates	Zero Energy Doors for Reach-In Coolers and Freezers	Baseline E1	COM	COM-Refrigeration	School	11	109	14093
371	Business Energy Rebates	Business Energy Rebates	Zero Energy Doors for Reach-In Coolers and Freezers	Optimized Case D	COM	COM-Refrigeration	School	11	110	12903
372			Percentage Difference					1%	1%	-8%
373	Business Energy Rebates	Business Energy Rebates	Air Tanks for Load / No-Load Screw Compressors (10 – 40 hp)	Baseline E1	IND	IND	Industrial	125	742	82289
374	Business Energy Rebates	Business Energy Rebates	Air Tanks for Load / No-Load Screw Compressors (10 – 40 hp)	Optimized Case D	IND	IND	Industrial	112	663	58703
375			Percentage Difference					-11%	-11%	-29%
376	Business Energy Rebates	Business Energy Rebates	Cycling Refrigerated Air Dryers (≤ 300 CFM capacity)	Baseline E1	IND	IND	Industrial	7	63	5377
377	Business Energy Rebates	Business Energy Rebates	Cycling Refrigerated Air Dryers (≤ 300 CFM capacity)	Optimized Case D	IND	IND	Industrial	6	56	3104
378			Percentage Difference					-11%	-11%	-42%

379	Business Energy Rebates	Business Energy Rebates	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Baseline E1	IND	IND	Industrial	5	43	6802
380	Business Energy Rebates	Business Energy Rebates	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Optimized Case D	IND	IND	Industrial	4	37	4916
381			Percentage Difference					-15%	-15%	-28%
382	Business Energy Rebates	Business Energy Rebates	Fluorescent T5 and HPT8 Fixtures (4 FT) lamps-Retrofit (dual baseline	Baseline E1	IND	IND	Industrial	-134	-742	40388
383	Business Energy Rebates	Business Energy Rebates	Fluorescent T5 and HPT8 Fixtures (4 FT) lamps-Retrofit (dual baseline	Optimized Case D	IND	IND	Industrial	-148	-820	28345
384			Percentage Difference					10%	10%	-30%
385	Business Energy Rebates	Business Energy Rebates	LED Exit Sign-End of Life replacement	Baseline E1	IND	IND	Industrial	0	3	559
386	Business Energy Rebates	Business Energy Rebates	LED Exit Sign-End of Life replacement	Optimized Case D	IND	IND	Industrial	0	2	173
387			Percentage Difference					-47%	-47%	-69%
388	Business Energy Rebates	Business Energy Rebates	LED Exterior Fixtures-End of Life replacement	Baseline E1	IND	IND	Industrial	24	104	15467
389	Business Energy Rebates	Business Energy Rebates	LED Exterior Fixtures-End of Life replacement	Optimized Case D	IND	IND	Industrial	17	72	6564
390			Percentage Difference					-30%	-30%	-58%
391	Business Energy Rebates	Business Energy Rebates	LED High Bay Fixture	Baseline E1	IND	IND	Industrial	1238	6863	1799902
392	Business Energy Rebates	Business Energy Rebates	LED High Bay Fixture	Optimized Case D	IND	IND	Industrial	560	3105	412976
393			Percentage Difference					-55%	-55%	-77%
394	Business Energy Rebates	Business Energy Rebates	LED Lamps-End of Life	Baseline E1	IND	IND	Industrial	19	108	13757
395	Business Energy Rebates	Business Energy Rebates	LED Lamps-End of Life	Optimized Case D	IND	IND	Industrial	20	109	12928
396			Percentage Difference					1%	1%	-6%
397	Business Energy Rebates	Business Energy Rebates	LED Lamps-Retrofit (dual baseline)	Baseline E1	IND	IND	Industrial	717	3977	290360
398	Business Energy Rebates	Business Energy Rebates	LED Lamps-Retrofit (dual baseline)	Optimized Case D	IND	IND	Industrial	268	1483	92047
399			Percentage Difference					-63%	-63%	-68%
400	Business Energy Rebates	Business Energy Rebates	LED Linear Replacement Lamps	Baseline E1	IND	IND	Industrial	103	571	128055
401	Business Energy Rebates	Business Energy Rebates	LED Linear Replacement Lamps	Optimized Case D	IND	IND	Industrial	78	432	80996
402			Percentage Difference					-24%	-24%	-37%
403	Business Energy Rebates	Business Energy Rebates	LED Low Bay Fixture	Baseline E1	IND	IND	Industrial	103	569	194078
404	Business Energy Rebates	Business Energy Rebates	LED Low Bay Fixture	Optimized Case D	IND	IND	Industrial	68	375	101227
405			Percentage Difference					-34%	-34%	-48%
406	Business Energy Rebates	Business Energy Rebates	Lighting Controls - Occupancy Sensors	Baseline E1	IND	IND	Industrial	0	203	24350
407	Business Energy Rebates	Business Energy Rebates	Lighting Controls - Occupancy Sensors	Optimized Case D	IND	IND	Industrial	0	111	6626
408			Percentage Difference					#DIV/0!	-45%	-73%
409	Business Energy Rebates	Business Energy Rebates	Photoluminescent Exit Sign	Baseline E1	IND	IND	Industrial	0	3	677
410	Business Energy Rebates	Business Energy Rebates	Photoluminescent Exit Sign	Optimized Case D	IND	IND	Industrial	0	2	206
411			Percentage Difference					-50%	-50%	-70%
412	Business Energy Rebates	Business Energy Rebates	Relamp/Reballast-Retrofit (dual baseline)	Baseline E1	IND	IND	Industrial	1335	7399	972367
413	Business Energy Rebates	Business Energy Rebates	Relamp/Reballast-Retrofit (dual baseline)	Optimized Case D	IND	IND	Industrial	153	848	48879
414			Percentage Difference					-89%	-89%	-95%
415	Business Energy Rebates	Business Energy Rebates	T8 Dimmable Stairwell Lighting	Baseline E1	IND	IND	Industrial	6	31	5394
416	Business Energy Rebates	Business Energy Rebates	T8 Dimmable Stairwell Lighting	Optimized Case D	IND	IND	Industrial	3	16	1109
417			Percentage Difference					-48%	-48%	-79%
418	Business Energy Rebates	Business Energy Rebates	Variable Speed Drive Screw Compressors (10 - 40 hp)	Baseline E1	IND	IND	Industrial	22	197	25531
419	Business Energy Rebates	Business Energy Rebates	Variable Speed Drive Screw Compressors (10 - 40 hp)	Optimized Case D	IND	IND	Industrial	16	144	12140
420			Percentage Difference					-27%	-27%	-52%
421	Business Energy Solutions	Business Energy Solutions	DHW Pipe Insulation	Baseline E1	COM	COM-Other	Office	2	13	2762
422	Business Energy Solutions	Business Energy Solutions	DHW Pipe Insulation	Optimized Case D	COM	COM-Other	Office	2	16	2606
423			Percentage Difference					19%	19%	-6%
424	Business Energy Solutions	Business Energy Solutions	DHW Tank Wrap	Baseline E1	COM	COM-Other	Office	8	73	16547
425	Business Energy Solutions	Business Energy Solutions	DHW Tank Wrap	Optimized Case D	COM	COM-Other	Office	10	84	14705
426			Percentage Difference					16%	16%	-11%
427	Business Energy Solutions	Business Energy Solutions	Faucet Aerator	Baseline E1	COM	COM-Other	Office	27	239	41970
428	Business Energy Solutions	Business Energy Solutions	Faucet Aerator	Optimized Case D	COM	COM-Other	Office	30	262	42743
429			Percentage Difference					9%	9%	2%
430	Business Energy Solutions	Business Energy Solutions	Ground Source Heat Pump	Baseline E1	COM	COM-HVAC	Office	244	1789	980023
431	Business Energy Solutions	Business Energy Solutions	Ground Source Heat Pump	Optimized Case D	COM	COM-HVAC	Office	36	265	200180
432			Percentage Difference					-85%	-85%	-80%
433	Business Energy Solutions	Business Energy Solutions	Ground/Water Source Heat Pumps	Baseline E1	COM	COM-HVAC	Office	2	12	4023

434	Business Energy Solutions	Business Energy Solutions	Ground/Water Source Heat Pumps	Optimized Case D	COM	COM-HVAC	Office	1	8	2064
435			Percentage Difference					-33%	-33%	-49%
436	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Baseline E1	COM	COM-HVAC	Office	137	1009	562463
437	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Optimized Case D	COM	COM-HVAC	Office	84	613	282423
438			Percentage Difference					-39%	-39%	-50%
439	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Baseline E1	COM	COM-HVAC	Office	14	100	19426
440	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Optimized Case D	COM	COM-HVAC	Office	13	98	17378
441			Percentage Difference					-2%	-2%	-11%
442	Business Energy Solutions	Business Energy Solutions	LED Lamps-End of Life-BES	Baseline E1	COM	COM-Lighting	Office	11	97	65708
443	Business Energy Solutions	Business Energy Solutions	LED Lamps-End of Life-BES	Optimized Case D	COM	COM-Lighting	Office	5	42	17434
444			Percentage Difference					-57%	-57%	-73%
445	Business Energy Solutions	Business Energy Solutions	LED Lamps-Retrofit (dual baseline)-BES	Baseline E1	COM	COM-Lighting	Office	36	313	90424
446	Business Energy Solutions	Business Energy Solutions	LED Lamps-Retrofit (dual baseline)-BES	Optimized Case D	COM	COM-Lighting	Office	41	360	118254
447			Percentage Difference					15%	15%	31%
448	Business Energy Solutions	Business Energy Solutions	Relamp/Reballast-Retrofit (dual baseline)-BES	Baseline E1	COM	COM-Lighting	Office	96	840	204344
449	Business Energy Solutions	Business Energy Solutions	Relamp/Reballast-Retrofit (dual baseline)-BES	Optimized Case D	COM	COM-Lighting	Office	23	204	34498
450			Percentage Difference					-76%	-76%	-83%
451	Business Energy Solutions	Business Energy Solutions	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Baseline E1	COM	COM-Refrigeration	Other Commercial	5	52	27082
452	Business Energy Solutions	Business Energy Solutions	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Optimized Case D	COM	COM-Refrigeration	Other Commercial	7	72	36509
453			Percentage Difference					38%	38%	35%
454	Business Energy Solutions	Business Energy Solutions	Evaporator Fan Motor Controls for Walk-In Freezers and Coolers-BES	Baseline E1	COM	COM-Refrigeration	Other Commercial	33	48	43310
455	Business Energy Solutions	Business Energy Solutions	Evaporator Fan Motor Controls for Walk-In Freezers and Coolers-BES	Optimized Case D	COM	COM-Refrigeration	Other Commercial	44	64	57792
456			Percentage Difference					35%	35%	33%
457	Business Energy Solutions	Business Energy Solutions	Faucet Aerator	Baseline E1	COM	COM-Other	Other Commercial	37	324	56934
458	Business Energy Solutions	Business Energy Solutions	Faucet Aerator	Optimized Case D	COM	COM-Other	Other Commercial	41	355	57983
459			Percentage Difference					9%	9%	2%
460	Business Energy Solutions	Business Energy Solutions	Ground Source Heat Pump	Baseline E1	COM	COM-HVAC	Other Commercial	319	2426	1329437
461	Business Energy Solutions	Business Energy Solutions	Ground Source Heat Pump	Optimized Case D	COM	COM-HVAC	Other Commercial	47	359	271551
462			Percentage Difference					-85%	-85%	-80%
463	Business Energy Solutions	Business Energy Solutions	Ground/Water Source Heat Pumps	Baseline E1	COM	COM-HVAC	Other Commercial	2	14	5090
464	Business Energy Solutions	Business Energy Solutions	Ground/Water Source Heat Pumps	Optimized Case D	COM	COM-HVAC	Other Commercial	1	9	2490
465			Percentage Difference					-35%	-35%	-51%
466	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Baseline E1	COM	COM-HVAC	Other Commercial	180	1368	763002
467	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Optimized Case D	COM	COM-HVAC	Other Commercial	109	832	383182
468			Percentage Difference					-39%	-39%	-50%
469	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Baseline E1	COM	COM-HVAC	Other Commercial	15	114	23077
470	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Optimized Case D	COM	COM-HVAC	Other Commercial	15	111	20558
471			Percentage Difference					-2%	-2%	-11%
472	Business Energy Solutions	Business Energy Solutions	Humidity-Based Door Heater Controls for Reach-In Coolers and Freez	Baseline E1	COM	COM-Refrigeration	Other Commercial	102	149	49077
473	Business Energy Solutions	Business Energy Solutions	Humidity-Based Door Heater Controls for Reach-In Coolers and Freez	Optimized Case D	COM	COM-Refrigeration	Other Commercial	140	204	64751
474			Percentage Difference					37%	37%	32%
475	Business Energy Solutions	Business Energy Solutions	LED Lamps-End of Life-BES	Baseline E1	COM	COM-Lighting	Other Commercial	26	218	101533
476	Business Energy Solutions	Business Energy Solutions	LED Lamps-End of Life-BES	Optimized Case D	COM	COM-Lighting	Other Commercial	14	116	35414
477			Percentage Difference					-47%	-47%	-65%
478	Business Energy Solutions	Business Energy Solutions	LED Lamps-Retrofit (dual baseline)-BES	Baseline E1	COM	COM-Lighting	Other Commercial	89	735	191475
479	Business Energy Solutions	Business Energy Solutions	LED Lamps-Retrofit (dual baseline)-BES	Optimized Case D	COM	COM-Lighting	Other Commercial	103	852	248769
480			Percentage Difference					16%	16%	30%
481	Business Energy Solutions	Business Energy Solutions	Low Flow Showerheads	Baseline E1	COM	COM-Other	Other Commercial	17	148	25519
482	Business Energy Solutions	Business Energy Solutions	Low Flow Showerheads	Optimized Case D	COM	COM-Other	Other Commercial	21	180	26907
483			Percentage Difference					22%	22%	5%
484	Business Energy Solutions	Business Energy Solutions	Night Covers for 3' Refrigerated Display Cases-BES	Baseline E1	COM	COM-Refrigeration	Other Commercial	6	58	29965
485	Business Energy Solutions	Business Energy Solutions	Night Covers for 3' Refrigerated Display Cases-BES	Optimized Case D	COM	COM-Refrigeration	Other Commercial	5	51	17509
486			Percentage Difference					-13%	-13%	-42%
487	Business Energy Solutions	Business Energy Solutions	Relamp/Reballast-Retrofit (dual baseline)-BES	Baseline E1	COM	COM-Lighting	Other Commercial	138	1140	277859
488	Business Energy Solutions	Business Energy Solutions	Relamp/Reballast-Retrofit (dual baseline)-BES	Optimized Case D	COM	COM-Lighting	Other Commercial	33	272	46091

489			Percentage Difference					-76%	-76%	-83%
490	Business Energy Solutions	Business Energy Solutions	DHW Pipe Insulation	Baseline E1	COM	COM-Other	Retail	3	26	5361
491	Business Energy Solutions	Business Energy Solutions	DHW Pipe Insulation	Optimized Case D	COM	COM-Other	Retail	3	30	5058
492			Percentage Difference					19%	19%	-6%
493	Business Energy Solutions	Business Energy Solutions	DHW Tank Wrap	Baseline E1	COM	COM-Other	Retail	16	141	32115
494	Business Energy Solutions	Business Energy Solutions	DHW Tank Wrap	Optimized Case D	COM	COM-Other	Retail	19	164	28541
495			Percentage Difference					16%	16%	-11%
496	Business Energy Solutions	Business Energy Solutions	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Baseline E1	COM	COM-Refrigeration	Retail	8	75	38747
497	Business Energy Solutions	Business Energy Solutions	Electronically Commutated (Brushless) DC Motors for Refrigeration A	Optimized Case D	COM	COM-Refrigeration	Retail	10	103	52236
498			Percentage Difference					38%	38%	35%
499	Business Energy Solutions	Business Energy Solutions	Evaporator Fan Motor Controls for Walk-In Freezers and Coolers-BES	Baseline E1	COM	COM-Refrigeration	Retail	47	68	61918
500	Business Energy Solutions	Business Energy Solutions	Evaporator Fan Motor Controls for Walk-In Freezers and Coolers-BES	Optimized Case D	COM	COM-Refrigeration	Retail	64	92	82626
501			Percentage Difference					35%	35%	33%
502	Business Energy Solutions	Business Energy Solutions	Faucet Aerator	Baseline E1	COM	COM-Other	Retail	53	464	81458
503	Business Energy Solutions	Business Energy Solutions	Faucet Aerator	Optimized Case D	COM	COM-Other	Retail	58	508	82959
504			Percentage Difference					9%	9%	2%
505	Business Energy Solutions	Business Energy Solutions	Ground Source Heat Pump	Baseline E1	COM	COM-HVAC	Retail	421	3472	1902082
506	Business Energy Solutions	Business Energy Solutions	Ground Source Heat Pump	Optimized Case D	COM	COM-HVAC	Retail	22	181	136622
507			Percentage Difference					-95%	-95%	-93%
508	Business Energy Solutions	Business Energy Solutions	Ground/Water Source Heat Pumps	Baseline E1	COM	COM-HVAC	Retail	3	23	7729
509	Business Energy Solutions	Business Energy Solutions	Ground/Water Source Heat Pumps	Optimized Case D	COM	COM-HVAC	Retail	2	15	3941
510			Percentage Difference					-33%	-33%	-49%
511	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Baseline E1	COM	COM-HVAC	Retail	237	1958	1091870
512	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Optimized Case D	COM	COM-HVAC	Retail	144	1190	548235
513			Percentage Difference					-39%	-39%	-50%
514	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Baseline E1	COM	COM-HVAC	Retail	23	189	36998
515	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Optimized Case D	COM	COM-HVAC	Retail	23	186	33080
516			Percentage Difference					-2%	-2%	-11%
517	Business Energy Solutions	Business Energy Solutions	Humidity-Based Door Heater Controls for Reach-In Coolers and Freez	Baseline E1	COM	COM-Refrigeration	Retail	148	213	70217
518	Business Energy Solutions	Business Energy Solutions	Humidity-Based Door Heater Controls for Reach-In Coolers and Freez	Optimized Case D	COM	COM-Refrigeration	Retail	203	292	92641
519			Percentage Difference					37%	37%	32%
520	Business Energy Solutions	Business Energy Solutions	LED Lamps-End of Life-BES	Baseline E1	COM	COM-Lighting	Retail	39	292	142343
521	Business Energy Solutions	Business Energy Solutions	LED Lamps-End of Life-BES	Optimized Case D	COM	COM-Lighting	Retail	20	151	48039
522			Percentage Difference					-48%	-48%	-66%
523	Business Energy Solutions	Business Energy Solutions	LED Lamps-Retrofit (dual baseline)-BES	Baseline E1	COM	COM-Lighting	Retail	110	813	213333
524	Business Energy Solutions	Business Energy Solutions	LED Lamps-Retrofit (dual baseline)-BES	Optimized Case D	COM	COM-Lighting	Retail	130	967	278128
525			Percentage Difference					19%	19%	30%
526	Business Energy Solutions	Business Energy Solutions	Night Covers for 3' Refrigerated Display Cases-BES	Baseline E1	COM	COM-Refrigeration	Retail	6	64	39677
527	Business Energy Solutions	Business Energy Solutions	Night Covers for 3' Refrigerated Display Cases-BES	Optimized Case D	COM	COM-Refrigeration	Retail	5	50	20386
528			Percentage Difference					-21%	-21%	-49%
529	Business Energy Solutions	Business Energy Solutions	Relamp/Reballast-Retrofit (dual baseline)-BES	Baseline E1	COM	COM-Lighting	Retail	220	1631	397390
530	Business Energy Solutions	Business Energy Solutions	Relamp/Reballast-Retrofit (dual baseline)-BES	Optimized Case D	COM	COM-Lighting	Retail	53	390	66104
531			Percentage Difference					-76%	-76%	-83%
532	Business Energy Solutions	Business Energy Solutions	Ground Source Heat Pump	Baseline E1	COM	COM-HVAC	School	411	3460	1895866
533	Business Energy Solutions	Business Energy Solutions	Ground Source Heat Pump	Optimized Case D	COM	COM-HVAC	School	21	180	136176
534			Percentage Difference					-95%	-95%	-93%
535	Business Energy Solutions	Business Energy Solutions	Ground/Water Source Heat Pumps	Baseline E1	COM	COM-HVAC	School	3	23	7722
536	Business Energy Solutions	Business Energy Solutions	Ground/Water Source Heat Pumps	Optimized Case D	COM	COM-HVAC	School	2	15	3943
537			Percentage Difference					-33%	-33%	-49%
538	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Baseline E1	COM	COM-HVAC	School	232	1951	1088302
539	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Optimized Case D	COM	COM-HVAC	School	141	1186	546536
540			Percentage Difference					-39%	-39%	-50%
541	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Baseline E1	COM	COM-HVAC	School	22	189	37041
542	Business Energy Solutions	Business Energy Solutions	High-Efficiency Air Source Heat Pumps	Optimized Case D	COM	COM-HVAC	School	22	186	33123
543			Percentage Difference					-2%	-2%	-11%

544	Custom	Custom	Custom Efficiency	Baseline E1	COM	COM-Other	COM	7909	60152	13857523
545	Custom	Custom	Custom Efficiency	Optimized Case D	COM	COM-Other	COM	6695	50919	6688943
546			Percentage Difference					-15%	-15%	-52%
547	Custom	Custom	Custom Efficiency	Baseline E1	IND	IND	Industrial	4435	38851	8950190
548	Custom	Custom	Custom Efficiency	Optimized Case D	IND	IND	Industrial	3153	27619	3628102
549			Percentage Difference					-29%	-29%	-59%
550	Custom	New Construction - BNI	Whole Building 20% Over Baseline	Baseline E1	COM	COM-Other	New Construction	154	1169	643230
551	Custom	New Construction - BNI	Whole Building 20% Over Baseline	Optimized Case D	COM	COM-Other	New Construction	89	677	213024
552			Percentage Difference					-42%	-42%	-67%
553	Custom	New Construction - BNI	Whole Building 40% Over Baseline	Baseline E1	COM	COM-Other	New Construction	307	2338	1286136
554	Custom	New Construction - BNI	Whole Building 40% Over Baseline	Optimized Case D	COM	COM-Other	New Construction	178	1354	426002
555			Percentage Difference					-42%	-42%	-67%
556	Efficient Products	Appliance Retirement	Dehumidifier (Retirement)	Baseline E1	RES-SF	RES-Appliance	RES-SF	448	1337	247315
557	Efficient Products	Appliance Retirement	Dehumidifier (Retirement)	Optimized Case D	RES-SF	RES-Appliance	RES-SF	448	1337	233442
558			Percentage Difference					0%	0%	-6%
559	Efficient Products	Appliance Retirement	Freezer Retirement	Baseline E1	RES-SF	RES-Appliance	RES-SF	890	6433	1543935
560	Efficient Products	Appliance Retirement	Freezer Retirement	Optimized Case D	RES-SF	RES-Appliance	RES-SF	672	4853	1149821
561			Percentage Difference					-25%	-25%	-26%
562	Efficient Products	Appliance Retirement	Refrigerator Retirement	Baseline E1	RES-SF	RES-Appliance	RES-SF	935	6757	1664349
563	Efficient Products	Appliance Retirement	Refrigerator Retirement	Optimized Case D	RES-SF	RES-Appliance	RES-SF	718	5187	1330596
564			Percentage Difference					-23%	-23%	-20%
565	Efficient Products	Appliance Retirement	Room A/C Retirement	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	1	5	1389
566	Efficient Products	Appliance Retirement	Room A/C Retirement	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	1	5	1422
567			Percentage Difference					0%	0%	2%
568	Efficient Products	Instant Savings	Advanced Power Strip (load sensing or remote control/wireless APS)	Baseline E1	RES-SF	RES-Plug Load	RES-SF	0	9158	1513893
569	Efficient Products	Instant Savings	Advanced Power Strip (load sensing or remote control/wireless APS)	Optimized Case D	RES-SF	RES-Plug Load	RES-SF	0	8290	803896
570			Percentage Difference					-9%	-9%	-47%
571	Efficient Products	Instant Savings	ENERGY STAR® LED Lamps	Baseline E1	RES-SF	RES-Lighting	RES-SF	1053	4201	1420339
572	Efficient Products	Instant Savings	ENERGY STAR® LED Lamps	Optimized Case D	RES-SF	RES-Lighting	RES-SF	673	2684	368604
573			Percentage Difference					-36%	-36%	-74%
574										
575	Efficient Products	Instant Savings	Hardwired Dimmer Switch	Baseline E1	RES-SF	RES-Lighting	RES-SF	0	591	207517
576										
577	Efficient Products	Instant Savings	Heavy Duty Outdoor Timer	Baseline E1	RES-SF	RES-Plug Load	RES-SF	0	388	47852
578	Efficient Products	Instant Savings	Heavy Duty Outdoor Timer	Optimized Case D	RES-SF	RES-Plug Load	RES-SF	0	379	35137
579			Percentage Difference					-2%	-2%	-27%
580	Efficient Products	Instant Savings	Indoor Motion Sensor	Baseline E1	RES-SF	RES-Lighting	RES-SF	0	1348	209725
581	Efficient Products	Instant Savings	Indoor Motion Sensor	Optimized Case D	RES-SF	RES-Lighting	RES-SF	0	28	4408
582			Percentage Difference					#DIV/0!	-98%	-98%
583										
584	Efficient Products	Instant Savings	Intelligent Thermostat	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	-213	533	73897
585										
586	Efficient Products	Instant Savings	Outdoor Motion Sensor	Baseline E1	RES-SF	RES-Lighting	RES-SF	0	2505	306762
587	Efficient Products	Instant Savings	Outdoor Motion Sensor	Optimized Case D	RES-SF	RES-Lighting	RES-SF	0	2486	263599
588			Percentage Difference					#DIV/0!	-1%	-14%
589	Efficient Products	Instant Savings	Power bar with integrated timer	Baseline E1	RES-SF	RES-Plug Load	RES-SF	0	1277	235037
590	Efficient Products	Instant Savings	Power bar with integrated timer	Optimized Case D	RES-SF	RES-Plug Load	RES-SF	0	1030	116076
591			Percentage Difference					-19%	-19%	-51%
592	Efficient Products	Instant Savings	Smartstrip	Baseline E1	RES-SF	RES-Plug Load	RES-SF	0	1239	432544
593	Efficient Products	Instant Savings	Smartstrip	Optimized Case D	RES-SF	RES-Plug Load	RES-SF	0	670	91234
594			Percentage Difference					-46%	-46%	-79%
595	Existing Homes	Direct Install	10.5 W LED	Baseline E1	RES-SF	RES-Lighting	RES-SF	3174	12660	4735217
596	Existing Homes	Direct Install	10.5 W LED	Optimized Case D	RES-SF	RES-Lighting	RES-SF	2281	9100	840376
597			Percentage Difference					-28%	-28%	-82%
598	Existing Homes	Direct Install	11 W LED	Baseline E1	RES-SF	RES-Lighting	RES-SF	2504	9988	3096824

599	Existing Homes	Direct Install	11 W LED	Optimized Case D	RES-SF	RES-Lighting	RES-SF	1941	7742	636040
600			Percentage Difference					-22%	-22%	-79%
601	Existing Homes	Direct Install	1W LED Nightlight	Baseline E1	RES-SF	RES-Lighting	RES-SF	918	3662	1050332
602	Existing Homes	Direct Install	1W LED Nightlight	Optimized Case D	RES-SF	RES-Lighting	RES-SF	677	2699	211909
603			Percentage Difference					-26%	-26%	-80%
604	Existing Homes	Direct Install	Building Envelope Retrofits (Insulation, Draft Proofing, EnergyStar W	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	7400	26180	10034614
605	Existing Homes	Direct Install	Building Envelope Retrofits (Insulation, Draft Proofing, EnergyStar W	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	6061	21441	7310072
606			Percentage Difference					-18%	-18%	-27%
607	Existing Homes	Direct Install	DHW Pipe Insulation	Baseline E1	RES-SF	RES-Water Heat	RES-SF	452	2790	470529
608	Existing Homes	Direct Install	DHW Pipe Insulation	Optimized Case D	RES-SF	RES-Water Heat	RES-SF	386	2380	114901
609			Percentage Difference					-15%	-15%	-76%
610	Existing Homes	Direct Install	DHW Tank Wrap	Baseline E1	RES-SF	RES-Water Heat	RES-SF	442	2724	455160
611	Existing Homes	Direct Install	DHW Tank Wrap	Optimized Case D	RES-SF	RES-Water Heat	RES-SF	360	2219	108644
612			Percentage Difference					-19%	-19%	-76%
613	Existing Homes	Direct Install	Embertec Power Strip	Baseline E1	RES-SF	RES-Plug Load	RES-SF	0	26674	4271257
614	Existing Homes	Direct Install	Embertec Power Strip	Optimized Case D	RES-SF	RES-Plug Load	RES-SF	0	23769	1382141
615			Percentage Difference					-11%	-11%	-68%
616										
617	Existing Homes	Direct Install	ENERGY STAR® Door	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	128	452	2278049
618										
619	Existing Homes	Direct Install	ENERGY STAR® Windows (300 ft2) (Replace Double Pane)	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	159	564	1509543
620										
621	Existing Homes	Direct Install	ENERGY STAR® Windows (Replace Single Pane)	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	438	1550	373608
622	Existing Homes	Direct Install	ENERGY STAR® Windows (Replace Single Pane)	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	358	1267	262809
623			Percentage Difference					-18%	-18%	-30%
624	Existing Homes	Direct Install	Low Flow (1.25 GPM) showerhead	Baseline E1	RES-SF	RES-Water Heat	RES-SF	206	1268	141217
625	Existing Homes	Direct Install	Low Flow (1.25 GPM) showerhead	Optimized Case D	RES-SF	RES-Water Heat	RES-SF	188	1162	48908
626			Percentage Difference					-8%	-8%	-65%
627	Existing Homes	Direct Install	Low Flow Faucet Aerator, 1.5 GPM	Baseline E1	RES-SF	RES-Water Heat	RES-SF	283	1747	159126
628	Existing Homes	Direct Install	Low Flow Faucet Aerator, 1.5 GPM	Optimized Case D	RES-SF	RES-Water Heat	RES-SF	271	1672	74815
629			Percentage Difference					-4%	-4%	-53%
630	Existing Homes	Green Heating	Advanced Automatic Pellet Combo Boiler	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	883	5660	1352555
631	Existing Homes	Green Heating	Advanced Automatic Pellet Combo Boiler	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	836	5357	727004
632			Percentage Difference					-5%	-5%	-46%
633	Existing Homes	Green Heating	Certified Pellet Boiler or Furnace Supplemented by Baseboard Heat (	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	548	3511	818549
634	Existing Homes	Green Heating	Certified Pellet Boiler or Furnace Supplemented by Baseboard Heat (	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	527	3377	616350
635			Percentage Difference					-4%	-4%	-25%
636	Existing Homes	Green Heating	Certified Pellet Stove	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	365	2338	385560
637	Existing Homes	Green Heating	Certified Pellet Stove	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	370	2372	404266
638			Percentage Difference					1%	1%	5%
639	Existing Homes	Green Heating	Certified Wood Boiler or Furnace	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	465	2983	693980
640	Existing Homes	Green Heating	Certified Wood Boiler or Furnace	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	552	3541	1103079
641			Percentage Difference					19%	19%	59%
642	Existing Homes	Green Heating	Certified Wood Stove	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	314	2015	301097
643	Existing Homes	Green Heating	Certified Wood Stove	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	308	1972	213751
644			Percentage Difference					-2%	-2%	-29%
645	Existing Homes	Green Heating	ENERGY STAR® Air Source Heat Pump	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	425	1504	616877
646	Existing Homes	Green Heating	ENERGY STAR® Air Source Heat Pump	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	402	1424	520044
647			Percentage Difference					-5%	-5%	-16%
648	Existing Homes	Green Heating	Ground Source Heat Pump	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	782	2767	939427
649	Existing Homes	Green Heating	Ground Source Heat Pump	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	876	3100	1363759
650			Percentage Difference					12%	12%	45%
651	Existing Homes	MURB	12 W LED	Baseline E1	MURB	RES-Lighting	MURB	2	22	38025
652	Existing Homes	MURB	12 W LED	Optimized Case D	MURB	RES-Lighting	MURB	2	22	38150
653			Percentage Difference					0%	0%	0%

654	Existing Homes	MURB	12 W LED	Baseline E1	MURB	RES-Lighting	MURB	79	691	254432
655	Existing Homes	MURB	12 W LED	Optimized Case D	MURB	RES-Lighting	MURB	79	691	258417
656			Percentage Difference					0%	0%	2%
657	Existing Homes	MURB	1W LED Nightlight	Baseline E1	MURB	RES-Lighting	MURB	9	80	24947
658	Existing Homes	MURB	1W LED Nightlight	Optimized Case D	MURB	RES-Lighting	MURB	9	80	25407
659			Percentage Difference					0%	0%	2%
660	Existing Homes	MURB	5W Chandelier LED bulb	Baseline E1	MURB	RES-Lighting	MURB	35	304	144651
661	Existing Homes	MURB	5W Chandelier LED bulb	Optimized Case D	MURB	RES-Lighting	MURB	35	304	146402
662			Percentage Difference					0%	0%	1%
663	Existing Homes	MURB	8 W LED	Baseline E1	MURB	RES-Lighting	MURB	124	1086	392157
664	Existing Homes	MURB	8 W LED	Optimized Case D	MURB	RES-Lighting	MURB	124	1086	398426
665			Percentage Difference					0%	0%	2%
666	Existing Homes	MURB	Advanced Power Strip (load sensing or remote control/wireless APS)	Baseline E1	MURB	RES-Plug Load	MURB	0	3121	302848
667	Existing Homes	MURB	Advanced Power Strip (load sensing or remote control/wireless APS)	Optimized Case D	MURB	RES-Plug Load	MURB	0	5408	669610
668			Percentage Difference					73%	73%	121%
669	Existing Homes	MURB	DHW Pipe Insulation	Baseline E1	MURB	RES-Water Heat	MURB	12	72	43295
670	Existing Homes	MURB	DHW Pipe Insulation	Optimized Case D	MURB	RES-Water Heat	MURB	1	6	812
671			Percentage Difference					-92%	-92%	-98%
672	Existing Homes	MURB	DHW Tank Wrap	Baseline E1	MURB	RES-Water Heat	MURB	77	472	97990
673	Existing Homes	MURB	DHW Tank Wrap	Optimized Case D	MURB	RES-Water Heat	MURB	20	123	15985
674			Percentage Difference					-74%	-74%	-84%
675	Existing Homes	MURB	ENERGY STAR® Refrigerator (Replacement)	Baseline E1	MURB	RES-Appliance	MURB	534	3859	1608472
676	Existing Homes	MURB	ENERGY STAR® Refrigerator (Replacement)	Optimized Case D	MURB	RES-Appliance	MURB	1083	7828	6158093
677			Percentage Difference					103%	103%	283%
678	Existing Homes	MURB	Intelligent Thermostat	Baseline E1	MURB	RES-HVAC/Shell	MURB	-6	16	3632
679	Existing Homes	MURB	Intelligent Thermostat	Optimized Case D	MURB	RES-HVAC/Shell	MURB	-6	16	9962
680			Percentage Difference					0%	0%	174%
681	Existing Homes	MURB	Low Flow (1.25 GPM) showerhead	Baseline E1	MURB	RES-Water Heat	MURB	134	828	100764
682	Existing Homes	MURB	Low Flow (1.25 GPM) showerhead	Optimized Case D	MURB	RES-Water Heat	MURB	12	72	5068
683			Percentage Difference					-91%	-91%	-95%
684	Existing Homes	MURB	Low Flow Faucet Aerator, 1.5 GPM	Baseline E1	MURB	RES-Water Heat	MURB	205	1267	165229
685	Existing Homes	MURB	Low Flow Faucet Aerator, 1.5 GPM	Optimized Case D	MURB	RES-Water Heat	MURB	71	437	42892
686			Percentage Difference					-65%	-65%	-74%
687	Existing Homes	MURB	Programmable Electronic Thermostat (Baseboard)	Baseline E1	MURB	RES-HVAC/Shell	MURB	-4	10	909
688	Existing Homes	MURB	Programmable Electronic Thermostat (Baseboard)	Optimized Case D	MURB	RES-HVAC/Shell	MURB	-4	10	1154
689			Percentage Difference					0%	0%	27%
690	Existing Homes	Solar	Solar DHW	Baseline E1	RES-SF	RES-Water Heat	RES-SF	539	2214	2471386
691										
692	Existing Homes	Solar	Solar Space and Water Heat (Supplement Electricity)	Baseline E1	RES-SF	RES-Package	RES-SF	0	2231	688748
693										
694	Existing Homes	Solar	Solar Space Heating (Displacing Electricity)	Baseline E1	RES-SF	RES-HVAC/Shell	RES-SF	1911	1511	318245
695	Existing Homes	Solar	Solar Space Heating (Displacing Electricity)	Optimized Case D	RES-SF	RES-HVAC/Shell	RES-SF	2128	1682	594756
696			Percentage Difference					11%	11%	87%
697	New Construction - Res	Performance Plus	EnerGuide 83 New Home	Baseline E1	RES-NC	RES-Package	RES-NC	291	1029	652823
698	New Construction - Res	Performance Plus	EnerGuide 83 New Home	Optimized Case D	RES-NC	RES-Package	RES-NC	185	656	214351
699			Percentage Difference					-36%	-36%	-67%
700	New Construction - Res	Performance Plus	EnerGuide 85 New Home	Baseline E1	RES-NC	RES-Package	RES-NC	424	1498	796915
701	New Construction - Res	Performance Plus	EnerGuide 85 New Home	Optimized Case D	RES-NC	RES-Package	RES-NC	316	1120	352035
702			Percentage Difference					-25%	-25%	-56%
703	New Construction - Res	Performance Plus	EnerGuide 86 New Home	Baseline E1	RES-NC	RES-Package	RES-NC	490	1732	865473
704	New Construction - Res	Performance Plus	EnerGuide 86 New Home	Optimized Case D	RES-NC	RES-Package	RES-NC	382	1352	427168
705			Percentage Difference					-22%	-22%	-51%
706	New Construction - Res	Performance Plus	EnerGuide 87 New Home	Baseline E1	RES-NC	RES-Package	RES-NC	557	1970	935274
707	New Construction - Res	Performance Plus	EnerGuide 87 New Home	Optimized Case D	RES-NC	RES-Package	RES-NC	452	1599	507220
708			Percentage Difference					-19%	-19%	-46%

709	New Construction - Res	Performance Plus	EnerGuide 88 New Home	Baseline E1	RES-NC	RES-Package	RES-NC	625	2210	1005141
710	New Construction - Res	Performance Plus	EnerGuide 88 New Home	Optimized Case D	RES-NC	RES-Package	RES-NC	525	1858	590997
711			Percentage Difference					-16%	-16%	-41%
712	New Construction - Res	Performance Plus	EnerGuide 88+ New Home	Baseline E1	RES-NC	RES-Package	RES-NC	694	2454	1076385
713	New Construction - Res	Performance Plus	EnerGuide 88+ New Home	Optimized Case D	RES-NC	RES-Package	RES-NC	602	2129	678949
714			Percentage Difference					-13%	-13%	-37%
715	New Construction - Res	Solar	Solar DHW	Baseline E1	RES-NC	RES-Water Heat	RES-NC	0	1	1143
716										
717	New Construction - Res	Solar	Solar Space and Water Heat (Supplement Electricity)	Baseline E1	RES-NC	RES-Package	RES-NC	0	2	608
718										
719	New Construction - Res	Solar	Solar Space Heating (Displacing Electricity)	Baseline E1	RES-NC	RES-HVAC/Shell	RES-NC	0	2	325

End Use Category	Average TRC over 2016-2018	2016 EfficiencyOne Plan FY Unit Cost $/MWh	2016 EfficiencyOne Plan MWh	2016 EfficiencyOne Plan Cost	2016 EfficiencyOne Plan Percentage of Total DSM Cost	2016 NSPI Alternative Plan MWh	2016 NSPI Alternative Plan Cost	2016 NSPI Alternative Plan Percentage of Total DSM Cost	2017 EfficiencyOne Plan FY Unit Cost $/MWh	2017 EfficiencyOne Plan MWh	2017 EfficiencyOne Plan Cost	2017 EfficiencyOne Plan Percentage of Total DSM Cost	2017 NSPI Alternative Plan MWh	2017 NSPI Alternative Plan Cost	2017 NSPI Alternative Plan Percentage of Total DSM Cost	2018 EfficiencyOne Plan FY Unit Cost $/MWh	2018 EfficiencyOne Plan MWh	2018 EfficiencyOne Plan Cost	2018 EfficiencyOne Plan Percentage of Total DSM Cost	2018 NSPI Alternative Plan MWh	2018 NSPI Alternative Plan Cost	2016 to 2018 period EfficiencyOne Plan FY Unit Cost $/MWh	2016 to 2018 period EfficiencyOne Plan MWh	2016 to 2018 period EfficiencyOne Plan Cost	2016 to 2018 period EfficiencyOne Plan Percentage of Total DSM Cost	2016 to 2018 period NSPI Alternative Plan MWh	2016 to 2018 period NSPI Alternative Plan Cost
RES-Appliance	1.3	$ 274	5,818	$ 1,592,994	4.1%	5,818	$ 1,592,994	7.2%	$ 276	6,376	$ 1,757,773	4.4%	6,376	$ 1,757,773	7.9%	$ 277	6,191	$ 1,713,304	4.0%	6,191	$ 1,713,304	$ 275	18,386	$ 5,064,071	4.2%	18,386	$ 5,064,071
RES-HVAC/Shell	1.5	$ 335	14,769	$ 4,948,436	12.8%	4,600	$ 1,200,000	5.4%	$ 372	17,443	$ 6,487,501	16.1%	4,600	$ 1,200,000	5.4%	$ 435	18,854	$ 8,192,421	19.2%	4,600	$ 1,200,000	$ 384	51,067	$ 19,628,358	16.2%	13,800	$ 3,600,000
RES-Lighting	3.8	$ 314	12,566	$ 3,951,969	10.3%			0.0%	$ 321	12,772	$ 4,095,629	10.2%			0.0%	$ 325	11,799	$ 3,833,331	9.0%			$ 320	37,136	$ 11,880,929	9.8%	-	$ -
RES-Behaviour			-	$ -						-	$ -						-	$ -						-	$ -		-	$ -
RES-Plug Load	3.8	$ 162	13,179	$ 2,136,509	5.5%	13,179	$ 2,136,509	9.6%	$ 162	14,343	$ 2,327,851	5.8%	14,343	$ 2,327,851	10.4%	$ 163	14,334	$ 2,339,070	5.5%	14,334	$ 2,339,070	$ 163	41,856	$ 6,803,430	5.6%	41,856	$ 6,803,430
RES-Water Heat	1.1	$ 313	4,806	$ 1,506,312	3.9%			0.0%	$ 301	4,546	$ 1,367,672	3.4%			0.0%	$ 306	4,031	$ 1,231,854	2.9%			$ 307	13,382	$ 4,105,837	3.4%	-	$ -
RES-Package	1.7	$ 453	4,436	$ 2,010,124	5.2%			0.0%	$ 460	4,326	$ 1,991,500	4.9%			0.0%	$ 463	4,364	$ 2,019,743	4.7%			$ 459	13,126	$ 6,021,367	5.0%	-	$ -
COM-Lighting	1.9	$ 225	22,906	$ 5,164,000	13.4%	22,906	$ 5,164,000	23.3%	$ 233	20,827	$ 4,854,509	12.0%	20,827	$ 4,854,509	21.7%	$ 238	22,287	$ 5,310,140	12.5%	22,287	$ 5,310,140	$ 232	66,019	$ 15,328,649	12.6%	66,019	$ 15,328,649
COM-Other	2.8	$ 240	22,953	$ 5,502,104	14.3%	22,953	$ 5,502,104	24.8%	$ 239	22,841	$ 5,466,313	13.6%	22,841	$ 5,466,313	24.5%	$ 239	23,308	$ 5,578,350	13.1%	23,308	$ 5,578,350	$ 239	69,103	$ 16,546,768	13.6%	69,103	$ 16,546,768
COM-HVAC	1.1	$ 420	8,891	$ 3,735,026	9.7%			0.0%	$ 415	8,745	$ 3,625,726	9.0%			0.0%	$ 408	9,136	$ 3,728,310	8.8%			$ 414	26,771	$ 11,089,062	9.1%	-	$ -
COM-Motors	3.5	$ 158	992	$ 157,147	0.4%	992	$ 157,147	0.7%	$ 159	967	$ 153,737	0.4%	967	$ 153,737	0.7%	$ 160	1,079	$ 172,218	0.4%	1,079	$ 172,218	$ 159	3,038	$ 483,102	0.4%	3,038	$ 483,102
COM-Refrigeration	2.6	$ 217	1,074	$ 233,291	0.6%	1,074	$ 233,291	1.1%	$ 222	1,045	$ 232,239	0.6%	1,045	$ 232,239	1.0%	$ 219	1,154	$ 252,944	0.6%	1,154	$ 252,944	$ 219	3,273	$ 718,473	0.6%	3,273	$ 718,473
COM-Process	2.7	$ 121	885	$ 106,919	0.3%	885	$ 106,919	0.5%	$ 122	840	$ 102,553	0.3%	840	$ 102,553	0.5%	$ 124	944	$ 116,839	0.3%	944	$ 116,839	$ 122	2,669	$ 326,311	0.3%	2,669	$ 326,311
IND	2.7	$ 211	19,864	$ 4,198,947	10.9%	19,864	$ 4,198,947	18.9%	$ 198	21,433	$ 4,237,999	10.5%	21,433	$ 4,237,999	19.0%	$ 219	18,803	$ 4,118,596	9.7%	18,803	$ 4,118,596	$ 209	60,101	$ 12,555,542	10.3%	60,101	$ 12,555,542
TOTAL		$ 265	133,139	$ 35,243,779		92,271	$ 20,291,912		$ 269	136,505	$ 36,701,002		93,273	$ 20,332,974		$ 283	136,285	$ 38,607,120		92,702	$ 20,801,461	$ 272	405,929	$ 110,551,900		278,246	$ 61,426,346
Enabling Strategies				$ 3,300,000			$ 1,900,004	8.6%			$ 3,600,000			$ 1,994,461	8.9%			$ 4,000,000			$ 2,155,194			$ 10,900,000			$ 4,055,198
Education and Outreach				$ 1,600,000	4.2%			0.0%			$ 1,700,000	4.2%						$ 1,800,000	4.2%					$ 5,100,000	4.2%		
Development and Research				$ 1,100,000	2.9%			0.0%			$ 1,200,000	3.0%						$ 1,300,000	3.1%					$ 3,600,000	3.0%		
Other				$ 600,000	1.6%			0.0%			$ 700,000	1.7%						$ 900,000	2.1%					$ 2,200,000	1.8%		
TOTAL with Enabling Strategies				$ 38,543,779	100.0%		$ 22,191,915	100.0%			$ 40,301,002	100.0%		$ 22,327,434	100.0%			$ 42,607,120	100.0%		$ 22,956,655			$ 121,451,900	100.0%		$ 65,481,544
First Year Unit Cost $/MWh				$ 289			$ 241				$ 295			$ 239				$ 313			$ 248			$ 299			$ 235

Annual Incremental Peak Demand Savings (kW)							
2016		**2017**		**2108**		**2016-18 Contract**	
EfficiencyOne	NSPI	EfficiencyOne	NSPI	EfficiencyOne	NSPI	EfficiencyOne	NSPI
885	885	973	973	948	948	2,807	2,807
4,123	1,200	4,671	1,200	5,015	1,200	13,810	3,600
2,686	-	2,724	-	2,487	-	7,898	-
-		-		-		-	-
-		-		-		-	-
847	-	796	-	707	-	2,350	-
1,001	-	1,026	-	1,053	-	3,079	-
2,912	2,912	2,644	2,644	2,829	2,829	8,385	8,385
2,983	2,983	2,974	2,974	3,034	3,034	8,991	8,991
1,656	-	1,643	-	1,778	-	5,077	-
113	113	110	110	123	123	347	347
351	351	352	352	391	391	1,094	1,094
135	135	130	130	146	146	411	411
2,698	2,698	2,990	2,990	2,520	2,520	8,207	8,207
						-	-
20,389	11,276	21,033	11,373	21,033	11,192	62,456	33,842

Schedule A

Scope of Services

The following UARB approved Electricity Efficiency and Conservation Activities are identified to be carried out by EfficiencyOne as a holder of the Efficiency Nova Scotia franchise, over the 2016-2018 Agreement Term.

Overview of Programs and Sub-components 2016-2018

(Tables to be populated by E1, based on the final 2016-2018 DSM Plan as approved by the UARB.)

Program and Sub-Component	Total 2016-2018		
	Cumulative Annual Net Energy Savings at Generator	Cumulative Annual Net Demand Savings at Generator	Unit Cost
	(GWh)	(MW)	($/kWh)
Residential Sector			
List each program and sub-component			
Sub-Total			
Business, Non-Profit and Institutional			
List each program and sub-component			
Sub-Total			
Enabling Strategies			
List each program and sub-component			
Total			

EECA in 2016

Program and Sub-Component	Total 2016		
	Cumulative Annual Net Energy Savings at Generator	Cumulative Annual Net Demand Savings at Generator	Unit Cost
	(GWh)	(MW)	($/kWh)
Residential Sector			
List each program and sub-component			
Sub-Total			
Business, Non-Profit and Institutional			
List each program and sub-component			
Sub-Total			
Enabling Strategies			
List each program and sub-component			
Total			

EECA in 2017

Program and Sub-Component	Total 2017		
	Cumulative Annual Net Energy Savings at Generator	Cumulative Annual Net Demand Savings at Generator	Unit Cost
	(GWh)	(MW)	($/kWh)
Residential Sector			
List each program and sub-component			
Sub-Total			
Business, Non-Profit and Institutional			
List each program and sub-component			
Sub-Total			
Enabling Strategies			
List each program and sub-component			
Total			

EECA in 2018

Program and Sub-Component	Total 2018		
	Cumulative Annual Net Energy Savings at Generator	Cumulative Annual Net Demand Savings at Generator	Unit Cost
	(GWh)	(MW)	($/kWh)
Residential Sector			
List each program and sub-component			
Sub-Total			
Business, Non-Profit and Institutional			
List each program and sub-component			
Sub-Total			
Enabling Strategies			
List each program and sub-component			
Total			

Specifications of Programs and Sub-Components

(Technical tables to be provided and populated by E1, based on the final 2016-2018 DSM Plan as approved by the UARB. NS Power recommends these tables include a column to identify program subcomponents.)

Enabling Strategies

(E1 to populate a detailed breakdown of Enabling Strategies by type of expenditure, separately for each category greater than $250,000 over the 3 year period)

Schedule B

Compensation

The figure below identifies the Contract Price allocated for each year of the Term.

Year	$M
2016	
2017	
2018	
Total	

The schedule below provides the current projection of the cash requirement profile of EfficiencyOne over the term of the 2016-2018 Agreement for delivery of energy and demand savings as provided in Schedule "A". The percentages reflect a projection of the expected profile of EfficiencyOne's DSM expenditures.

Current Projection of Cash Requirement Profile (expressed as percentages of the annual amounts)			
Payment Due Date	2016	2017	2018
January 1st	8.5%	8.5%	8.5%
February 1st	7.8%	7.8%	7.8%
March 1st	8.3%	8.3%	8.3%
April 1st	8.8%	8.8%	8.8%
May 1st	7.5%	7.5%	7.5%
June 1st	7.0%	7.0%	7.0%
July 1st	7.1%	7.1%	7.1%
August 1st	7.2%	7.2%	7.2%
September 1st	9.1%	9.1%	9.1%
October 1st	11.9%	11.9%	11.9%
November 1st	8.4%	8.4%	8.4%
December 1st	8.4%	8.4%	8.4%
Total	100.0%	100.0%	100.0%

In the case where financial statements show that E1 did not spend the full annual amount from previous years, E1 shall retain those amounts and carrying costs and that surplus is deducted from the year's cash required to be delivered from NS Power to E1 for that year.