THE BRETON LAW GROUP

James R. Gogan
Direct Dial: (902) 563-5920
E-Mail: jim@bretonlawgroup.com

File No. 41736-92

August 14, 2019

Nova Scotia Utility & Review Board
PO Box 1692, Unit "M"
Halifax, Nova Scotia
B3J 3S3

Attention: Doreen Friis, Regulatory Affairs Officer / Clerk

Dear Ms. Friis:

Re: DSM Potential Study

The Nova Scotia Utility and Review Board ("Board"), in its Order in Matter M08604, (EfficiencyOne Application for Approval of Supply Agreement and 2019 DSM Resource Plan) issued July 23, 2018, directed EfficiencyOne to initiate a new DSM Potential Study ("Study") for completion by July 31, 2019. At the request of EfficiencyOne, the Board granted an extension to file the DSM Potential Study Report on August 14, 2019.

2019 DSM POTENTIAL STUDY REPORT

Enclosed please find the DSM Potential Study Report to be filed on behalf of EfficiencyOne, including the following Appendices:

- Appendix A: Methodology Approach
- Appendix B: Baseline Study
    - Appendix B - 1: Electricity Usage Online Instrument – Residential & Site Visit Follow Up
    - Appendix B - 2: Electricity Usage Online Instrument – Commercial
    - Appendix B - 3: Electricity Usage Tables – Residential
    - Appendix B - 4: Electricity Usage Tables – Commercial
- Appendix C: Demand Response Inputs (Excel tool to be filed electronically)
- Appendix D: Demand Response Outputs (Excel tool to be filed electronically)
- Appendix E: Energy Efficiency Inputs (Excel tool to be filed electronically)
- Appendix F: Energy Efficiency Outputs (Excel tool to be filed electronically)
- Appendix G: 8760 Data (hourly savings per sector for all 25 years of the Study) (Excel tool to be filed electronically).

As indicated above, Appendices C, D, E, F and G are Excel tool spreadsheets. Given the nature of these Appendices, EfficiencyOne requests permission to file these electronically. I confirm 4 paper copies of the DSM Potential Study Report and Appendices A and B will be filed with the Board.

2019 DSM POTENTIAL STUDY – STAKEHOLDER ENGAGEMENT PROCESS

In addition to the Report and Appendices filed herein, EfficiencyOne believes it would be of assistance to the Board to detail the process EfficiencyOne undertook in relation to stakeholder engagement throughout the course of the Potential Study.

EfficiencyOne's role as project manager was to facilitate the interactions between the DSMAG members and the successful proponent. As stakeholder engagement figured prominently in the development of the Potential Study, EfficiencyOne developed a stakeholder engagement schedule that allowed DSMAG members (including EfficiencyOne) to have several opportunities to participate in the process. The stakeholder engagement plan included the following four milestones:

- Scope of Work to inform EfficiencyOne's Request for Proposal for Potential Study Development:
  - **November 6, 2018**: EfficiencyOne released a draft scope of work with a stakeholder comment period ending November 16, 2018.
  - **December 6, 2018**: Revised scope of work and EfficiencyOne's reply comments to the DSMAG were released.
  - **December 7, 2018** : DSMAG meeting held where EfficiencyOne presented to stakeholders the final scope of work incorporating the comments received from Stakeholders.

- Navigant's Potential Study assumptions and modelling plan:
  - **March 22, 2019**: Navigant released the Potential Study assumptions and modelling plan to the DSMAG, with a comment period ending April 5, 2019.
  - **May 9, 2019**: Revised Potential Study assumptions and modelling plan and reply to stakeholder comments released.

- Navigant's draft Baseline Study report and detailed model assumptions:
  - **May 27, 2019**: Navigant release of the draft Baseline Study report and detailed modelling assumptions.
  - **June 7, 2019**: EfficiencyOne WebEx with the DSMAG where Navigant reviewed the report and assumptions used prior to the comment period ending.
  - **June 19, 2019**: Revised Baseline Study report and detailed model assumptions and reply to stakeholder comments were released to DSMAG.

- Navigant's draft Potential Study report:
    - **July 15, 2019**: Navigant releases the draft Potential Study report.
    - **July 16, 2019**: EfficiencyOne facilitates Technical Conference with model walk-through for all DSMAG members.
    - **July, 24, 2019**: Navigant releases additional 8760 energy savings data reflective of Navigant's "Base Case" scenario.
    - **August 2, 2019**: Reply to stakeholder comments released to DSMAG.

Throughout each phase of the Potential Study development EfficiencyOne received various feedback from stakeholders. In each case, this feedback was communicated and reviewed with Navigant, and where deemed appropriate, incorporated into the Potential Study process and final report. Details of the comments, and the manner in which they were incorporated into the development process and final draft of the Potential Study, are set out in the attached Appendix "A".

EfficiencyOne appreciates the participation of the stakeholders throughout the development of this Potential Study. EfficiencyOne believes the robust engagement process has resulted in a comprehensive DSM Potential Study that will significantly inform the ongoing development of the 2020 Integrated Resource Plan.

Yours very truly,

THE BRETON LAW GROUP

James R. Gogan

Appendix "A"

Stakeholder Feedback

Stakeholder Review & Comment Period #1 - RFP – Scope of Work

On November 6, 2018 EfficiencyOne shared a draft Scope of Work for the 2019 Potential Study Services with the DSMAG, and invited written comments from stakeholders until November 16, 2018, in an effort to inform the development of the Request for Proposal for these services. The following table highlights specific stakeholder comments and how EfficiencyOne has addressed each:

Stakeholder Comment	How Comment was Addressed
Consider an enhanced consultation process.	E1 revised the final Scope of Work by providing a stakeholder engagement schedule and adding the following additional items: • A comment period for stakeholders to examine and comment on the successful proponent's Draft Potential Study Assumptions and Modelling Plan; • A technical conference and comment period to allow stakeholders the opportunity to review and comment on draft Baseline Study results; and • A technical conference and comment period to allow stakeholders the opportunity to review and comment on draft Potential Study results. Stakeholder comment periods were subsequently expanded to two weeks for each.
Consider enhanced model access and transparency.	E1 revised the final Scope of Work to reflect the following enhanced transparency requirements: • Model inputs, assumptions, data sources, calculations and outputs are available for review by E1, stakeholders and the UARB; and • Proponents must disclose any limitations they require with respect to transparency and the use of their model.
Define cost-effectiveness testing to be provided and the types of benefits/costs to be included.	E1 revised the final Scope of Work to clarify the following: • Non-energy benefits included in Matter M08888 will not be included. • The benefits (or costs, in some cases) included within the TRC test will include Avoided Utility Costs, O&M impacts, fuel-switching impacts, and water impacts.

	Rate Impact Measure (RIM) test results were not included in the final Scope of Work but were provided to stakeholders as part of the Potential Study draft results.
Consider expanding the Scope of Work to be an Integrated DSM Potential Study, with added consideration of Demand Response at a minimum.	E1 modified the final Scope of Work to include demand-focused measures (including Demand Response). In addition, the Demand Response portion of the Study included battery storage technologies and predictions for EV adoption.
Consider analyzing and reporting on the low-income residential segment separately.	E1 revised the final Scope of Work to include specific requirements and disaggregation of results for Low-Income Nova Scotians.
Consider the following when modelling Technical, Economic and Achievable Potential: • Include only those measures that are currently commercially available; • Identify potential from Codes and Standards; • Avoided costs should be specified by E1 to the chosen vendor; • A maximum and current potential scenario should be developed; and • Developing scenarios should be based on incentive levels, good program and incentive design, delivery approach, availability of financing and marketing strategies.	E1 revised the final Scope of Work to include the following: • Clarified that Achievable Potential cases should include additional factors beyond incentive level changes; • Clarified that E1 intends to provide avoided costs information to the vendor; • Clarified the treatment of emerging technologies; and • Clarified that savings from Codes and Standards are to be quantified. E1 recommended that consideration of other comments was more appropriate as part of the review process for the Draft Potential Study Assumptions and Modelling Plan document.

Stakeholder Review & Comment Period #2 – Potential Study Assumptions and Modelling Plan

On March 22, 2019 EfficiencyOne shared draft Potential Study Assumptions and Modelling Plan with the DSMAG and invited written comments from stakeholder until April 5, 2019. The following table highlights specific stakeholder comments and how EfficiencyOne has addressed these:

Stakeholder Comment	How Comment was Addressed
Stakeholders should have the opportunity to specify potential scenarios.	Draft scenarios were provided to stakeholders for review on May 29, 2019 as part of the scenarios/sensitivities and detailed assumptions package.

A scenario showing no incentives should be included.	Draft scenarios were provided to stakeholders for review on May 29, 2019 as part of the scenarios/sensitivities and detailed assumptions package. A "low" scenario will be provided as one of the five potential scenarios modelled. A no incentive scenario effectively forms a forecast of naturally occurring improvements in energy efficiency which is accounted for in NS Power's load forecast. E1 understands that NS Power's forecast will form the basis for the IRP load forecasts.
Potential screened using PAC as the cost effectiveness test should be provided.	Draft scenarios were provided to stakeholders for review on May 29, 2019 as part of the scenarios/sensitivities and detailed assumptions package. Navigant provided an alternative view of Economic Potential, screened using the Program Administrator cost test, as part of the Draft Results package shared with the DSMAG.
A scenario should be provided in the Potential Study examining DSM potential in Nova Scotia considering only known, commercially-available technologies from E1's current measure database. Additionally, all scenarios should identify the proportion of savings attributed to measures that are currently not commercially available.	All achievable potential scenarios have been prepared in such a manner that only currently commercially-available technologies have been considered. No future emerging technology assumptions have been included in achievable potential results.

Stakeholder Review & Comment Period #3 – Assumption Detail and Draft Baseline Study Report

On May 24, 2019, EfficiencyOne shared additional assumption detail with the DSMAG, followed by a draft Baseline Study Report, shared on May 27, 2019 and invited written comments from stakeholders until June 7, 2019. The following table highlights specific stakeholder comments and how EfficiencyOne has addressed these:

Stakeholder Comment	How Comment was Addressed
Provide information regarding the source of inputs and assumptions	E1 provided sources for inputs (including incremental costs) along with the Draft Potential Study Report on July 15, 2019.

(including incremental costs assumptions) to stakeholders.	
Consider using updated avoided costs.	The 2019 DSM Potential Study relies on the 2014 IRP avoided costs of energy and capacity as well as the transmission and distribution avoided costs as provided by NS Power in the fall of 2018. E1 does not support using modifications to avoided costs that have not gone through a rigorous regulatory process inclusive of stakeholder review.

Stakeholder Review & Comment Period #4 – Draft Potential Study Report

On July 15, 2019 EfficiencyOne shared a draft Potential Study Report with the DSMAG and invited written comments from stakeholder until July 26, 2019. The following table highlights specific stakeholder comments and how EfficiencyOne has addressed these:

Stakeholder Comment	How Comment was Addressed
Consider continuing to work with stakeholders through the IRP process to increase transparency and to use the Potential Study and historic DSM experience and affordability to inform the IRP process	EfficiencyOne has facilitated multiple opportunities for stakeholder comment throughout the 2019 DSM Potential Study. These stakeholder comment and engagement opportunities exceeded original planning expectations, given the request for additional opportunities brought by NS Power and other stakeholders. EfficiencyOne agrees with the importance of stakeholder participation in the Potential Study process, and has considered all feedback provided by stakeholders. EfficiencyOne intends to respect the filing date of August 14, 2019, established by the UARB, for the Final 2019 DSM Potential Study work products, and does not anticipate any further technical development of the Potential Study beyond that date. EfficiencyOne does intend to fully participate in the 2020 IRP process, and will be available to respond to stakeholder questions for the purposes of clarification and facilitating understanding throughout that process.

EfficiencyOne

Nova Scotia Energy Efficiency and Demand Response Potential Study for 2021-2045

Prepared by Navigant for EfficiencyOne

FILED
August 14, 2019

Nova Scotia Energy Efficiency and Demand Response Potential Study for 2021-2045

Prepared for:

EfficiencyOne

Submitted by:
Navigant Consulting Ltd.
First Canadian Place
100 King Street West | Suite 4950
P.O. Box 64
Toronto, ON M5X 1B1

416.777.2440
navigant.com

Reference No.: 207668

August 14, 2019

TABLE OF CONTENTS

TABLE OF FIGURES

E. EXECUTIVE SUMMARY

EfficiencyOne engaged Navigant Consulting, Inc. (Navigant) to prepare energy efficiency (EE) and demand response (DR) potential studies for electricity for the province of Nova Scotia over a 25-year forecast horizon, from 2021 to 2045.

For energy efficiency, the study's objective is to assess the potential in the residential and business, nonprofit and institutional (BNI) sectors by analyzing energy efficiency measures, defining operational and maintenance activities to keep existing devices or equipment in good working order, and improving end user behaviours to reduce energy consumption. The energy efficiency analysis efforts provide input data to Navigant's Demand Side Management Simulator (DSMSim™) model, which calculates technical, economic and market savings potential across Nova Scotia. These results[1] will be used to inform integrated resource planning (IRP), and energy efficiency and demand response program design in Nova Scotia.

E.1 Estimation of Energy Efficiency Potential

Navigant employed its proprietary DSMSim™ potential model to estimate the technical, economic and market savings potential for electricity and winter peak demand across Nova Scotia. DSMSim™ is a bottom-up technology diffusion and stock tracking model implemented using a System Dynamics[2] framework. The model explicitly accounts for different types of efficient measures such as retrofit (RET), replace-on-burnout (ROB), and new construction (NEW), and the impacts these measures have on savings potential. The model then reports the technical, economic and market potential savings in aggregate in total for the province, and by sector, customer segment, end use category, and highest-impact measures.

This study defines **technical potential** as the energy savings that can be achieved assuming that all installed measures can immediately be replaced with the efficient measure, wherever technically feasible, regardless of the cost, market acceptance, or whether a measure has failed (or "burned out") and is in need of being replaced.

Economic potential is a subset of technical potential, using the same assumptions regarding immediate replacement as in technical potential, but limiting the calculation only to those measures that have passed the benefit-cost test chosen for measure screening, in this case the Total Resource Cost (TRC) test or the Program Administrator Cost (PAC) test.

Market potential (also referred to as achievable potential) further considers the likely rate of demand-side management (DSM) resource acquisition, given factors like the rate of equipment turnover (a function of a measure's lifetime), simulated incentive levels, consumer willingness to adopt efficient technologies, and the likely rate at which marketing activities can facilitate technology adoption. The adoption of DSM measures can be broken down into calculation of the "equilibrium" market share and calculation of the dynamic approach to equilibrium market share, as discussed in more detail below.

Technical potential savings reported in this study are "gross", rather than "net," meaning they do not include the effects of natural change, spillover, freeridership, and other effects not attributable to DSM programs. Providing gross potential is advantageous because it permits a reviewer to more easily calculate net potential when new information about net-to-gross ratios or changing end use intensities become available.

---

[1] Demand Response analysis results are provided in Appendix D. Energy Efficiency analysis results are provided in Appendix F.

[2] See Sterman, John D. *Business Dynamics: Systems Thinking and Modeling for a Complex World*. Irwin McGraw-Hill, 2000, for detail on System Dynamics modelling. Also see http://en.wikipedia.org/wiki/System_dynamics for a high-level overview.

E.2 Estimation of Demand Response Potential

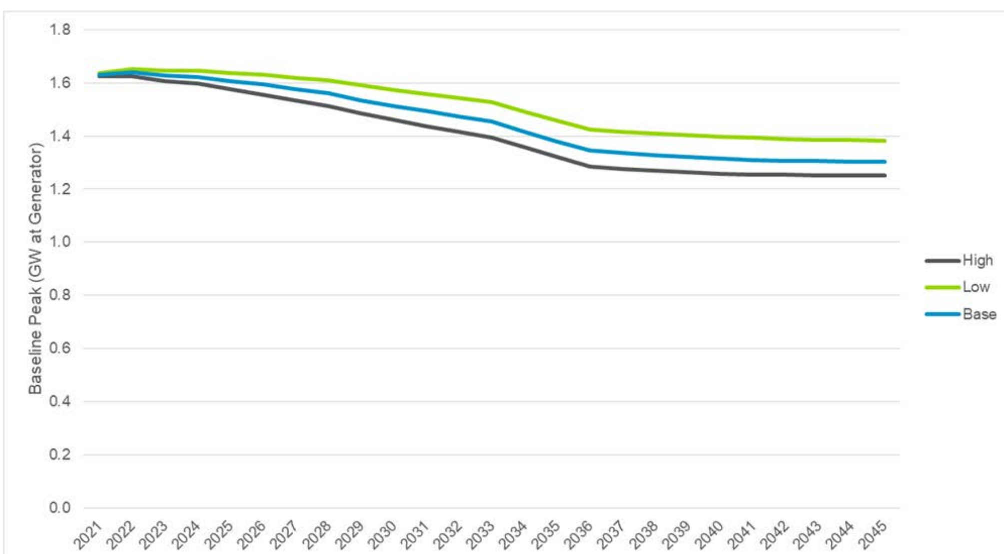
Navigant developed DR potential and cost estimates using a bottom-up analysis. The analysis involved five steps: (1) characterize the market, (2) develop baseline projections, (3) define and characterize DR options, (4) develop key assumptions for potential and costs, and (5) estimate potential and costs. Navigant used both primary data from EfficiencyOne and relevant secondary sources for this analysis, as documented in this report. The DR potential analysis efforts provide input data to Navigant's Demand-Response Simulator (DRSim™) model, which calculates total DR potential across Nova Scotia.

Navigant developed DR potential and cost estimates using a bottom-up analysis. The analysis involved five steps: (1) characterize the market, (2) develop baseline projections, (3) define and characterize DR options, (4) develop key assumptions for potential and costs, and (5) estimate potential and costs. Navigant used both primary data from EfficiencyOne and relevant secondary sources for this analysis, as documented in this report. The DR potential analysis efforts provide input data to Navigant's Demand-Response Simulator (DRSim™) model, which calculates total DR potential across Nova Scotia.

The foundation for the DR potential assessment is to develop disaggregated bottom-up peak demand projections (post EE) by customer class, segment and end use. The steps to determine the baseline peak projections were: (1) define the peak period, (2) calculate coincident peak demand factors, (3) obtain end use shares, (4) determine energy sales after subtracting Navigant's energy efficiency potential study results, and (5) apply coincident peak demand factors and end use shares to calculate bottom-up peak demand projections.

Three different scenarios from the energy efficiency potential study were considered in the baseline winter peak projections: (1) low, (2) base, and (3) mid. These correspond to the scenarios low, base, and high, respectively, in the DR study. Figure ES-1 shows the baseline peak projections across the three DR scenarios.

Figure ES-1. Winter Baseline Peak Forecast by DR Scenario (GW at generator)



Source: Navigant analysis

The DR options included in the analysis are representative of commonly deployed and emerging DR programs in the industry and are listed in Figure ES-2.

Figure ES-2. Summary of Demand Response Options Considered in Study

DR Option	Brief Description	Eligible Customer Classes	End Use
Direct Load Control (DLC)	Control of electric loads by a thermostat and/or load control switch.	Residential Small Commercial Small Industrial	Electric Furnace[3] Heat Pump[4] HVAC[5] Hot Water
BNI Curtailment	Firm capacity reduction commitment. $/kW payment based on delivered capacity, administered through third party aggregators.	Large Commercial Large Industrial Interruptible	HVAC Lighting Water Heating Total Facility
BTM Battery Control	Use of batteries for load shifting and dispatching to the grid.	All classes	Batteries
EV Charging Control	Charging modulation to reduce EV demand during peak periods	EV	EV
Critical Peak Pricing (CPP)	A rate schedule with significantly higher peak prices to discourage consumption during peak times	All classes	Total Facility
Behavioural Demand Response (BDR)	Targeted notifications and incentives are provided to customers to encourage peak shaving	Residential	Total Facility

Source: Navigant

Navigant calculated both technical and market potential associated with implementing DR programs for this study. Technical potential refers to the theoretical maximum potential under 100% participation of the eligible load. Navigant calculated technical potential by multiplying the eligible load/customers by the unit impact for each sub-option. An important caveat is that, by definition, technical potential calculation does not consider participation overlaps. Therefore, the technical potential estimates for each DR option should be considered independently.

Navigant assessed cost-effectiveness of DR options and calculated achievable potential by multiplying achievable participation assumptions (subject to program participation hierarchy) by the technical potential estimates. Achievable potential also accounts for customer opt-out during DR events. In addition to the potential estimates, Navigant developed annual and levelized costs by DR options.

[3] Electric furnace and heat pump apply to residential. For small commercial and industrial, Navigant refers to the end use load type as HVAC.

[4] *Ibid.*

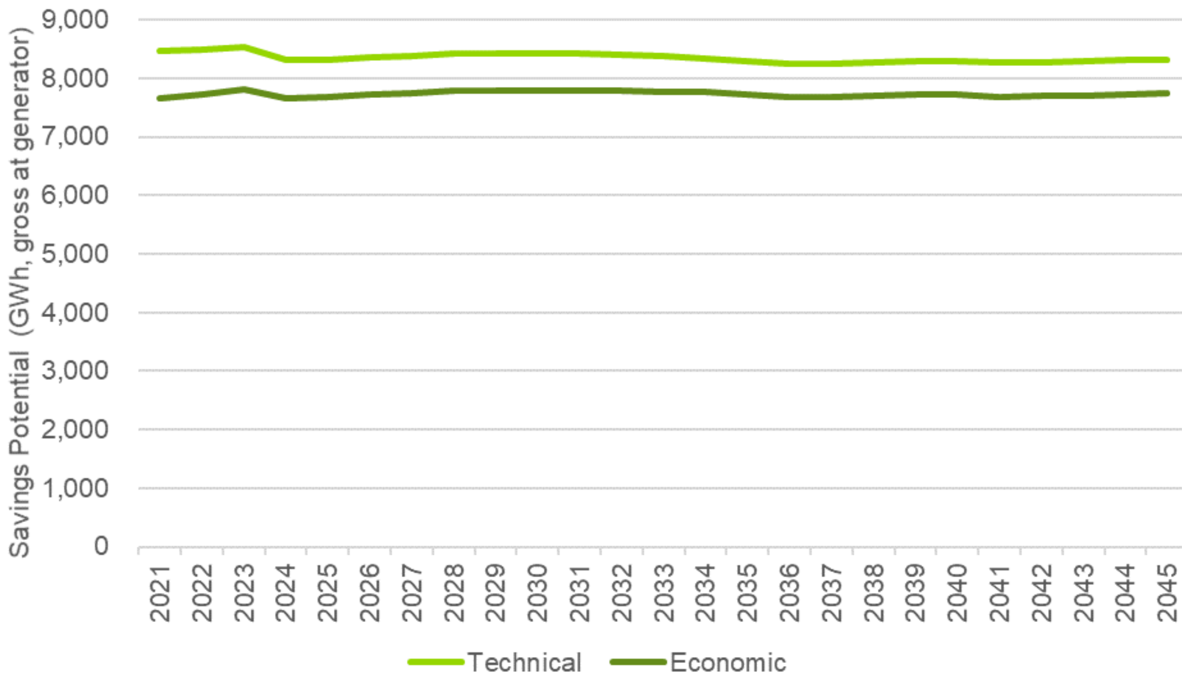
[5] *Ibid.*

E.3 Findings

E. 3.1 EE Potential Results

Figure ES-3 provides the technical and economic potential at generator for Nova Scotia. Technical and economic potential remain relatively flat over the 25-year study horizon, around 8,300 GWh and 7,700 GWh (gross at generator), respectively.

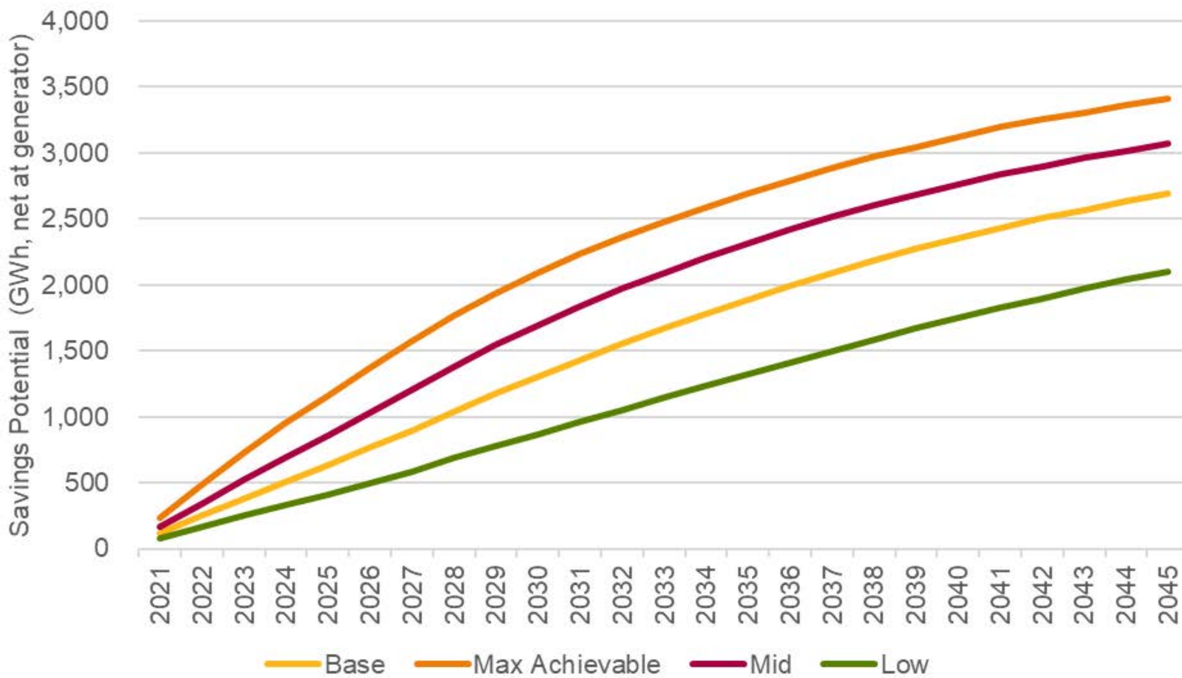
Figure ES-3. EE Technical and Economic Potential Electricity Savings (GWh, gross at generator)



Source: Navigant analysis

Figure ES-4 shows the cumulative potential results for the four market potential scenarios presented; (1) maximum achievable, (2) mid case, (3) base case, and (4) low case, which range from more than 2,000 GWh to just under 3,500 GWh (net at generator) over the 25-year period. Technical and economic potential savings are gross, while market potential is net of freeridership.

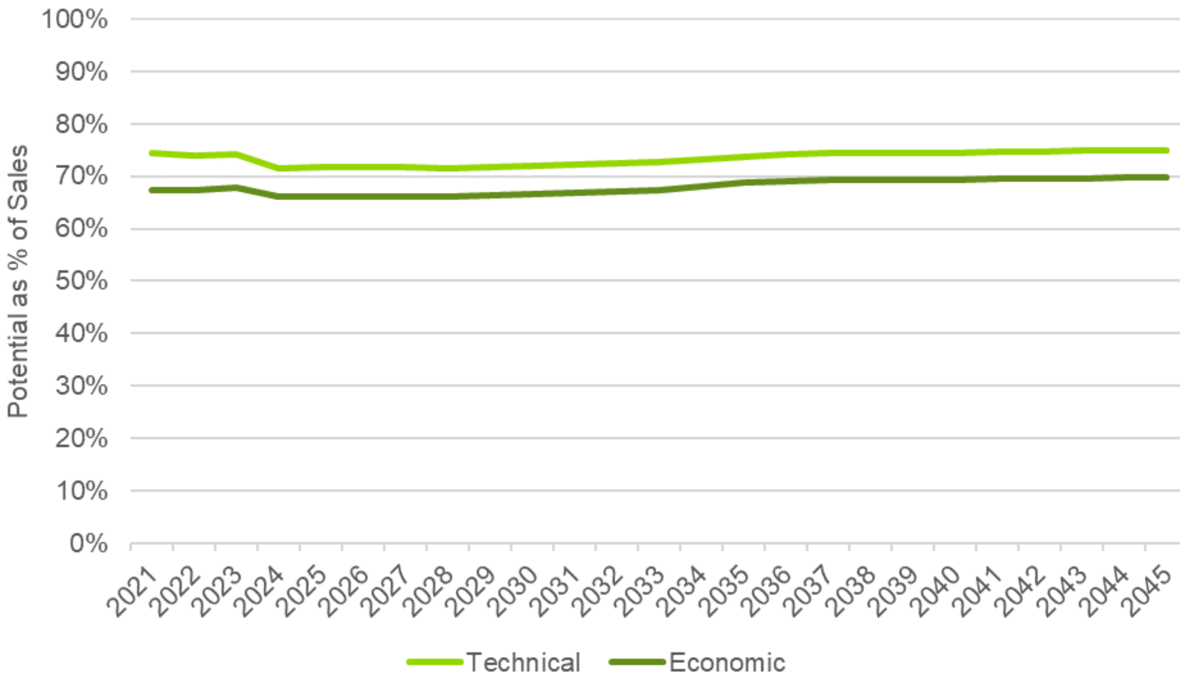
Figure ES-4. EE Market Potential Electricity Cumulative Savings (GWh, net at generator)



Source: Navigant analysis

Figure ES-5 presents the technical and economic electricity savings at generator potential as a percentage of customers' total electricity consumption. Annually, technical and economic potential savings ranges from 66% to 75% of electricity sales over the 25-year period. These technical potential savings are due in part to the inclusion of fuel-switching measures, allowing a very large portion of HVAC load to be technically removed.

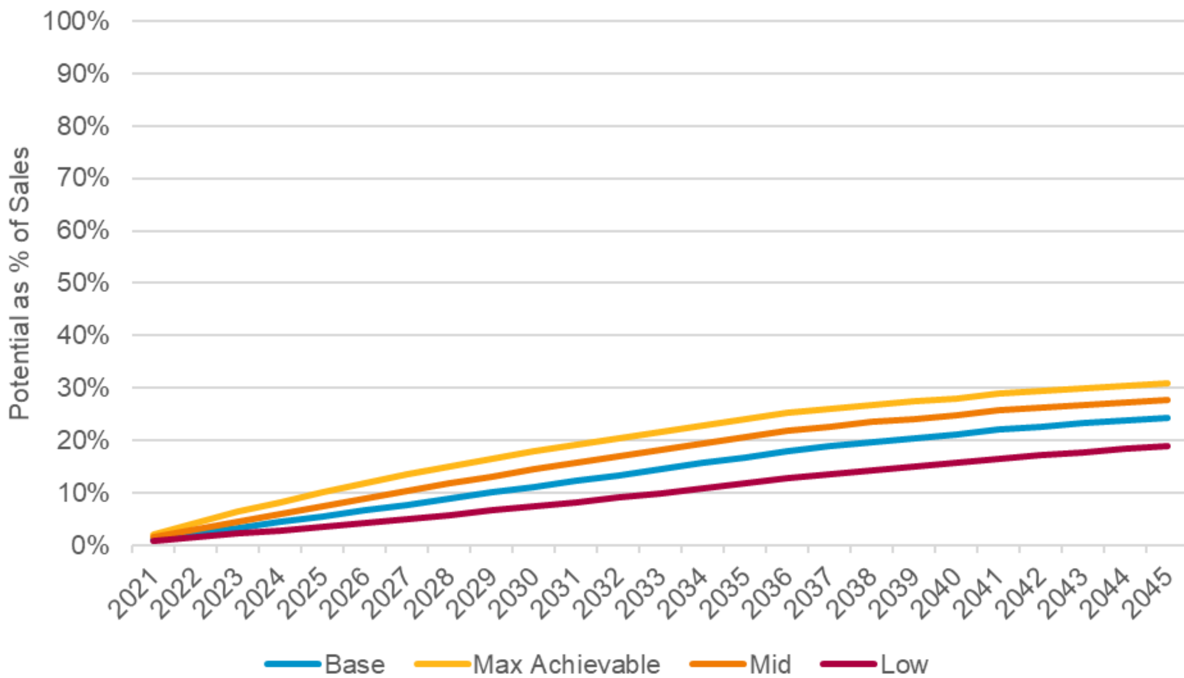
Figure ES-5. EE Technical and Economic Potential Electricity Savings as a Percent of Total Sales (%)



Source: Navigant analysis

Figure ES-6 presents cumulative achievable electricity savings at generator potential as a percentage of customers' total electricity consumption for the four market potential scenarios. Overall, market potential scenarios range from the low case at 19% to maximum achievable at 31% of electricity sales over the 25-year period.

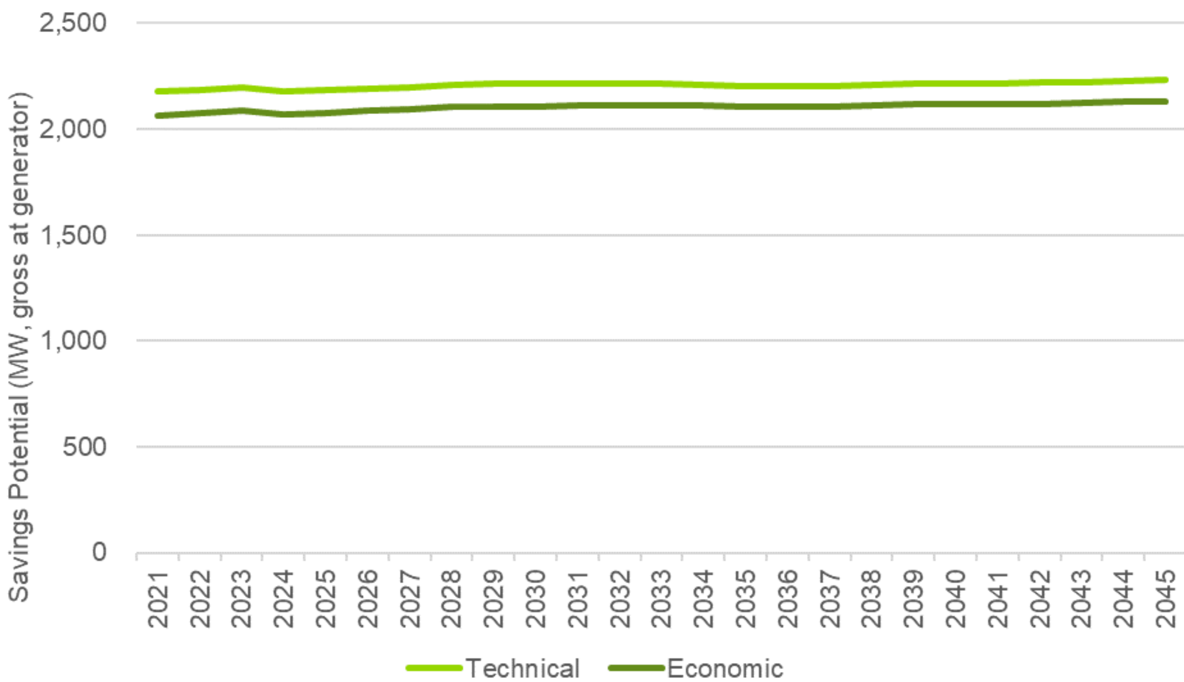
Figure ES-6. EE Market Potential Electricity Cumulative Savings as a Percent of Total Sales (%)



Source: Navigant analysis

The total technical and economic winter peak at generator demand savings potential are shown in Figure ES-7. Similar to the electricity results, technical and economic savings remain relatively flat over the 25-year study horizon, at around 2,100 to 2,200 MW (gross at generator). Technical and economic potential savings are gross.

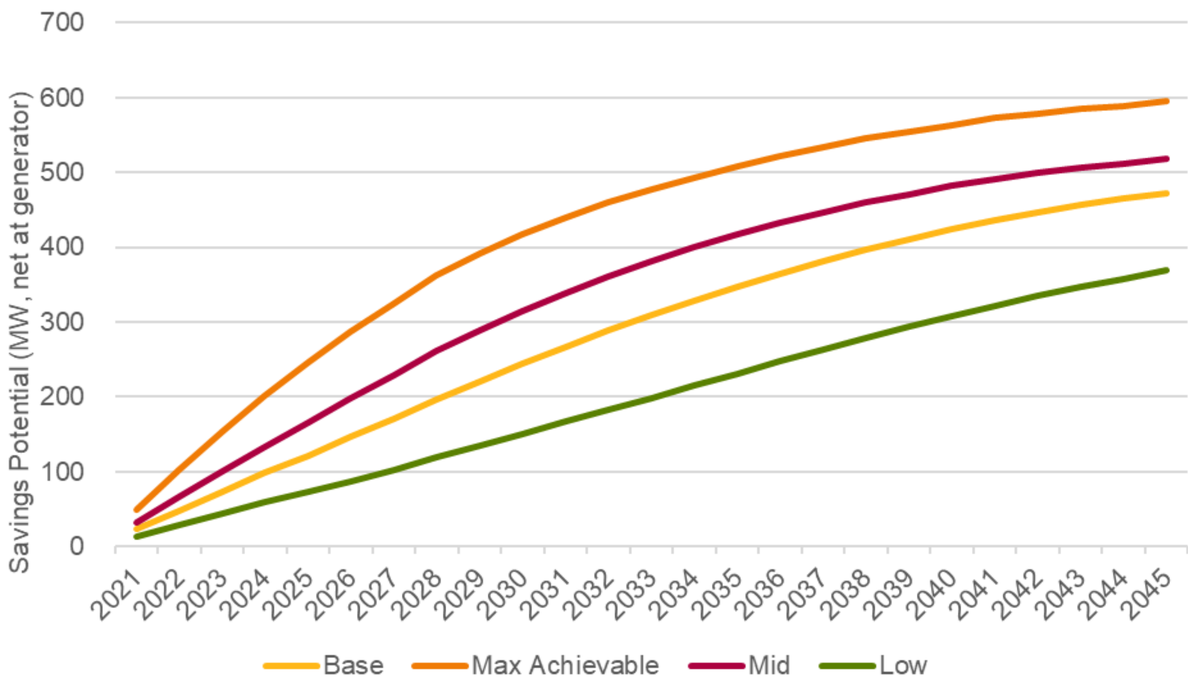
Figure ES-7. EE Technical and Economic Potential Winter Peak Demand Savings (MW, gross at generator)



Source: Navigant analysis

Figure ES-8 presents market winter peak demand results for four market potential scenarios; (1) maximum achievable, (2) mid case, (3) base case, and (4) low case, and ranges between 375 MW and 600 MW (net at generator) over the 25-year period. Market potential is net of freeridership.

Figure ES-8. EE Market Potential Winter Peak Demand Cumulative Savings (MW, net at generator)

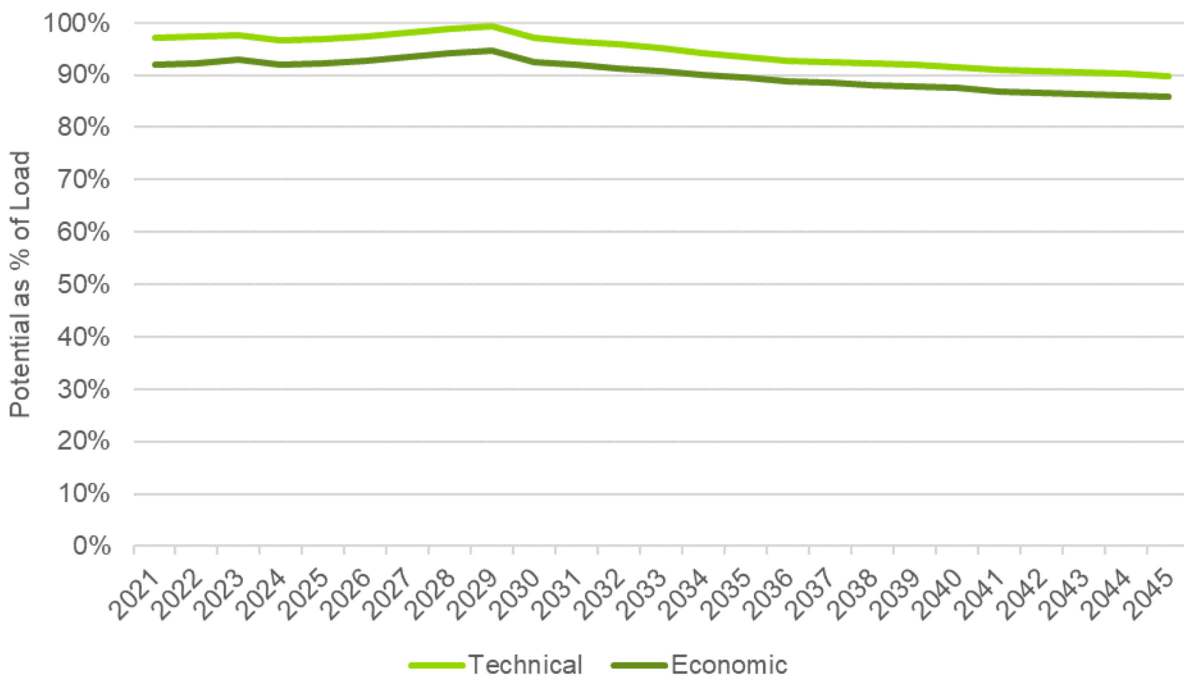


Source: Navigant analysis

Figure ES-9 presents the technical and economic winter peak demand at generator savings potential as a percentage of customers' total winter peak electricity load. Annually, technical and economic potential savings ranges around 85% to 99% over the 25-year period, in a large part due to fuel switching potential in HVAC.

The demand percent of sales values presented in this report are also higher than expected due to differing line loss factors in this study and the forecasted Nova Scotia Power system requirement document. The system requirement document, from which the total at generator demand forecast is sourced, indicates a 6.7% average line loss when calculating generation requirements. Line losses for the residential sector used in the at generator potential estimates are 14.7%, per NS Power's 2014 Cost of Service Study.

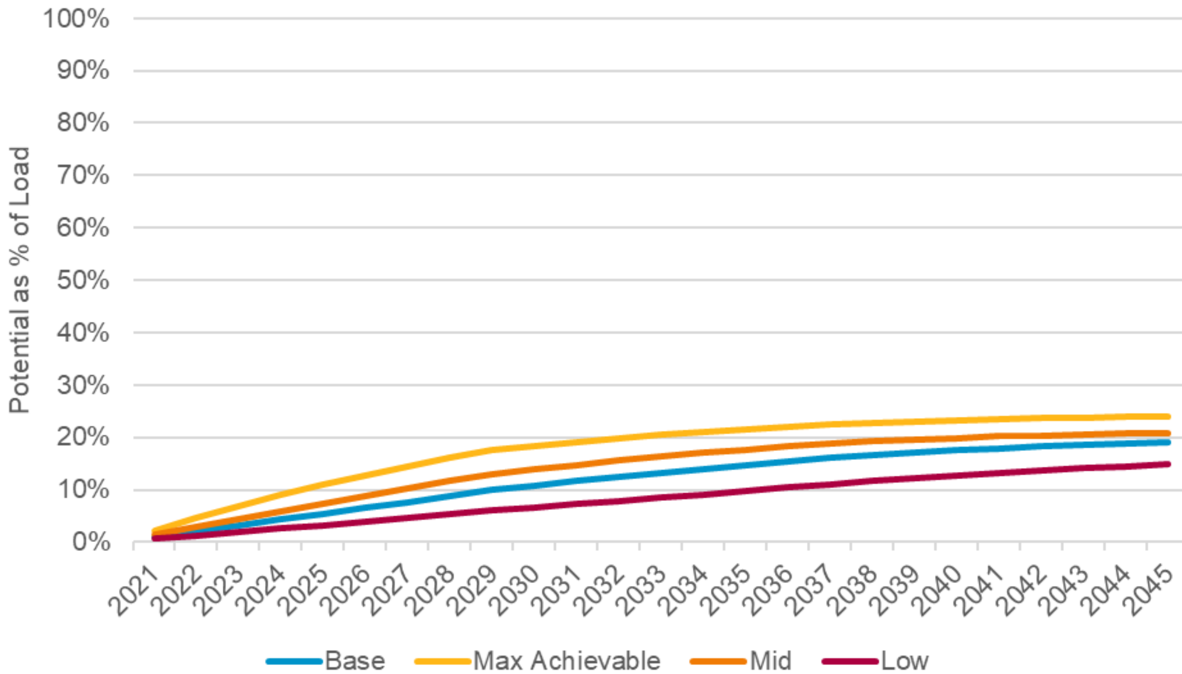
Figure ES-9. EE Technical and Economic Potential Winter Peak Demand Savings as a Percent of Total Load (%)



Source: Navigant analysis

Figure ES-10 presents the market winter peak demand at generator savings potential as a percentage of customers' total winter peak electricity load. Overall, market potential scenarios range from the low case at 15% to maximum achievable at 24% over the 25-year period.

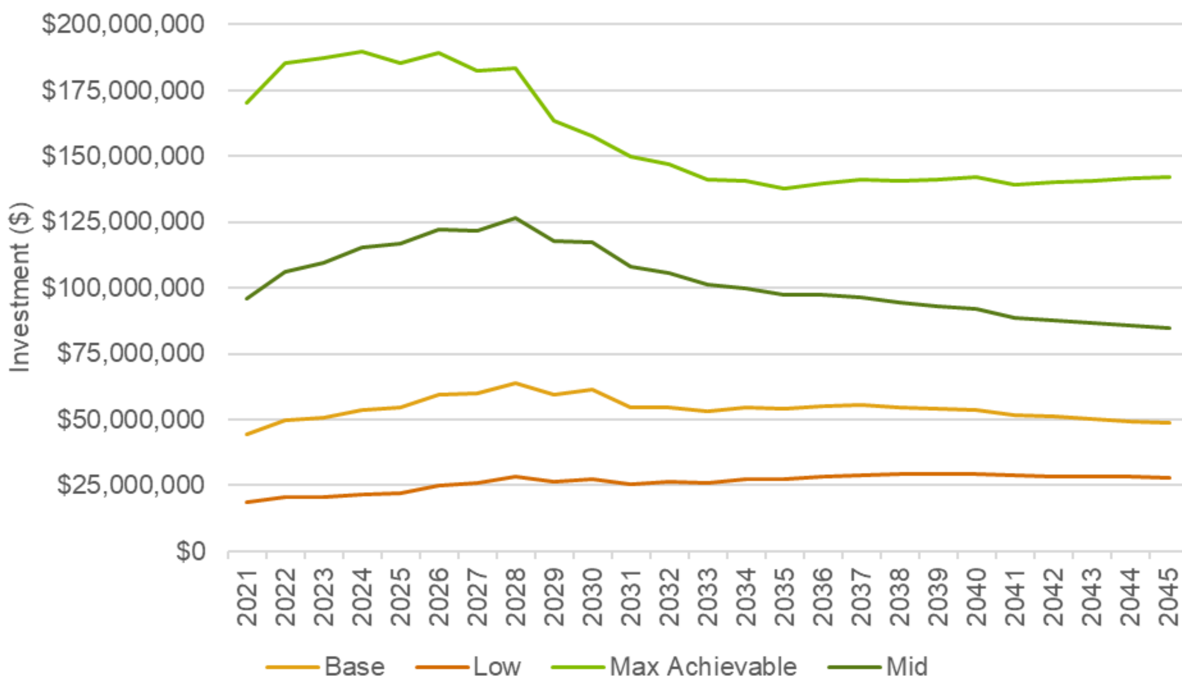
Figure ES-10. EE Market Potential Winter Peak Demand Savings as a Percent of Total Load (%)



Source: Navigant analysis

Figure ES-11 presents the level of investment in nominal dollars for each of the four achievable scenarios over the 25-year time horizon. The maximum achievable scenario reaches close to $190 million in 2024 and then declines to around $140 million annually. The mid case varies between $96 million to more than $126 million in 2028 and then declines to below $85 million. The base case ranges from around $44 million to $64 million annually. The low case varies from approximately $18 million to $28 million annually.

Figure ES-11. EE Total Portfolio Annual Investment, by Achievable Potential Scenario (nominal $)



Source: Navigant analysis

E. 3.2 DR Potential Results

Figure ES-12 shows the TRC benefits, costs (in NPV 2020 dollars) and benefit-cost (BC) ratios calculated for each DR option, as well as the results from the PAC test for the base case. All DR options, other than BTM Battery Control and EV Charging control are cost-effective for this case.

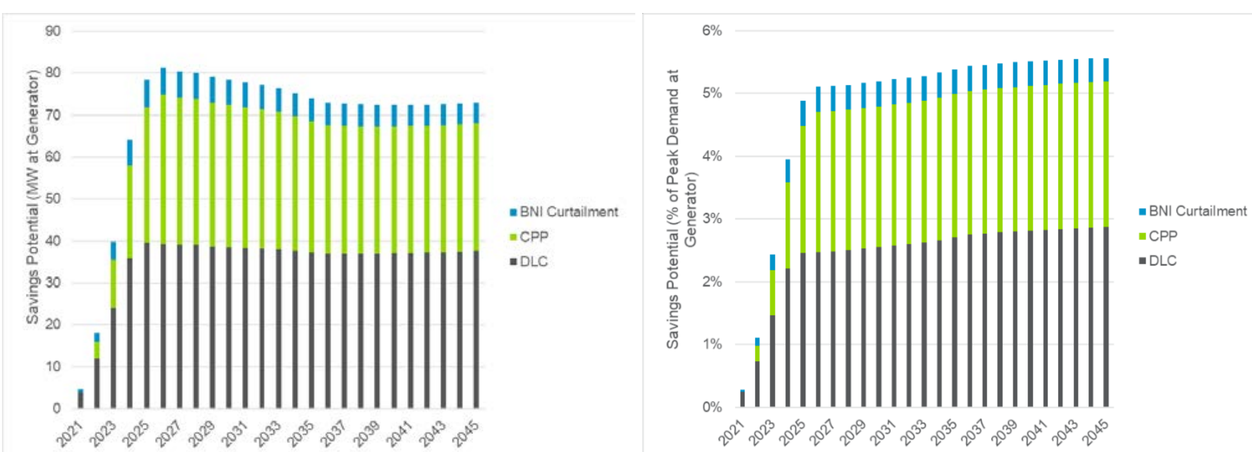
Figure ES-12. DR Achievable Base Case, Benefit-Cost Assessment by Option (TRC and PAC Test Benefit-Cost Ratios)

DR Option	Benefits (NPV 2020 million $)	Costs (NPV 2020 million $)	TRC Test Benefit-Cost Ratio	PAC Test Benefit Cost Ratio
CPP	65.05	25.23	2.58	2.58
DLC	81.47	66.60	1.22	1.06
BNI Curtailment	12.67	11.03	1.15	0.87
Behavioural DR	5.52	5.78	0.96	0.96
BTM Battery Control	19.17	22.91	0.84	0.73
EV Charging Control	3.05	11.08	0.28	0.26

Source: Navigant analysis

Figure ES-13 shows the MW breakdown of the DR achievable potential by cost-effective DR option, and the achievable potential as a percentage of Nova Scotia Power's peak demand. The cost-effective DR achievable potential under the base case is estimated to increase steadily to about 80 MW by 2027 and then declines and plateaus at about 70 MW from 2035 onward. The decline in potential is associated with the decrease in baseline peak demand for DR with progressively higher savings from energy efficient measures. Under the base scenario, the cost-effective achievable potential steadily increases to around 5% of peak demand in 2027 and increases slightly during the following years. DLC constitutes almost half of the total potential followed by CPP at 42%. BNI Curtailment share is significantly smaller at around 8%.

Figure ES-13. DR Achievable Potential for Cost-Effective Options (MW at generator and Percent of Peak Demand)



Source: Navigant analysis

E. 2.2.1 Demand Response Investment Levels

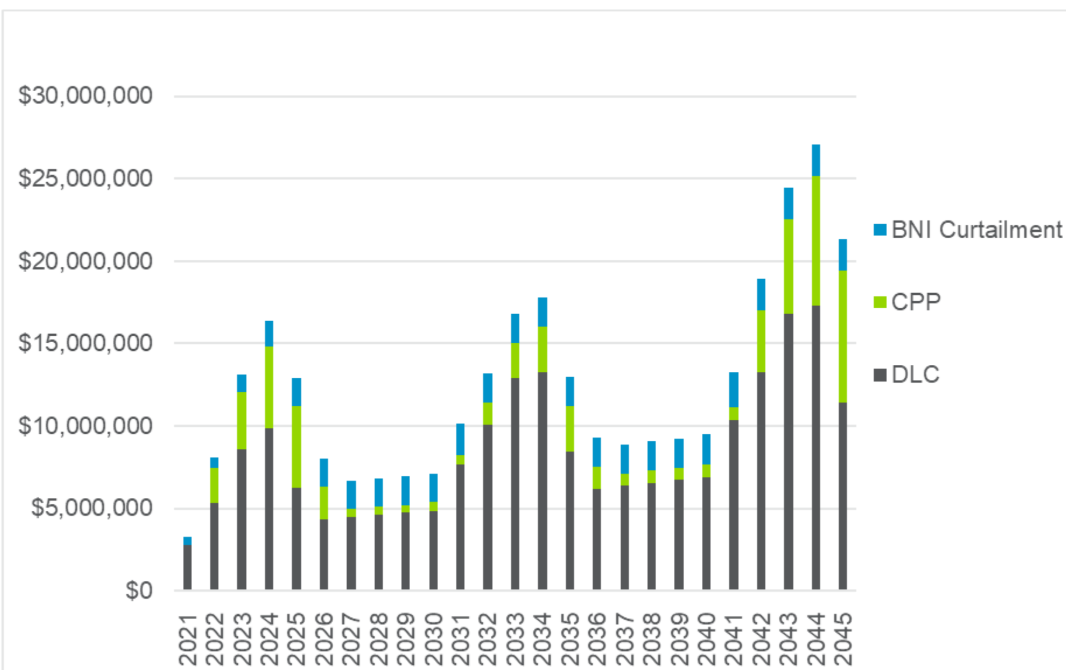
Figure ES-14 summarizes the annual program investment for cost-effective DR options in the base case. The results indicate the following:

- The program investment for DLC increase steadily from 2021 to 2024 and then drop until 2026. The costs remain steady and then spike back up in 2031 because the DLC program has a life of 10 years, so technology enablement and program development costs are re-incurred at this time. From then on, costs fluctuate in accordance with program participation, which is tied to the saturation of the end-use devices (heat pumps, electric furnace, water heating), until it reaches 2041, when the program costs are re-incurred again. The two main cost components for DLC are the control equipment cost (thermostats and switches), and customer incentives for DR program participation.

- CPP program investment is relatively high during its initial ramp up between 2022 to 2026, and then drops in 2027-2028 when the program is fully ramped up. The program has a life of 10 years and the technology is assumed to have a 20-year life, so program development costs and technology enablement are re-incurred on a 20 and 10 year cycle, respectively. Enabling technology costs for customers that are offered the rate in conjunction with enabling technologies is a major cost component. Other significant costs are marketing and outreach to customers to enroll them in rates.

- The investment for BNI curtailment is tied directly to the potential estimates, as majority of the program costs are rolled into an aggregator payment and represented as a delivery cost in terms of $/kW-yr.

Figure ES-14. DR Annual Program Costs by Option for Cost-Effective DR Options ($)



Source: Navigant Analysis

E. 2.2.2 Scenario Analysis

For the low and high cases, Navigant adjusted assumed participation levels, incentive amounts, marketing spending, and equipment saturation to determine the impacts on the DR achievable potential. The peak demand forecasts also varied by case, as these were tied to the different demand reduction scenario impacts from the energy efficiency potential study. Three different scenarios from the Energy Efficiency Potential Study were considered in the baseline winter peak projections: (1) low, (2) base, and (3) mid. These correspond to the scenarios low, base, and high, respectively, in the DR study. A critical assumption for the high case was the default opt-out participation model for CPP.

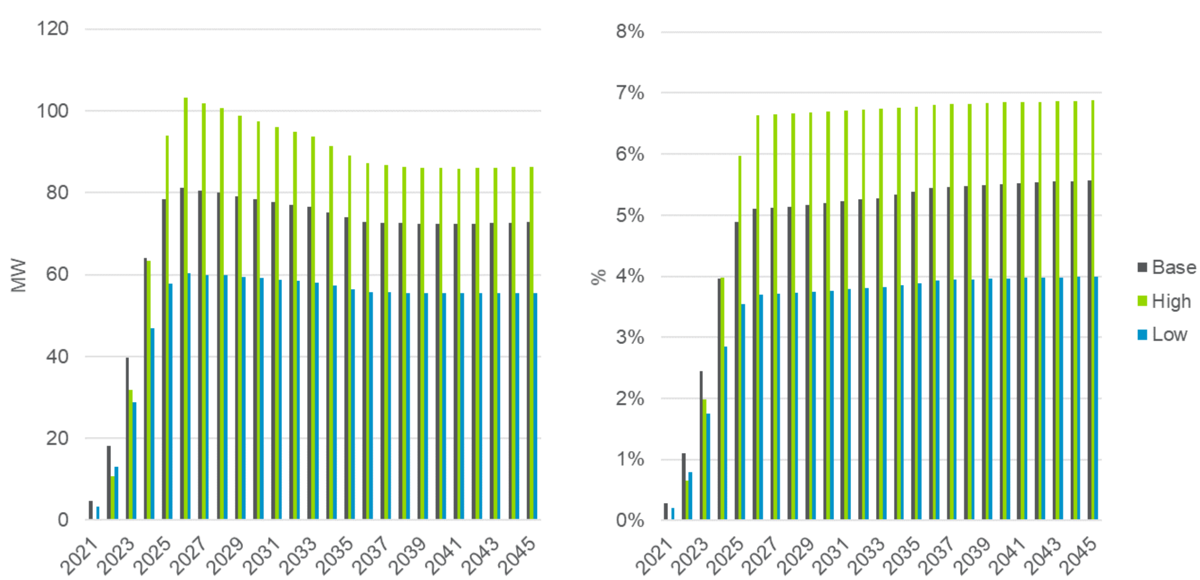
The high participation in the CPP program under the default opt-out model causes the remaining pool of customers available to participate in other DR programs to be relatively small. The fixed costs of the program, such as annual program administration costs and program startup costs, get allocated over a smaller number of customers for DLC and BNI Curtailment, which render these options to be not cost-effective under the high scenario. High scenario costs are only associated with CPP and behavioural DR, so annual program costs are lower in the high scenario than the base scenario, despite greater savings potential, primarily from CPP. The low scenario costs are lower than the base scenario costs due to lower participation levels and lower per participant incentives and marketing costs.

The annual portfolio costs (in nominal dollars) are expected to increase from:

- $3.3 million in 2021 to $21.4 million in 2045 for the base scenario
- $2.7 million in 2022 to $12.0 million in 2045 for the high scenario
- $2.4 million in 2021 to $12.1 million in 2045 for the low scenario

Figure ES-15 shows achievable MW potential and percent of peak load potential reduction by scenario for cost-effective DR options only. The high scenario is 18% greater than the base scenario potential, while the low potential is approximately 24% lower than the base case potential. The 2045 potential under the low, base, and high scenarios represents approximately 4.1%, 5.6%, and 6.9% of NS Power's peak demand in 2045, respectively.

Figure ES-15. DR All Scenarios, Achievable Potential (MW at Meter and Percent of Peak Demand)



Source: Navigant Analysis

1. INTRODUCTION

This section provides an overview of the potential study, including background and study goals, a discussion of the report's organization and key caveats and limitations of the potential study. Navigant's best-in-class modeling tools ensure the rigour, validity and sensibility required of the DSM Potential Study results. Our potential study models have been validated in numerous provinces and U.S. states, and our DSM potential studies and models have been quoted by ACEEE as being "robust and transparent… [and] their methodology for forecasting participation is industry standard best-practice."[6]

As is typical in the development of such studies, Navigant worked collaboratively with EfficiencyOne and stakeholders, through the Demand Side Management Advisory Group (DSMAG) to ensure the study, to the fullest extent, best reflects current Nova Scotia market conditions. Navigant received considerable guidance and feedback from the DSMAG, including EfficiencyOne staff, particularly in the development of global input assumptions and measure characterizations. We also carefully considered, and as appropriate, were responsive to stakeholders' input, incorporating their feedback into the analysis approach.

1.1 Context and Study Goals

Navigant was retained by EfficiencyOne to develop an estimate of the potential for electric energy efficiency and demand response in Nova Scotia during the 2021 to 2045 (25-year) timeframe. Navigant worked with EfficiencyOne and stakeholders to develop information on current levels and patterns of energy use in Nova Scotia, characterize potential measures which could be implemented to increase energy efficiency and demand response through DSM programs in the province, and develop estimates of energy efficiency and demand response potential. The study data and analysis will be used to inform integrated resource planning, and energy efficiency and demand response program design in Nova Scotia. Figure 1-1 summarizes the various elements of the project scope.

Figure 1-1. Summary of Project Scope

Element	Dimensions
Forms of Energy	Electricity
Type of Potential	Energy Efficiency (Energy and Demand) and Demand Response Technical, Economic (EE only), Achievable
Sectors	Residential and Business, Nonprofit and Institutional (BNI)
Climate	Single Weather Zone
Time Horizon	2021- 2045 (25 years)

1.2 Stakeholder Engagement

EfficiencyOne engaged stakeholders beginning in the fall of 2018 to encourage input into the development of the 2019 Electricity Demand Side Management Potential Study. The stakeholder engagement process and level of participation in Nova Scotia was typical of what Navigant has seen in other jurisdictions. Navigant appreciates the thorough review and comments provided by stakeholders, and thanks them for their feedback and participation in the process. Navigant carefully considered all stakeholder input and, as appropriate, incorporated this feedback to inform and enhance the potential study, in terms of meeting study objectives, reflecting the Nova Scotia content, and using the most up to date Nova Scotia data. Stakeholder engagement throughout the study included the following:

[6] ACEEE study titled "Cracking the TEAPOT: Technical, Economic, and Achievable Energy Efficiency Potential Studies," August 2014.

- Baseline Study and Pre-Modelling Scenarios' Assumptions WebEx Presentation held May 28, 2019
- 2019 Potential Study Technical Conference held July 16, 2019
- Three formal stakeholder review and comment periods:
    - On March 22, 2019, EfficiencyOne shared draft Potential Study Assumptions and Modelling Plan with the DSMAG, and invited written comments from stakeholder until April 5, 2019
    - On May 27, 2019, EfficiencyOne shared a draft Baseline Study Report with the DSMAG, and invited written comments from stakeholder until June 7, 2019
    - On July 15, 2019, EfficiencyOne shared a draft Potential Study Report with the DSMAG. and invited written comments from stakeholder until July 26, 2019

1.3 Caveats and Limitations

There are several caveats and limitations associated with the results of this study, as detailed below.

1.3.1 Program Design

The results of this study provide the savings potential in Nova Scotia. However, this potential study is not intended to provide, nor does it have information on, detailed program designs. Different program designs and delivery mechanisms would inevitably result in different levels of adoption of efficient technologies, which means the output of this study is an estimate of what could be achieved under the specific set of assumptions outlined in this study. Program design is typically a separate activity and is outside the scope of this study.

1.3.2 Measure Characterization

The scope of this study employed both primary data collection techniques and a variety of secondary data sources for estimates of measure savings, costs and market presence (e.g., saturations and densities). Primary data, specific to Nova Scotia was used wherever possible. Where Nova Scotia-specific data was not available, the best available data was used. This situation and approach did not limit our ability to achieve the study objectives and is consistent with the previous electricity potential study for Nova Scotia and Navigant's experience in other jurisdictions.

Furthermore, the team considers the measure list used in this study to appropriately focus on those technologies likely to have the highest impact on savings potential over the study horizon. However, there is always the possibility unidentified emerging technologies may arise that could increase savings opportunities over the forecast horizon, and broader societal changes may affect levels of energy use in ways not anticipated in the study. Similarly, this study does not make assumptions about future code and standard changes beyond those already planned for the study period.

Potential studies must make assumptions about the adoption of technologies and options that inevitably come with a degree of uncertainty. While techniques such as use of payback acceptance curves and technology diffusion models are considered to provide reasonable aggregate estimates of savings potential, such techniques (which must be applied to dozens or in some cases hundreds of energy efficiency measures) are limited in their ability to accurately predict adoption for specific measures or in specific customer segments.

For energy efficiency, model calibration steps (e.g., comparing forecast results with past achieved results) seek to ground the forecasts in the real world, but inaccuracies are bound to exist the further one drills into a technology or segment—even if the aggregate results are considered to be reasonable. One reason that aggregate results can in many cases be more reliable than individual technology or segment results is that forecasting inaccuracies, at the measure-level will exhibit a pooling effect when aggregated up to the portfolio (whereby positive or negative differences at a finer level of aggregation can help to offset each other in an aggregate result). While more in-depth technology adoption techniques do exist (e.g., discrete choice analysis) to improve the forecast accuracy for any given technology, application of these techniques to the quantity of measures analyzed in studies such as this are not typically warranted considering the dramatic increase in costs one would have to incur to calibrate a different adoption model for every single measure.

1.4 Interpreting Results

This report includes a high-level account of savings potential results across Nova Scotia and focuses largely on aggregated forms of savings potential. Energy efficiency potentials are estimated at the finest level of granularity, which is at the measure-level within each customer segment. The measure-level data is mapped to the various customer segments and end-use categories to permit a reviewer to easily create custom aggregations. Measure level results are available in the study appendices as noted below. Demand response potentials are estimated using a bottom-up analysis, with primary data from NS Power and relevant secondary sources of information, as documented in the study appendices (noted below).

1.5 Report Organization

The report is organized as follows:

Section 2 – provides an overview of **Global Data** developed and used in the study.

Section 3 – discusses the **Energy Efficiency Measure Characterization**, including key parameters.

Section 4 – presents the **Energy Efficiency Technical Potential Forecast** for energy efficiency measures, including a summary of results by sector and end use**.**

Section 5 – provides the **Energy Efficiency Economic Potential Results** for energy efficiency measures, including a summary of results by sector and end use**.**

Section 6 – presents the **Energy Efficiency Market Potential Approaches**, including discussion of equilibrium market share, behavioural measures, investment and incentive strategy, re-participation, and model calibration.

Section 7 – discusses the **Reference Forecast Approach** and scenario configuration.

Section 8 – presents the **Energy Efficiency Market Potential Approach by Scenario** for energy efficiency measures, including a summary of results by sector, end use, customer segment, and measure, as well as cost-effectiveness tests and investment.

Section 9 – provides the **Energy Efficiency Market Potential Sensitivity Analysis Results** by differing key assumptions.

Section 10 – presents the **Demand Response Methodology,** including market characterization, baseline projections, characterization of options, and key assumptions.

Section 11 – provides the **Demand Response Potential and Cost-Effectiveness Results** for the technical and achievable potentials, investment levels, scenario analysis, and discusses snapback effects. Achievable potential results are presented for DR options, sub-options, customer class, and building type for cost-effective DR options.

Section 12 – presents the **Conclusion** of the study.

The report also includes the following eleven Appendices:

- Appendix A. Modelling Plan
- Appendix B. Residential Sector and BNI Sector Baseline Study
    - Appendix B-1. Electricity Usage Online Survey Instrument - Residential & Site Visit Follow-up
    - Appendix B-2. Electricity Usage Online Survey Instrument - Commercial
    - Appendix B-3. Electricity Usage Tables - Residential - Self Reported
    - Appendix B-4. Electricity Usage Tables - Commercial - Self Reported
- Appendix C. Demand Response Model Inputs
- Appendix D. Demand Response Model Outputs
- Appendix E. Energy Efficiency Model Inputs
- Appendix F. Energy Efficiency Model Outputs
- Appendix G. EE Base Case Achievable 8760 Loadshape Disaggregation

2. GLOBAL DATA

Navigant aggregated multiple data sources to simulate many elements of the market conditions in Nova Scotia that help to define the potential for energy saving technologies modelled in this study. These inputs include energy and demand forecasts, residential household counts, business and industrial building stock, heating and hot water fuel splits, and end use energy allocations. Together, these are referred to as the "global" data because they help to define the context of the modeled savings potential, and the scope of potential adoption. To develop these inputs, Navigant used data sources from the Nova Scotia Baseline Study (see Appendix B), EfficiencyOne, Nova Scotia Power, Statistics Canada, Natural Resources Canada, the U.S. Department of Energy's Energy Information Agency (EIA), and others.

Where possible, Navigant prioritized primary data, or data specific to Nova Scotia including:

- Historical consumption and demand data
- Residential accounts data
- Residential (2019) and BNI (2019) end use (Baseline Study) surveys, and site visits (see Appendix B)
- ENS program evaluation reports
- NS Power end use intensity-based forecasts (Load Forecast Models)
- Previous Nova Scotia DSM potential studies

Where Nova Scotia-specific information was not available, Navigant utilized secondary data, including internal Navigant data sources. Navigant's review of these resources was generally used to support the data sources provided by EfficiencyOne and to ensure consistency among EfficiencyOne data, Navigant's estimates, and publicly-available resources. In order to develop the final estimates of energy consumption, Navigant compared and calibrated estimates with actual sales data obtained from Nova Scotia Power's End Use Intensity Models.

2.1 Segmentation of Customer Sectors

Navigant developed electricity consumption, demand, floorspace, customer counts, fuel splits, and end use allocations by sector, and customer segment where possible. Where data was not available to estimate these splits, Navigant aggregated to the sector level. Navigant worked with EfficiencyOne and the DSM Advisory Group to determine an appropriate level of segmentation for each sector.

The segmentation also reflects Navigant's modeling approach for representing efficiency measures within the DSMSim™ model. DSMSim™ models energy efficiency measures at the segment level, and tracks building and equipment stocks for each segment within Nova Scotia. Differences in fuel choices (i.e., space and water heating market shares), types of equipment used (i.e., use of a furnace or boiler for space heating), and equipment and system efficiency levels are all represented within the model for each segment, as required and as permitted by data availability.

Figure 2-1 shows the segmentation used for the residential and BNI sectors, with additional detail provided for each sector in the following sections.

Figure 2-1. Customer Segments by Sector

Residential	BNI
Mi'kmaw Households	Small Commercial
Single Family Market Rate	Large Commercial
Single Family Low Income	Institutional
Multifamily Market Rate	Industrial
Multifamily Low Income	

Source: Navigant

2.1.1 Residential Sector

Navigant divided residential customers into five segments based on the type of residential building occupied, as shown in Figure 2-2.

Figure 2-2. Description of Residential Segments

Segment	Description
Mi'kmaw	Mi'kmaw Households, blended building type
Single-Family Market Rate	Detached, attached, row and/or townhouses, less than four units
Single-Family Low Income	Detached, attached, row and/or townhouses, less than four units
Multifamily Market Rate	Apartments, attached housing, four or more units
Multifamily Low Income	Apartments, attached housing, four or more units

Source: Navigant

Navigant developed the breakdown of the residential sector into dwelling types based on Nova Scotia customer and StatsCan data. Figure 2-3 shows the stock (residential households) estimates by housing type and Appendix A describes the methodology used to develop this data. Individually-metered multifamily building units are included in the residential sector for purposes of this study, while master-metered multifamily buildings are included in the BNI stock.

Figure 2-3. Base Year Housing Stocks (Residential units)

Housing Type	Dwellings
Mi'kmaw	11,260
Single Family Market Rate	364,233
Single Family Low Income	16,252
Multifamily Market Rate	40,470
Multifamily Low Income	48,756
Total	480,971

Source: Navigant analysis based on Nova Scotia and StatsCan data

2.1.2 BNI Sector

Navigant divided the BNI sector into four segments. Figure 2-4 provides a list and description for the BNI segments.

Figure 2-4. Description of BNI Segments

Segment	Description
Small Commercial	BNI customer segments were designed to align with 2018 NS Power Data (sales) and EfficiencyOne's Rate and Bill Impact Analysis (customer counts) reports, and reflect blended averages based on rate-code / size bins.
Large Commercial	
Institutional	
Industrial	

Source: Navigant

Navigant selected the BNI segments with the goal that the building types within those segments be reasonably similar in terms of electricity use, operating and mechanical systems, and annual operating hours. This approach allowed for consistency in building characteristics within each segment as required by the measure characterization and modeling processes. These segments were mapped to usage and demand data by rate classes and building type descriptions provided by EfficiencyOne, allowing for the customer segment level disaggregation in this study.

Navigant used household counts for residential, and floorspace for BNI as the stock bases to scale customer adoption. In order to best forecast floorspace for BNI, Navigant applied end-use intensities derived from Nova Scotia Power's 2018 End Use Intensity Model to the load forecast before DSM. Residential household counts were estimated directly from account forecast data, assuming one household per account on average. Figure 2-5 summarizes the resulting floor space estimates developed for each BNI segment for the study's base year, 2019.

Figure 2-5. Base Year BNI Area (million m^2)

Segment	Floor Area (million m^2)	Floor Area (%)
Small Commercial	6.07	13%
Large Commercial	24.53	53%
Institutional	2.84	6%
Industrial	13.16	28%
Total	**46.60**	**100%**

Source: Navigant analysis

2.2 End Use Definitions

The next step in the base year calibration analysis involved the establishment of specific end uses for each customer sector. This potential study defines end uses as a specific activity or customer need that requires energy, such as space heating or domestic water heating, without specifying the particular type of equipment used to satisfy that need.

Figure 2-6 presents the list of end uses by sector used in the potential study. These end use categories are used primarily for the binning of potential estimates, and for quality control steps to check the range of savings forecasts against the estimated end use consumption.

Figure 2-6. End Uses by Sector

Residential	BNI
Lighting	Lighting
HVAC	HVAC
Domestic Hot Water	Refrigeration
Refrigeration	Cooking & Laundry
Other	Domestic Hot Water
	Process
	Energy Management
	Electronics & IT
	Other

Source: Navigant

2.3 Fuel Shares

Navigant developed fuel share and equipment data for each end use based on the segmentations defined in the previous sections, using the 2019 Nova Scotia Baseline Study results for space heating, and domestic hot water heating. These shares are available in Appendix B.

2.4 End Use Allocations

End use allocations describe the share of baseline energy consumed by a given customer application, such as lighting, refrigeration, of HVAC. Navigant used Nova Scotia Power's 2018 End Use Intensity Model (associated with the 2018 Load Forecast), which calibrates provincial and regional end use allocations to Nova Scotia-specific load characteristics. Navigant mapped NS Power building types and end uses to the customer segments and end uses defined in this study, and used the 2019 estimates as the basis for the baseline end use consumption. End use allocations are used in this study to aggregate results to more digestible categories, and for quality control of intermediate outputs.

2.5 Electricity Consumption

EfficiencyOne provided Navigant with information on actual sales and customer numbers for Nova Scotia for 2018 through the 2018 Emera Management Discussion & Analysis (MD&A) report. These consumption data were then disaggregated to the customer segment level using customer class and rate segmentations in the 2018 RBIA. Finally, for the energy efficiency modeling portion of the study, these values were calibrated to the 2018 Nova Scotia Power load forecast (before DSM). Figure 2-7 shows the estimated total electricity consumption by sector in 2019 before DSM.

As stated previously, Navigant included individually-metered multifamily housing types in the residential sector and master-metered multifamily housing types in the BNI sector development of stocks and sales forecasts.

Figure 2-7. Nova Scotia Electric Electricity Consumption in 2019 (GWh at meter)

Segment	GWh Consumption
Residential	4,950
BNI	6,209
Total	11,159

Source: Navigant analysis

3. ENERGY EFFICIENCY MEASURE CHARACTERIZATION

Navigant and EfficiencyOne fully characterized 183 measures across Nova Scotia's residential and BNI sectors. Navigant prioritized measures with high impact, data availability, inclusion in EfficiencyOne's most recent DSM Plan and those most likely to be cost-effective as criteria for inclusion into DSMSim™.

3.1 Energy Efficiency Measure List

Navigant and EfficiencyOne developed a comprehensive measure list of energy efficiency measures likely to contribute to economic potential. Navigant reviewed current ENS program offerings, EfficiencyOne's 2020-2022 DSM Plan, the 2018 potential study update, and potential model measure lists from other jurisdictions to identify energy efficiency measures with the highest expected economic impact. Navigant worked with EfficiencyOne to finalize the measure list and ensure it contained technologies viable for future DSM program planning activities. Navigant did not include a generic future emerging technologies measure that would attempt to capture potential savings from technologies not currently ready for the market. All measures included are currently available in the market and economically viable.

3.2 Energy Efficiency Measure Characterization Key Parameters

The measure characterization effort consisted of defining more than 50 individual parameters for each of the 183 measures included in this study. This section defines 10 key parameters and how these impact technical and economic potential savings estimates.

1. **Measure Definition**: The team used the following variables to qualitatively define each characterized measure:
   - ***Replacement Type****:* Replacing the baseline technology with the efficient technology can occur in three variations:
     i. **Retrofit (RET):** where the model considers the baseline to be the existing equipment, and uses the energy and demand savings between the existing equipment and the efficient technology during technical potential calculations. RET also applies the full installed cost of the efficient equipment during the economic screening. For early retirement measures, the full cost will be reduced by the calculated deferred replacement credit.
     ii. **Replace On Burnout (ROB):** where the model considers the baseline to be the code-compliant technology option, and uses the energy and demand savings between the current code option and the efficient technology during technical potential calculations. ROB also applies the incremental cost between the efficient and code-compliant equipment during the economic screening.
     iii. **New Construction (NEW):** where the model considers the baseline to be the least cost, code-compliant option, and uses the energy and demand savings between this specific current code option and the efficient technology during technical potential calculations. NEW also applies the incremental cost between the efficient and code-compliant equipment during the economic screening.
   - ***Baseline Definition***: Describes the baseline technology.
   - ***EE Definition***: Describes the efficient technology set to replace the baseline technology.
   - ***Unit Basis***: The normalizing unit for energy, demand, cost, and density estimates.

2. **Sector, and End Use Mapping:** The team mapped each measure to the appropriate end uses, customer segments and sectors. Where Nova Scotia-specific information was not available, Navigant utilized secondary data, including internal Navigant data sources. Navigant's review of these resources was generally used to support the data sources provided by EfficiencyOne and to ensure consistency among EfficiencyOne data, Navigant's estimates, and publicly-available resources. In order to develop the final estimates of energy consumption, Navigant compared and calibrated estimates with actual sales data obtained from Nova Scotia Power's End Use Intensity Models. Section 1.1 describes the breakdown of customer segments with each sector.
3. **Annual Energy Consumption:** The annual energy consumption in kilowatt-hours (kWh) for each of the base and energy-efficient technologies
4. **Coincident Electric Demand**: The peak coincident demand in kilowatts (kW) for each of the base and energy-efficient technologies
5. **Fuel Type Applicability Multipliers**: Assigns the percentage of electric fuel type to measures with electric fuel type such as water heaters and space heating equipment
6. **Measure Lifetime:** The lifetime in years for the base and energy-efficient technologies. The Base and EE measure lifetime only differ in instances where the two cases represent inherently different technologies, such as light-emitting diodes (LEDs) or compact fluorescent lamp (CFL) bulbs compared to a baseline incandescent bulb.
7. **Incremental Costs:** The incremental cost between the assumed baseline and efficient technology, using the following variables:
    - ***Base Costs***: The cost of the base equipment, including both material and labor costs. This is zero for retrofit measures.
    - ***EE Costs:*** The cost of the energy-efficient equipment, including both material and labor costs.
8. **Technology Densities**: This study defines "density" as the number of units of the baseline and efficient technologies. For residential, these densities are on a per home basis, and for BNI these are per 1,000 square meters of building space.[7]
    - ***Base Initial Saturation***: The saturation of the baseline equipment as a percent of total equipment in a territory for a given customer segment
    - ***EE Initial Saturation:*** The saturation of the efficient equipment as a percent of total equipment in a territory for a given customer segment
    - ***Total Maximum Density***: The total number of both the baseline and efficient units in a territory for a given technology
9. **Technology Applicability:** The percentage of the base technology that can be reasonably and practically replaced with the specified efficient technology. For instance, occupancy sensors may only be practical for certain interior lighting fixtures (an applicability less than 1.0), while all existing incandescent exit signs can be replaced with efficient LED signs (an applicability of 1.0).
10. **Competition Group**: The team combined efficient measures competing for the same baseline technology density into a single competition group to avoid the double-counting of savings. (Appendix A provides further explanation on competition groups).

[7] See the accompanying model input workbook for density and saturation sources.

3.3 Energy Efficiency Measure Characterization Approaches and Sources

This section provides approaches and sources for the main measure characterization variables.

3.3.1 Energy and Demand Savings

Navigant took three general bottom-up approaches to analyzing residential and BNI measure energy and demand savings:

1. **Program Evaluation Data:** For most measures, Navigant used measure-specific program evaluation data from EfficiencyOne to inform energy savings.
2. **Technical Reference Manual (TRM) Standard Algorithms:** Navigant used TRM standard algorithms for unit energy savings and demand savings calculations for certain measures not included in ENS current or historical programs.
3. **Technical Reference Manual (TRM) Standard Algorithms:** Navigant used TRM standard algorithms for unit energy savings and demand savings calculations for certain measures not included in ENS current or historical programs.
4. **Engineering Analysis:** Navigant used appropriate engineering algorithms to calculate energy savings for any measures not included in ENS programs or available TRMs.

3.3.2 Incremental Costs

Navigant relied primarily on EfficiencyOne-provided program data and TRM data for incremental cost data. Navigant conducted secondary research and used a variety of other publicly-available cost data sources indicated in the accompanying measure input detail.

3.3.3 Building Stock and Densities

Navigant relied heavily on the 2019 Nova Scotia Baseline Study (see Appendix B) for information on equipment densities and saturations. Density and saturation inputs for between 70-80% of savings (depending on impact and potential type) were sourced from this study. For lower impact measures, measures not well suited for baseline research, and measures characterized directly through program offerings (e.g. custom, strategic energy management, and behavioural), EfficiencyOne historic program results and other secondary sources were used. These sources are indicated in the accompanying EE measure input detail (see Appendix E).

3.4 Codes and Standards Adjustments

Estimates of future adjustments in savings related to codes and standards are included as part of the measure characterization process.[8] To develop these estimates, Navigant worked with EfficiencyOne to characterize high-impact anticipated codes and standards, based on Canada's Forward Regulatory Plan 2019-2021 (in reference to *Canada's Energy Efficiency Regulations).* This forward regulatory plan consists of planned Amendments 15-16, as well as yet-formalized future planned Amendments. Building code impacts are based on publicly-available information regarding Canada's future goals with respect to building code evolution and adoption.

[8] See the accompanying EE measure input workbook (Appendix E) for codes and standards adjustments.

4. ENERGY EFFICIENCY TECHNICAL POTENTIAL FORECAST

This section briefly describes Navigant's approach to calculating technical potential and presents the results for Nova Scotia pertaining to total technical savings potential at different levels of aggregation. Results are shown by sector, end use category and highest-impact measures.

4.1 Approach to Estimating Energy Efficiency Technical Potential

This study defines **technical potential** as the total energy savings available assuming that all applicable installed baseline measures can *immediately* be replaced with the "efficient" measure/technology—wherever technically feasible—regardless of the cost, market acceptance, or whether a measure has failed and must be replaced.

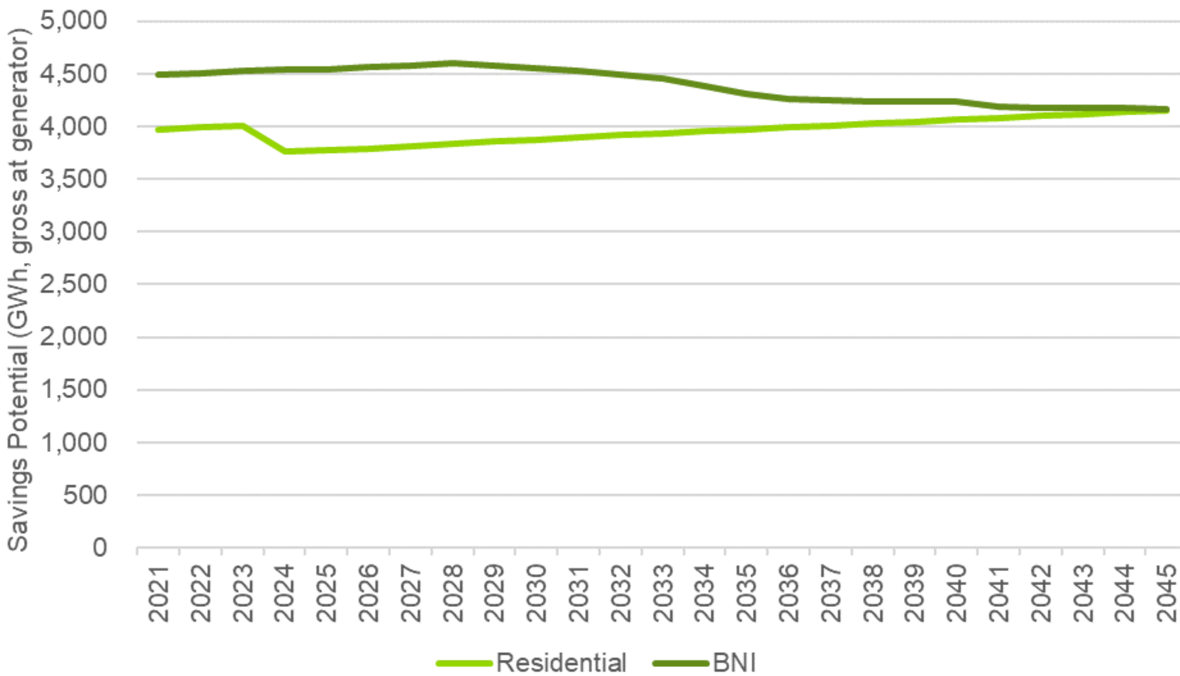
The *Modelling Plan for Nova Scotia Energy Efficiency and Demand Response Potential Studies* (see Appendix A) discusses the approach to estimating technical potential in more detail. Navigant used its DSMSim™ model to estimate the technical potential for demand-side resources considered for this study. DSMSim™ is a bottom-up technology-diffusion and stock-tracking model implemented using a System Dynamics framework.[9]

[9] See Sterman, John D. *Business Dynamics: Systems Thinking and Modeling for a Complex World*. Irwin McGraw-Hill. 2000 for detail on System Dynamics modelling. Also see http://en.wikipedia.org/wiki/System_dynamics for a high-level overview.

4.2 Energy Efficiency Technical Potential Results by Sector

Figure 4-1 shows the total electricity technical savings potential, gross at generator, for each sector. The BNI sector technical electricity savings is relatively flat, decreasing slightly near the end of the forecast horizon, reflecting moderately shrinking stocks in line with electric load. The residential sector savings potential ranges from about 3,760 to 4,150 GWh, with savings increasing with the slowly growing customer base over time. The BNI sector savings potential ranges from about 4,165 to 4,600 GWh, with savings increasing slightly and then decreasing over time.

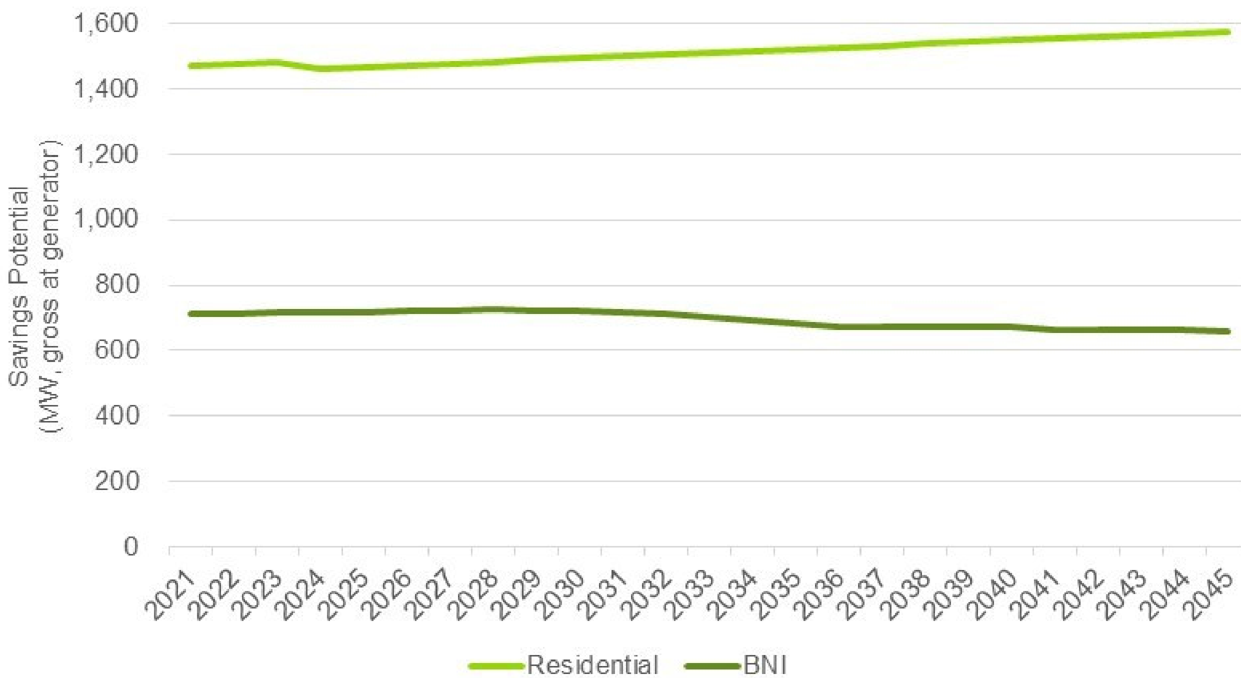
Figure 4-1. EE Technical Potential, Electricity Savings by Sector (GWh, gross at generator)



Source: Navigant analysis

Figure 4-2 shows the winter peak demand technical savings potential, gross at generator, for each sector. The BNI sector winter peak savings ranges between about 660 to 730 MW annually. The residential sector winter peak savings ranges from about 1,460 to 1,570 MW, reflecting the higher overall peak winter load for residential relative to BNI.

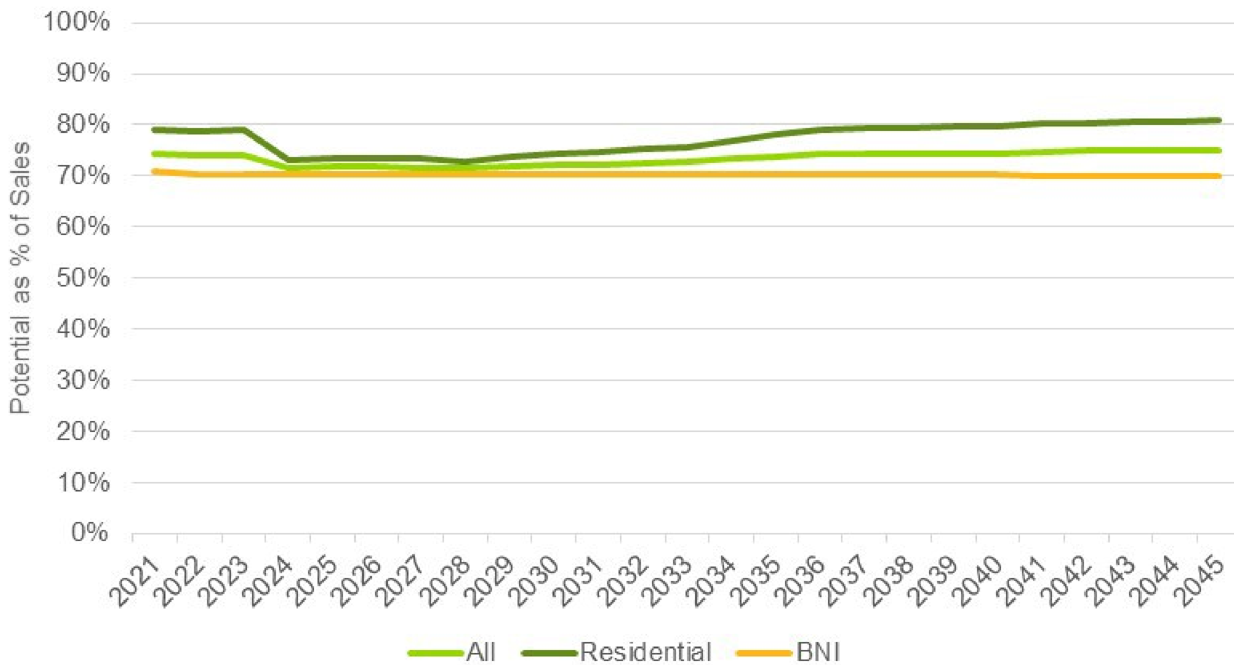
Figure 4-2. EE Technical Potential, Winter Peak Demand Savings by Sector (MW, gross at generator)



Source: Navigant analysis

Figure 4-3 shows the electricity technical savings potential for each sector as a percentage of that sector's total forecasted consumption. BNI sector and residential sector technical savings potential as a percent of consumption ranges between 70% to 81% annually. These technical potential savings are due in part to fuel-switching measures, allowing a very large portion of HVAC load to be technically removed.

Figure 4-3. EE Technical Potential, Electricity Savings by Sector as a Percent of Sector Sales (%)

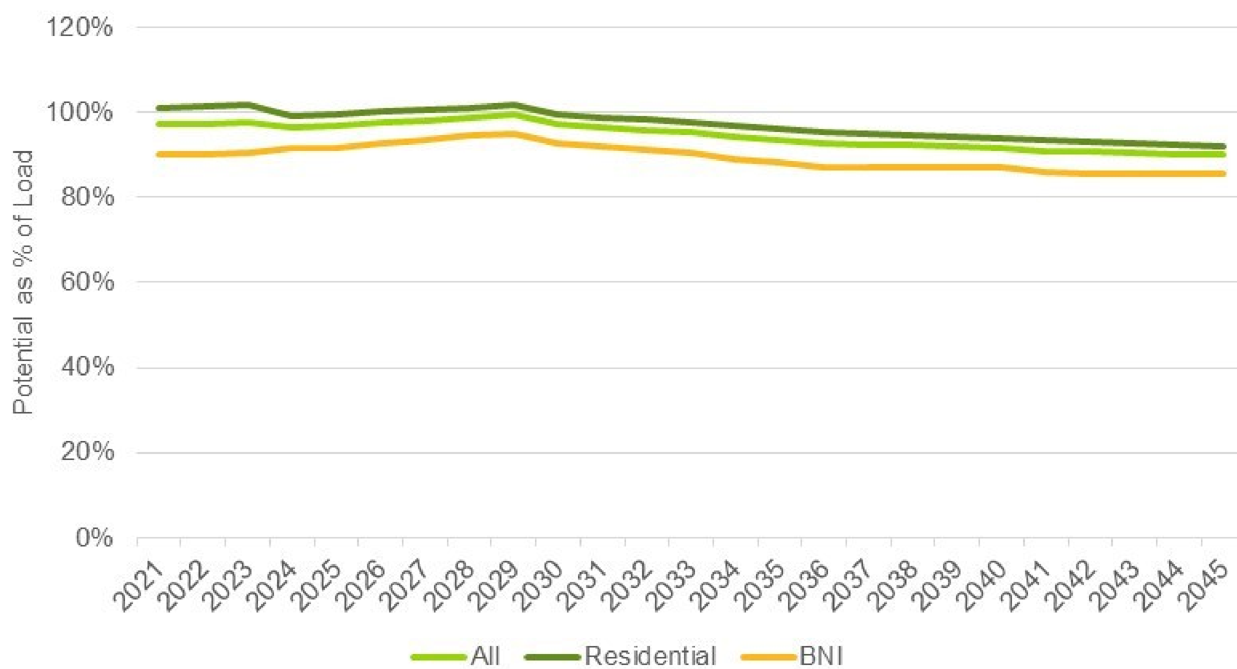


Source: Navigant analysis

Figure 4-4 shows the winter peak demand technical savings potential for each sector as a percentage of that sector's total forecasted electric load. BNI sector and residential sector technical savings potential as a percent of electric load range from 78% to 99% annually. Similar to the electricity savings as a percent of sales above, this is in a large part due to fuel switching potential in HVAC.

The demand percent of sales values presented in this report are higher than expected due to differing line loss factors in this study and the forecasted Nova Scotia Power system requirement document. The system requirement document, from which the total at generator demand forecast is sourced, indicates a 6.7% average line loss when calculating generation requirements. Line losses for the residential sector used in the at generator potential estimates are 14.7%. The potential study used these higher line loss factors from the 2014 COSS in response to stakeholder feedback to the modelling assumptions, and because it reflects the most recent data available.

Figure 4-4. EE Technical Potential, Winter Peak Demand Savings by Sector as a Percent of Sector Load (%)

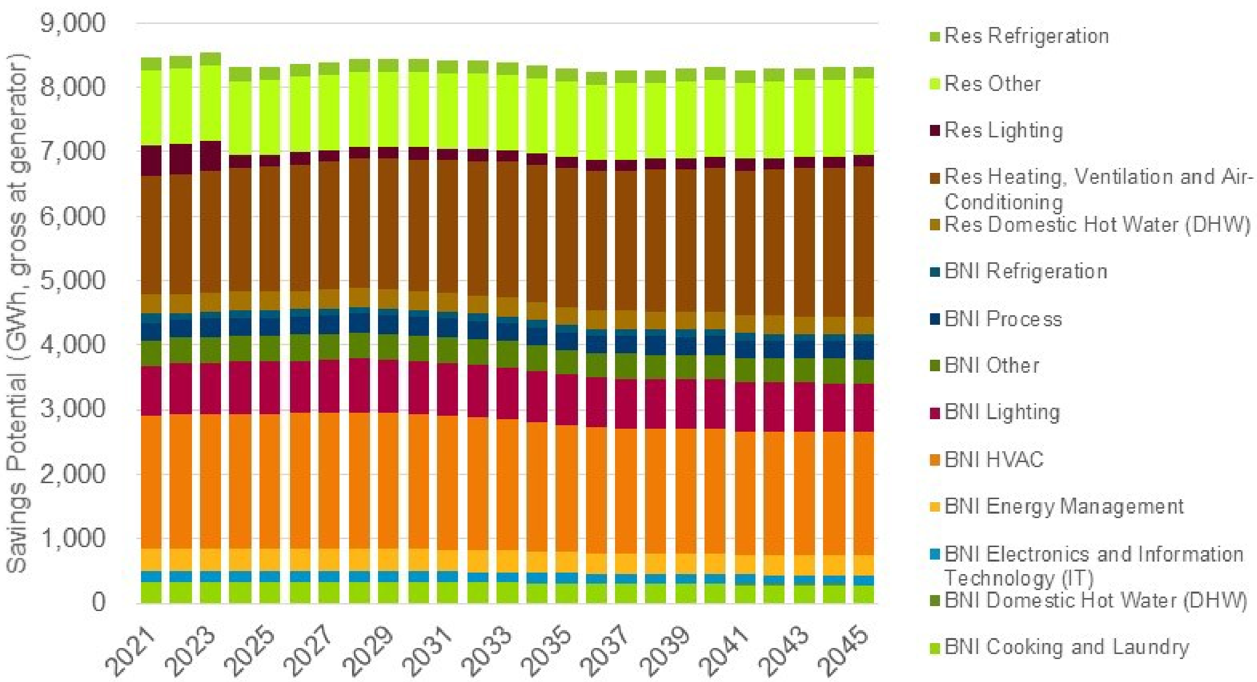


Source: Navigant analysis

4.3 Energy Efficiency Technical Potential Results by End Use

Figure 4-5 shows the electricity technical savings potential, gross at generator, across all end uses and sectors. The technical potential reflects the large role of electric space heating in Nova Scotia relative to other end uses across both sectors, and the relatively small role of lighting, especially after accounting for expected codes and standards around general service (i.e., screw-in) lamps.

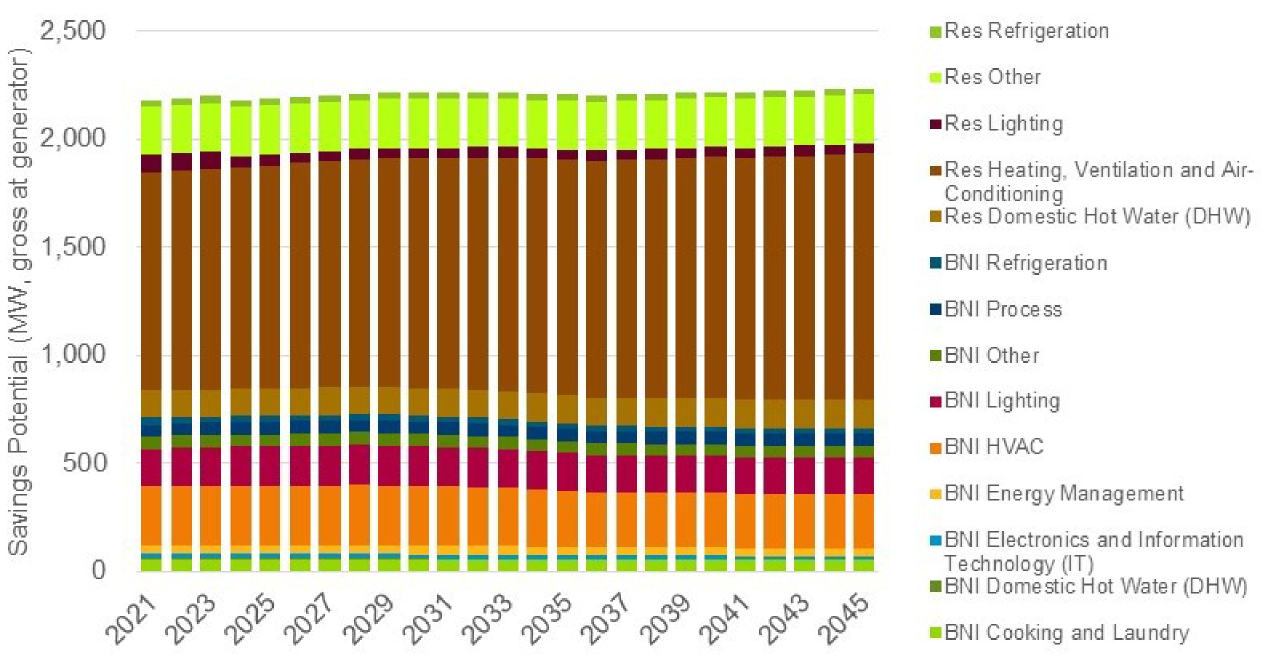
Figure 4-5. EE Technical Potential, Electricity Savings by End Use (GWh, gross at generator)



Source: Navigant analysis

Figure 4-6 shows the winter peak demand technical savings potential, gross at generator, across all end uses and sectors. The dominant end use is residential lighting, followed by BNI lighting. The dominant end use for savings potential again is HVAC, demonstrating the even larger role that electric space heating plays in demand savings potential relative to energy savings potential in Nova Scotia. This is true across end-uses, and represents more than 75% of the total potential for demand reduction through energy efficiency.

Figure 4-6. EE Technical Potential, Winter Peak Demand Savings by End Use (MW, gross at generator)

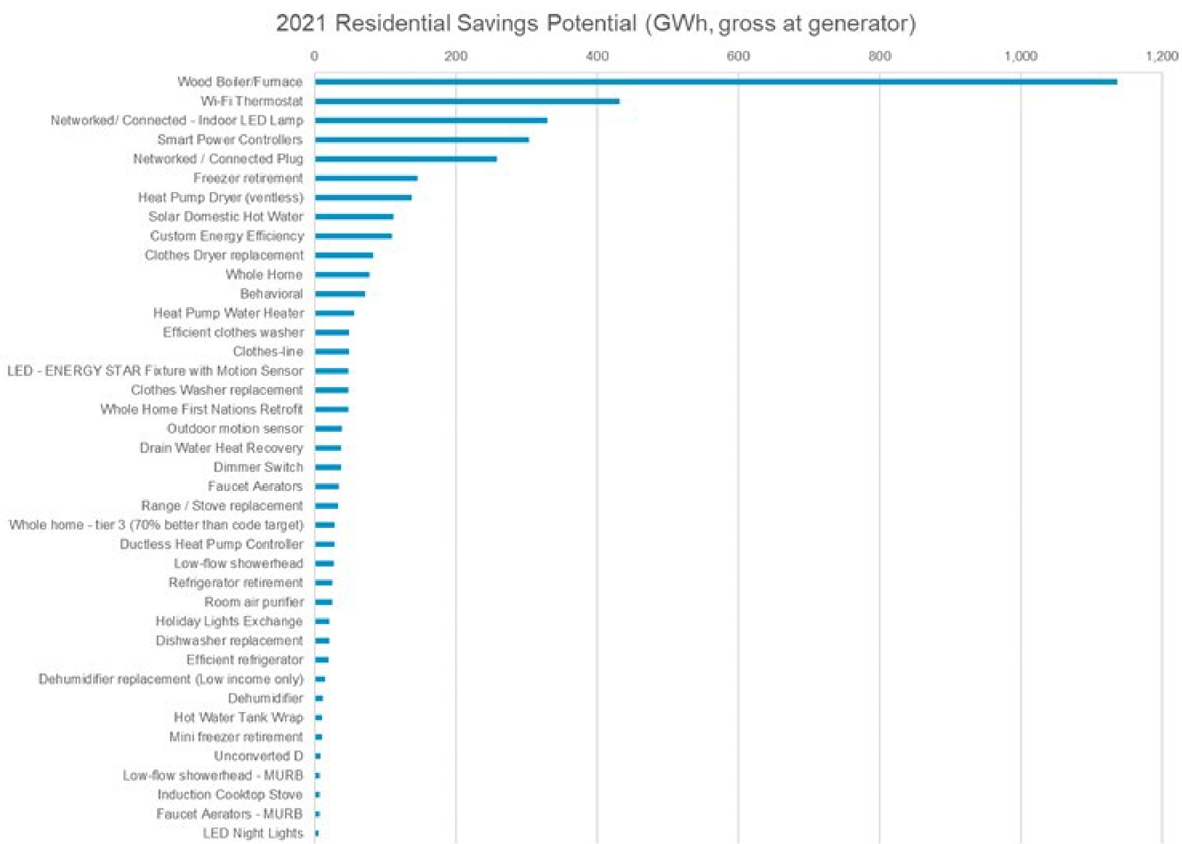


Source: Navigant analysis

4.4 Energy Efficiency Technical Potential Results by Measure

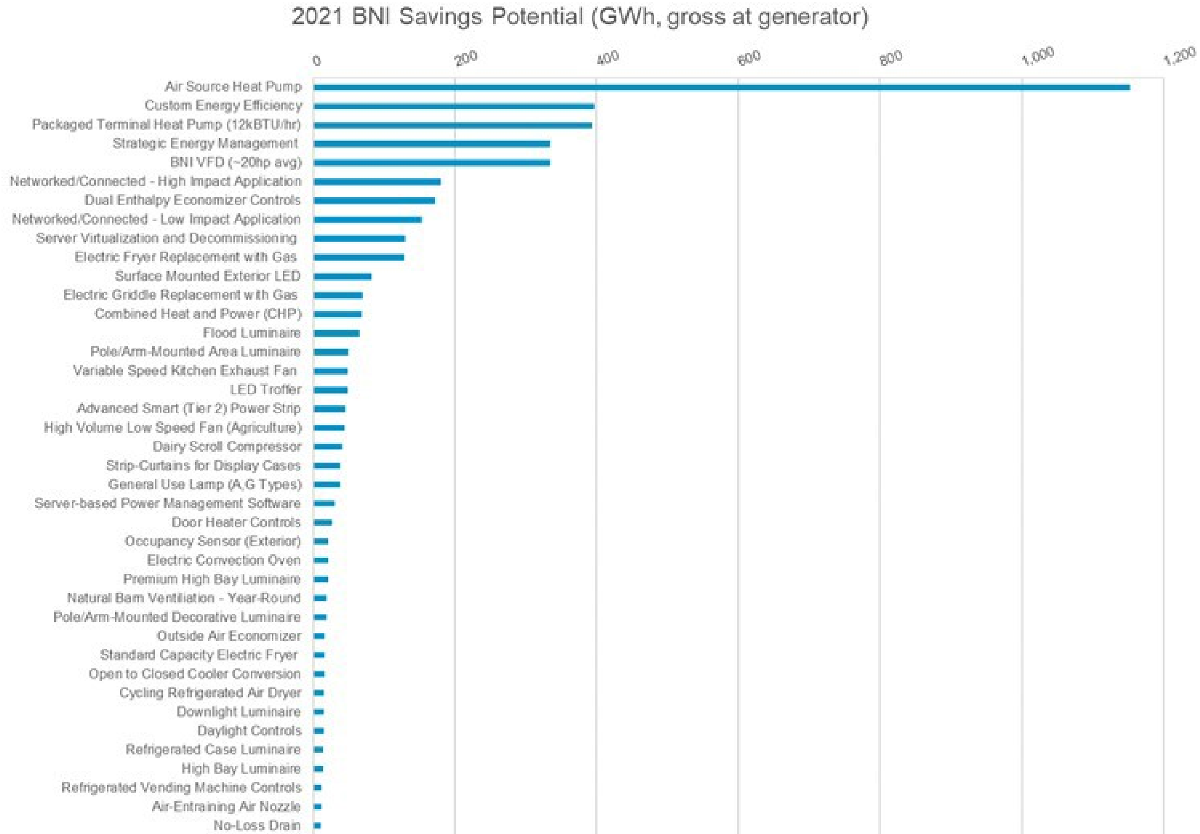
Figure 4-7 and Figure 4-8 present the top forty measures ranked by their electricity technical savings potential for residential and BNI, gross at generator, in 2021. The measure-level demand savings potential shown is after adjustments made to competition groups, meaning that the measures shown in this section are the measures with the greatest savings potential for their respective competition group. As an example, the measure with the most technical potential in residential heating is the Wood Boiler/Furnace – out competing heat pumps and pellet stoves.

Figure 4-7. EE Technical Potential, 2021 Top 40 Residential Measures for Electricity Savings (GWh, gross at generator)



Source: Navigant analysis

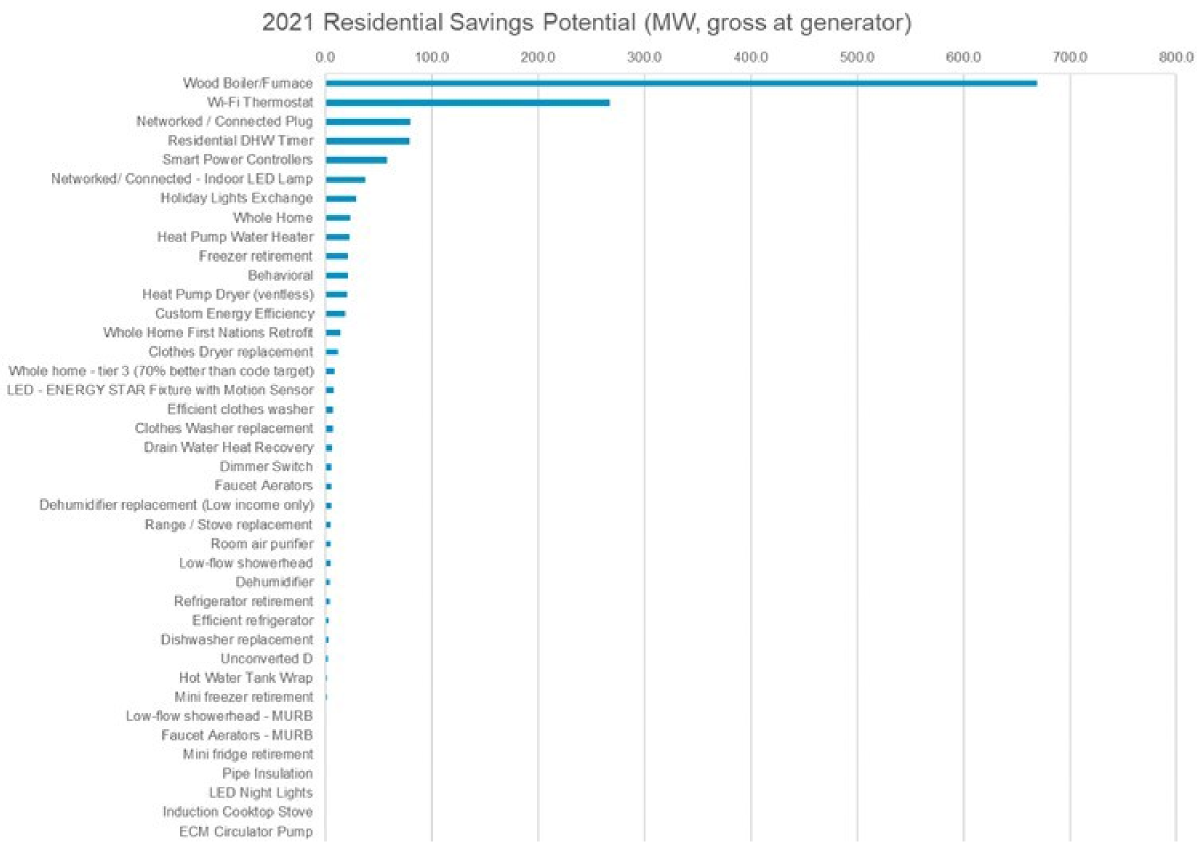
Figure 4-8. EE Technical Potential, 2021 Top 40 BNI Measures for Electricity Savings (GWh, gross at generator)



Source: Navigant analysis

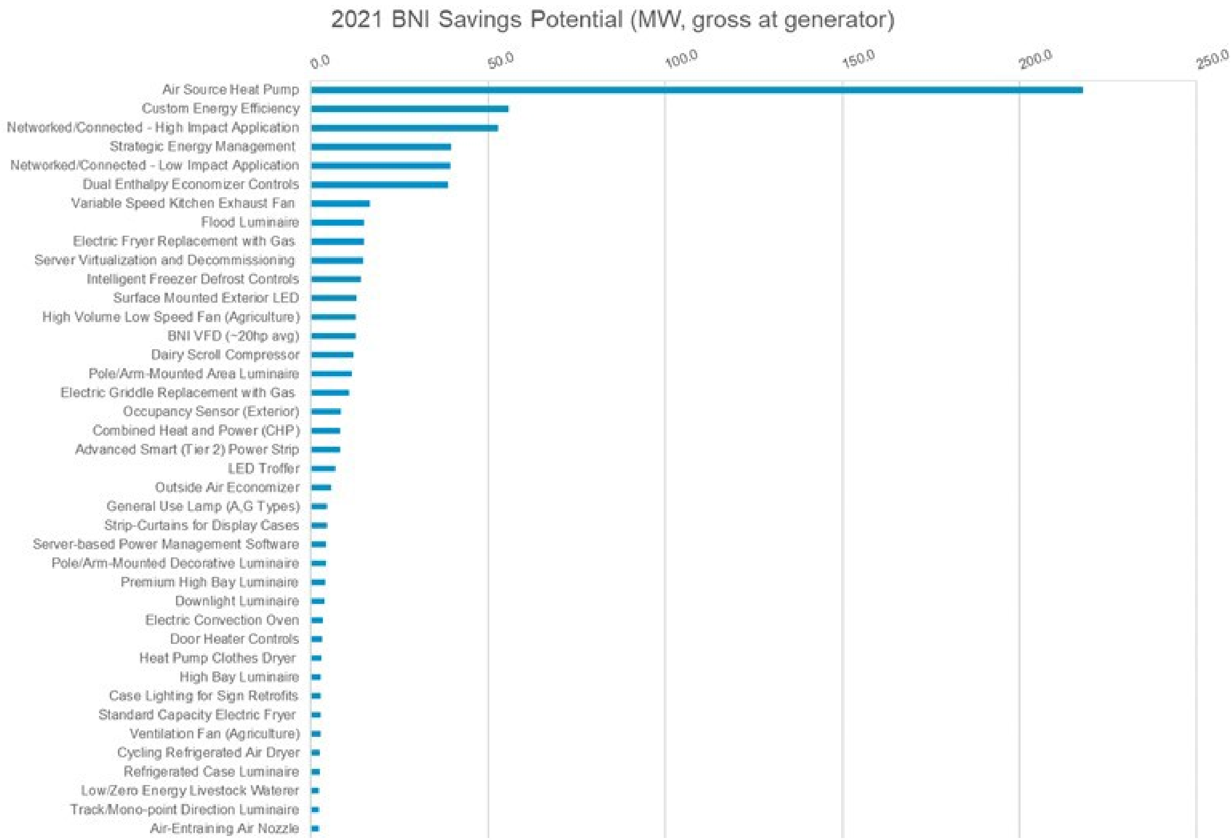
Figure 4-9 and Figure 4-10 present the top forty measures ranked by their winter peak demand technical savings potential for residential and BNI, gross at generator, in 2021. Because of the importance of HVAC, and the fact that these graphs show technical potential after competition, the savings decay down the curve is dramatic. This means that a few measures, such as Wi-Fi Thermostats, Wood Furnaces, and Air Source heat pumps represent the majority of the technical demand reduction potential for each sector.

Figure 4-9. EE Technical Potential, 2021 Top 40 Residential Measures for Winter Peak Demand Savings (MW, gross at generator)



Source: Navigant analysis

Figure 4-10. EE Technical Potential, 2021 Top 40 BNI Measures for Winter Peak Demand Savings (MW, gross at generator)



Source: Navigant analysis

5. ENERGY EFFICIENCY ECONOMIC POTENTIAL RESULTS

This section describes the economic savings potential, which is potential that meets a prescribed level of cost effectiveness, available in Nova Scotia. The section begins by explaining Navigant's approach to calculating economic potential. It then presents the results for economic savings potential at different forms of aggregation. Results are shown by sector, end use category and highest-impact measures. Additionally, Navigant developed an economic potential scenario using a PAC of 1.0 as the measure screen instead of a TRC of 1.0. Results for this scenario are shown by sector.

5.1 Approach to Estimating Economic Potential

Economic potential is a subset of technical potential, using the same assumptions regarding immediate replacement as in technical potential, but including only those measures that have passed the benefit-cost test chosen for measure screening (in this case the Total Resource Cost (TRC) test, per EfficiencyOne and the DSM Advisory Group's guidance). The TRC ratio for each measure is calculated each year and compared against the measure-level TRC ratio screening threshold of 1.0. A measure with a TRC ratio greater than or equal to 1.0 is a measure that provides monetary benefits greater than or equal to its costs. If a measure's TRC meets or exceeds the threshold, it is included in the economic potential. Measures with TRC ratios less than 1.0 were non-cost-effective and do not appear in the economic potential.

The TRC test is a cost-benefit metric that measures the net benefits of energy efficiency measures from combined stakeholder viewpoint of the program administrator and the customers. The TRC benefit-cost ratio is calculated in the model using Equation 1.

Equation 1. Benefit-Cost Ratio for Total Resource Cost Test

$$TRC = \frac{PV(Avoided\ Costs)}{PV(Technology\ Cost + Admin\ Costs)}$$

Where:

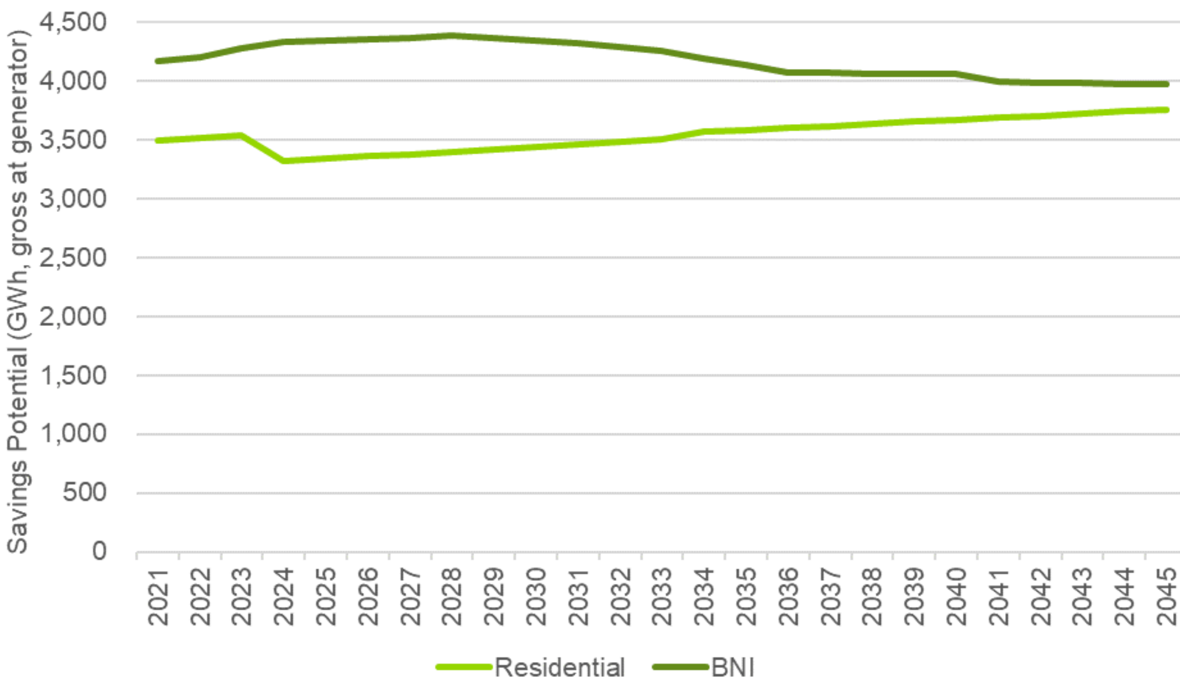
- *PV( )* is the present value calculation that discounts cost streams over time; using the selected discount rate (6.84%);
- *Avoided Costs* are the monetary benefits resulting from electricity and capacity savings (e.g., avoided costs of infrastructure investments, due to electricity conserved by efficient measures);
- *Technology Cost* is the incremental equipment cost to the customer;
- *Admin Costs* are the administrative costs incurred by the program administrator.

Navigant calculated TRC ratios for each measure based on the present value of benefits and costs (as defined above) over each measure's life. Similar to technical potential, only one "economic" measure (meaning that its TRC ratio meets the threshold) from each competition group is included in the summation of economic potential across measures (e.g., at the end use category, customer segment, sector, service territory or total level). If a competition group is composed of more than one measure that passes the TRC test, then the economic measure that provides the greatest electric savings potential is included in the summation of economic potential. This approach ensures that double-counting is not present in the reported economic potential.

5.2 Energy Efficiency Economic Potential Results by Sector

Figure 5-1 shows economic electricity savings potential, gross at generator, across all sectors. The residential and BNI economic savings potential grew at a relatively similar rate to technical potential – the majority of measures that comprise the technical potential and win their competition group are also cost-effective, creating a similar trajectory. Further, this shape is reflected in the NS Power load forecast and the customer stock data.

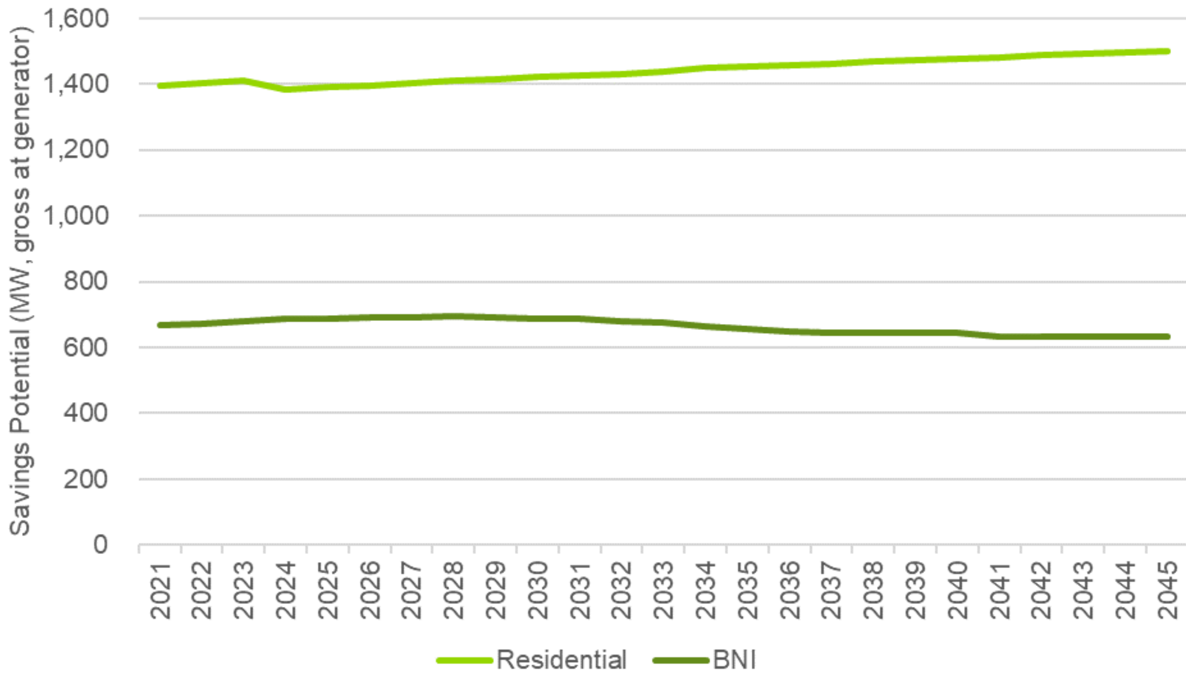
Figure 5-1. EE Economic Potential, Electricity Savings by Sector (GWh, gross at generator)



Source: Navigant analysis

Figure 5-2 winter peak demand potential, gross at generator, in each of the sectors. Relatively high avoided costs (from the 2014 Integrated Resource Plan) in the province make high saving measures more likely to screen, decreasing the gap between technical and economic demand potential.

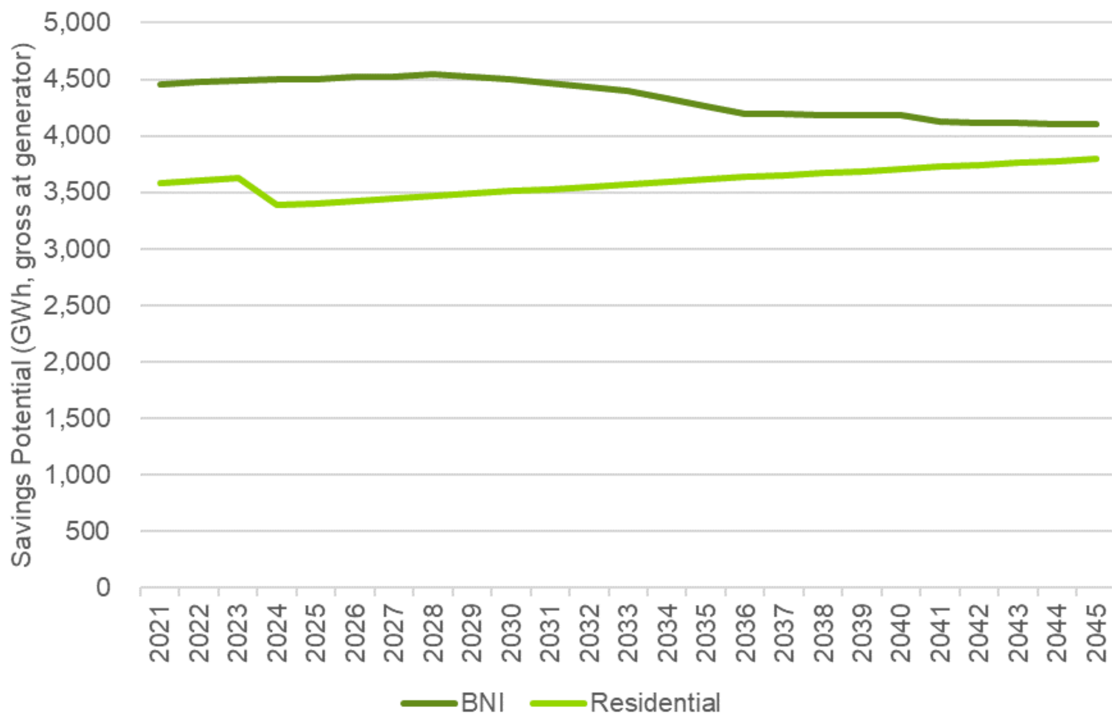
Figure 5-2. EE Economic Potential, Winter Peak Demand Savings by Sector (MW, gross at generator)



Source: Navigant analysis

Figure 5-3 presents the economic electricity potential, gross at generator, in each of the sectors using a program administrator cost (PAC) test screen of 1.0. Changing to the PAC as the primary screening test can alter the measures allowed to compete for economic potential due to differences in incentives and incremental costs. Administrative costs are included in both cost tests. In the total resource cost (TRC) test, incremental measure costs are in the denominator, while in the PAC, incentives replace incremental costs. The economic potential with a PAC screen is close to that with a TRC screen for both sectors (103% for residential, and 107% for BNI in 2021). This result indicates that measures screen similarly between the two tests, with slightly more measures screening under the PAC test.

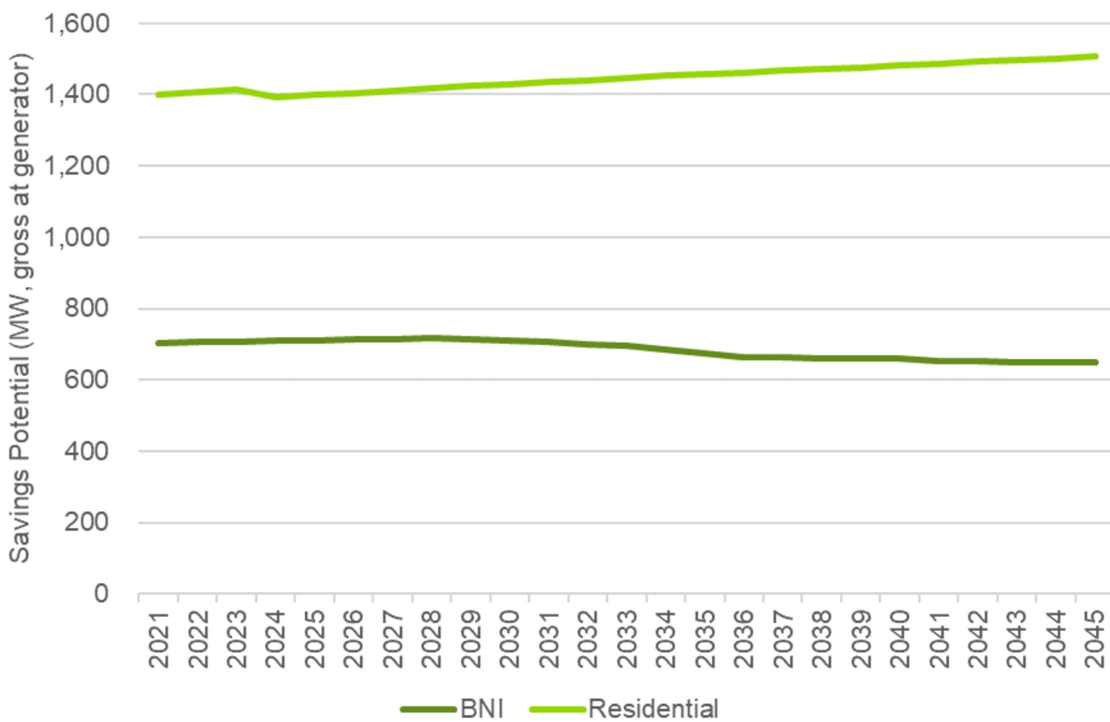
Figure 5-3. EE Economic Potential, Electricity Savings by Sector, PAC Test Screen (GWh, gross at generator)



Source: Navigant analysis

Figure 5-4 presents the economic winter peak demand potential, gross at generator, in each of the sectors using a PAC cost test screen of 1.0. As with the electricity results, the economic potential with a PAC test screen is close to that using a TRC screen for both sectors (100% for residential, and 106% for BNI in 2021). This result indicates that the measures that screen under the PAC test have slightly higher demand to electricity savings ratios, and that cost effectiveness screening was not a major limiting factor for economic potential. This is further demonstrated by the similarity of the economic potential and the technical potential, as the vast majority of these 'technically' superior measures in each competition group also pass the TRC screen of 1.0.

Figure 5-4. EE Economic Potential, PAC Screen, Winter Peak Demand Savings by Sector (MW, gross at generator)



Source: Navigant analysis

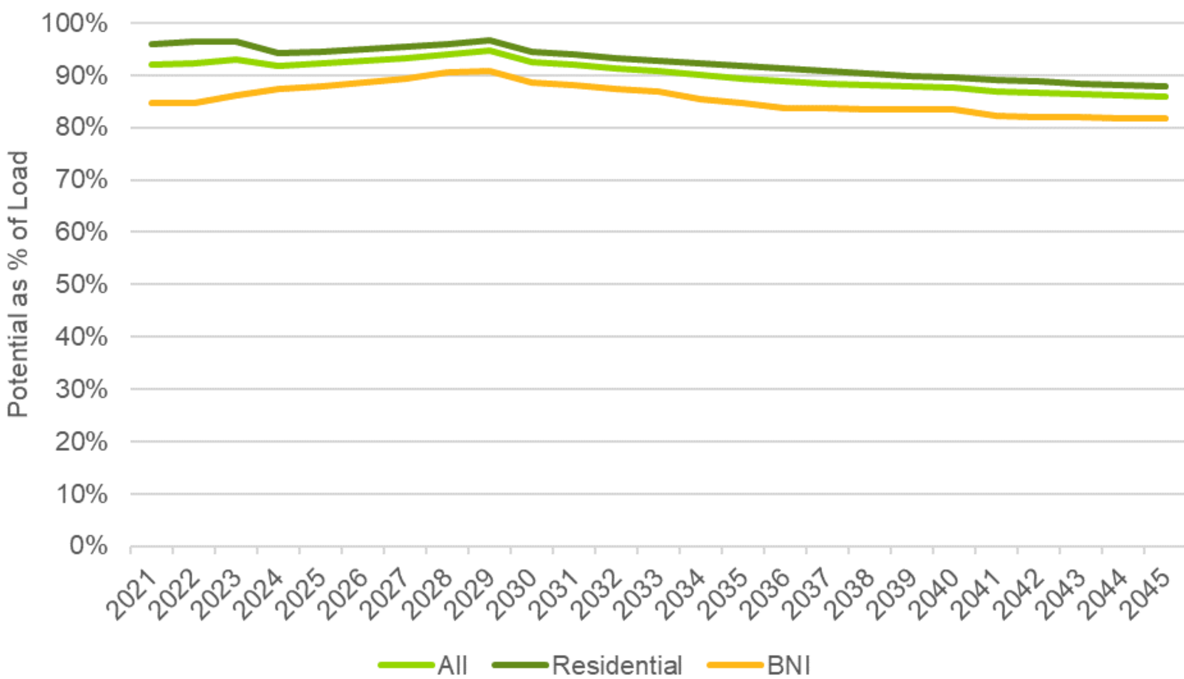
Figure 5-5 shows the economic electricity potential as a percentage of sales. BNI and Residential economic energy savings potential relative to sales in the respective sectors is very similar, suggesting similar opportunities for economic savings despite, for example, industrial processes which can be difficult to address through DSM programs. This emphasizes the relative importance of HVAC equipment potential and remaining potential in BNI lighting in Nova Scotia.

Figure 5-5. EE Economic Potential, Electricity Savings by Sector as a Percent of Sector Sales (%)

Source: Navigant analysis

Figure 5-6 shows the economic winter peak demand potential as a percentage of consumption. Very similar trends to the economic electricity percent of sales are exhibited with demand. Percent of consumption is stable between 81% to 96% for all sectors. The economic potential as a percentage of consumption within the BNI sector also closely follows technical potential, as the vast majority of technical competition group winners (highest saving measures) have a TRC of more than 1.0. Similar to the electricity savings as a percent of sales above, this is in a large part due to fuel switching potential in HVAC. In the residential sector this is also due to differences in the line loss factors used for the total load (6.7%) and the potential (14.7%) as discussed in section 4.2.

Figure 5-6. EE Economic Potential, Winter Peak Demand Savings by Sector as a Percent of Load (%)

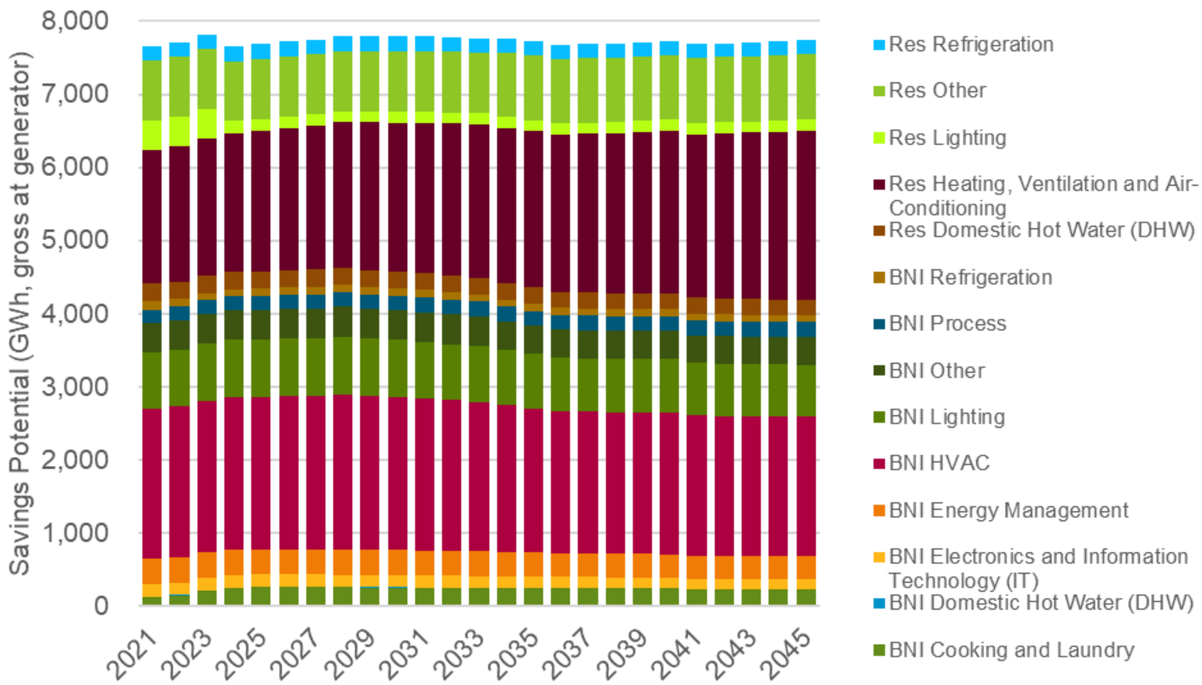


Source: Navigant analysis

5.3 Energy Efficiency Economic Potential Results by End Use

Figure 5-7 shows the economic electricity potential, gross at generator, by end use for both BNI and Residential. HVAC potential stands out for both sectors as an area with large economic savings opportunities, and unlike general service lighting, there are no large codes or standards that are expected to be rolled out in the study horizon to limit this potential. Aside from lighting and HVAC, Res Other, which includes plug loads and most appliances, shows high potential savings due mostly to Wi-Fi enabled plugs, which are commercially available, but currently at very low penetrations.

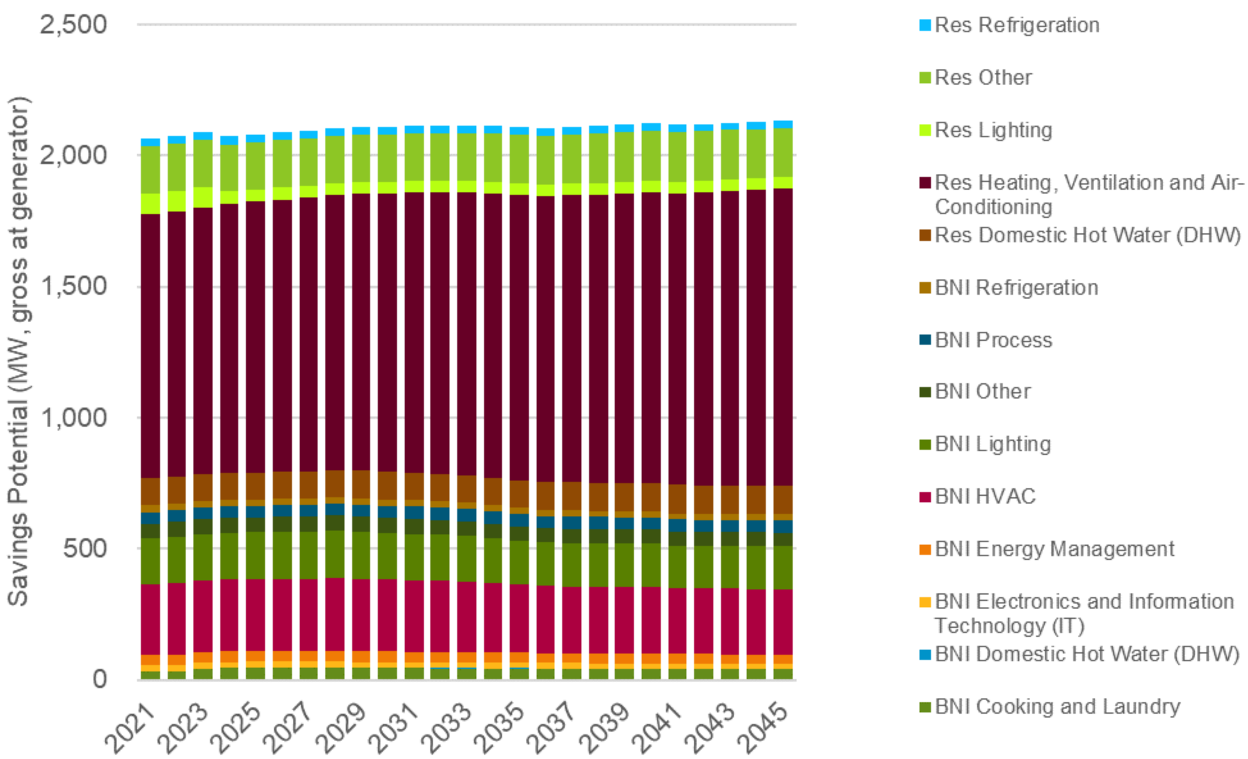
Figure 5-7. EE Economic Potential, Electricity Savings by End Use (GWh, gross at generator)



Source: Navigant analysis

Figure 5-8 shows the economic winter peak demand potential, gross at generator, by end use, which is dominated by Res HVAC for both sectors and BNI lighting. This is largely due to res HVAC competition group measures reducing HVAC equipment demand entirely though fuel switching and high peak coincidence of BNI lighting technologies.

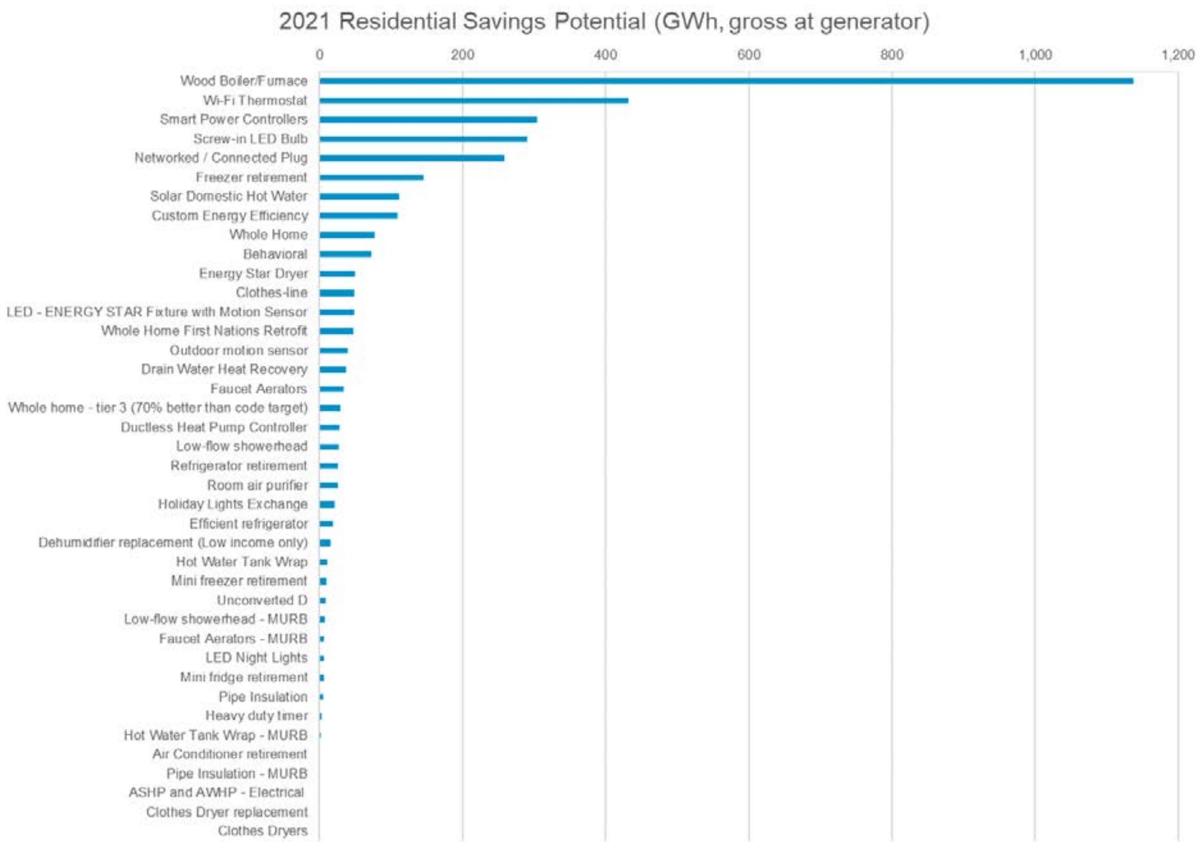
Figure 5-8. EE Economic Potential, Winter Peak Demand Savings by End Use (MW, gross at generator)



Source: Navigant analysis

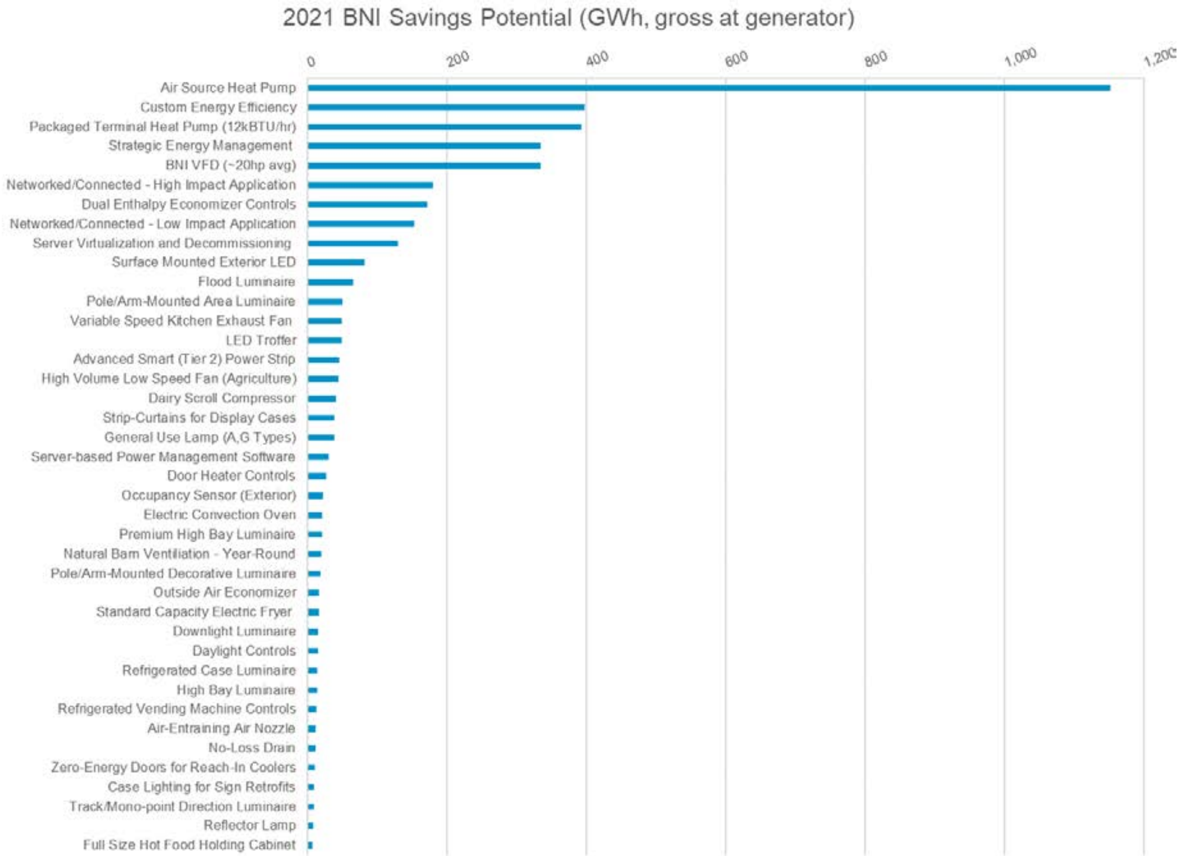
The measure-level economic energy savings potential in 2021, gross at generator, shown in Figure 5-9 and Figure 5-10 are after adjustments made to competition groups as detailed in section 3.2.4. The figures highlight the economic potential from the top 40 highest energy-savings measures for each sector. When compared with technical potential, only a few measures have dropped out – most notably Residential Networked/ Connected - Indoor LED Lamps and Residential Ventless Heat Pump Dryers do not screen at a TRC >= 1.0 threshold, and thus drop out of the economic potential top 40. As discussed earlier, most technical potential is economically achievable (i.e., passes a TRC test of 1.0). Therefore, the measure mix of the top 10 measures is largely the same as the technical potential results for both sectors.

Figure 5-9. EE Economic Potential, 2021 Top 40 Residential Measures for Electricity Savings (GWh, gross at generator)



Source: Navigant analysis

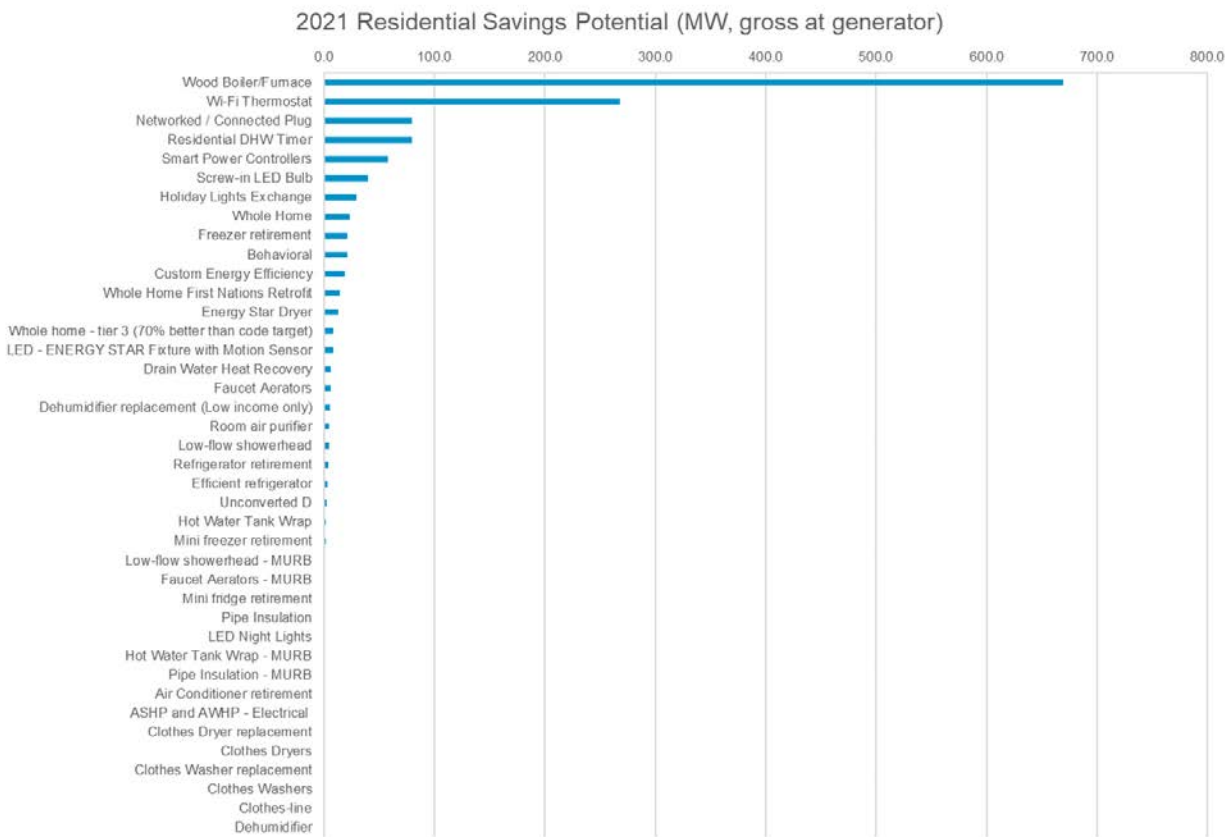
Figure 5-10. EE Economic Potential, 2021 Top 40 BNI Measures for Electricity Savings (GWh, gross at generator)



Source: Navigant analysis

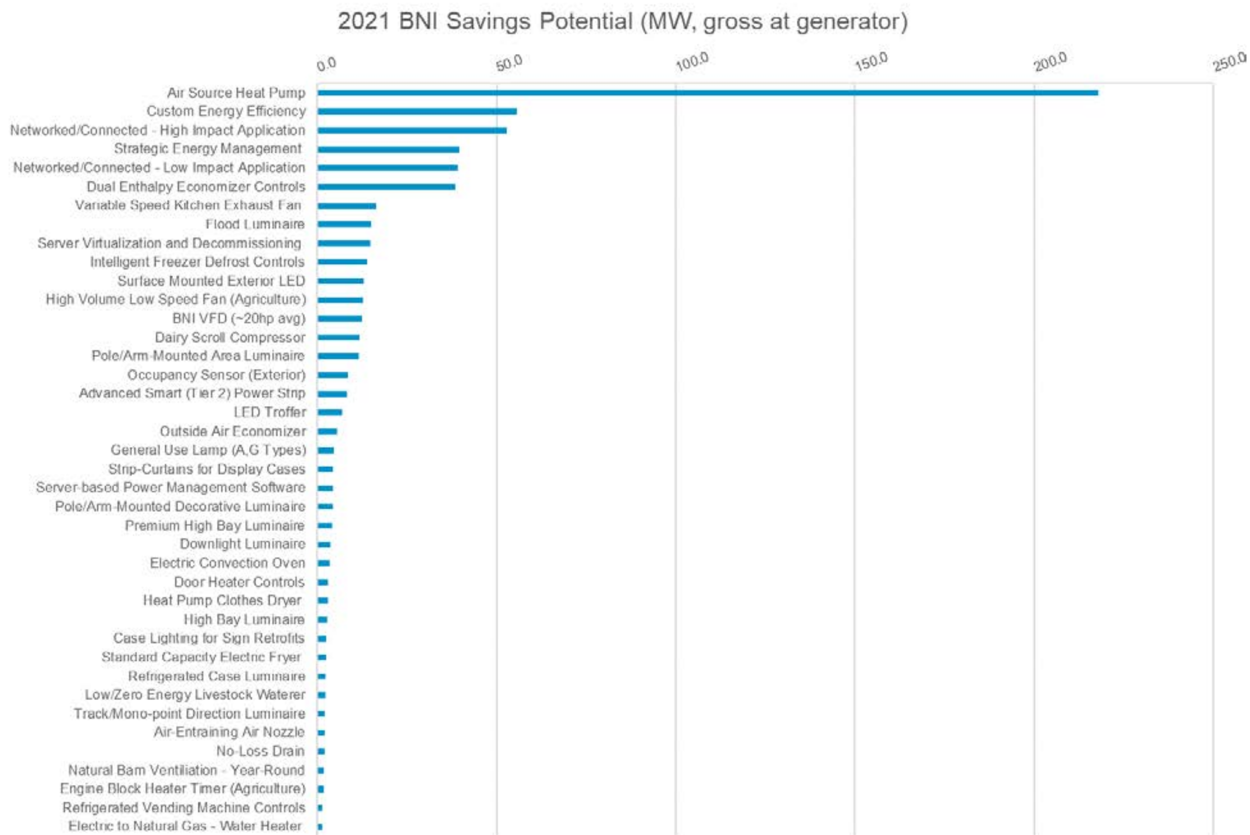
Figure 5-11 and Figure 5-12 provide the 40 highest winter peak demand-saving measures regarding economic potential for residential and BNI, gross at generator, in 2021. Compared with the technical potential results, only a few large measures drop out of the highest 20 measures: Residential Tier 3 Whole Home, Networked/ Connected - Indoor LED Lamp, and Heat Pump Water Heaters. As discussed earlier, most technical potential is economically achievable, passes a TRC test of 1.0. Therefore, the measure mix of top 10 to 20 measures is largely the same as the technical potential results for both sectors.

Figure 5-11. EE Economic Potential, 2021 Top Residential 40 Measures for Winter Peak Demand Savings (MW, gross at generator)



Source: Navigant analysis

Figure 5-12. EE Economic Potential, 2021 Top BNI 40 Measures for Winter Peak Demand Savings (MW, gross at generator)



Source: Navigant analysis

6. ENERGY EFFICIENCY MARKET POTENTIAL APPROACHES

Market potential further considers the likely rate of demand-side management (DSM) resource acquisition, given factors like the rate of equipment turnover (a function of a measure's lifetime), simulated incentive levels, consumer willingness to adopt efficient technologies, word of mouth effects that increase awareness in customers, and the likely rate at which marketing activities can facilitate technology adoption. The adoption of DSM measures can be broken down into calculation of the "equilibrium" market share and calculation of the dynamic approach to equilibrium market share, as discussed in more detail below.

Market potential differs from program potential in that market potential does not specifically take into account the various delivery mechanisms that can be used by program managers to tailor their approach depending on the specific measure or market. Rather, market potential represents a high-level assessment of savings that could be achieved over time, factoring in broader assumptions about customer acceptance and adoption rates that are not dependent on a particular program design. Additional effort is typically undertaken by program designers, using the directional guidance from a market potential study, to develop detailed plans for delivering energy efficiency programs. Market potential in this report relies on a Total Resource Cost (TRC) measure screen for cost effectiveness, with the threshold set at TRC of 0.7, intended to reflect Nova Scotia regulatory practice of screening at the program level.

Figure 6-1 summarizes the key methodology considerations and decision points informing the analysis in this report, with more detail provided in the report sections noted in the right-hand column of the figure. Navigant decided upon this methodology through discussions with EfficiencyOne and the DSM Advisory Group about which approach best serves the objective of the study to understand market savings potential. Since this study's scope for market potential estimates are not intended to be program-specific and are most reasonable when results are considered in aggregate, the methodology presented here focuses primarily on portfolio-level or sector-level approaches.

Figure 6-1. EE Market Potential Methodology Overview

Methodology Parameters	Approach
Benefit-cost test screen	Use the TRC as the primary screen for economic and market potential.
Diffusion parameters	Adjust diffusion parameters within ranges recommended by industry standard data sources to produce savings that are reasonably aligned with EfficiencyOne's DSM sector-level historical achievements.
Budget constraints	Do not apply budget constraints.
Incentive strategy	Set incentive levels to yield a desired customer payback time (years) by end use and sector.
Treatment of administrative costs	Include measure level variable administrative costs that scale per kWh saved, and fixed admin at the portfolio level, that does not scale with kWh saved.
Net-to-Gross (NTG)	Market potential estimates are developed using net savings based on historical program NTG values.
Re-participation	Assume 85% of measures re-participate as an efficient measure at the end of their measure life.
Codes and standards	Use the same assumptions about codes and standards as in technical and economic potential.

6.1 Calculation of "Equilibrium" Market Share

The equilibrium market share can be thought of as the percentage of individuals choosing to purchase a technology provided those individuals are fully aware of the technology and its relative merits (e.g., the energy- and cost-saving features of the technology). For DSM measures, a key differentiating factor between the base technology and the efficient technology is the energy and cost savings associated with the efficient technology. Of course, that additional efficiency often comes at a premium in initial cost. This study calculates an equilibrium market share as a function of the payback time of the efficient technology relative to the baseline technology. In effect, measures with more favourable customer payback times after incentives will have higher equilibrium market share, which reflects consumers' economically rational decision making. While such approaches certainly have limitations, they are nonetheless directionally reasonable and simple enough to permit estimation of market share for the hundreds of technologies appearing in most potential studies.

To inform this study, the team used equilibrium "payback acceptance" curves that Navigant developed using primary research from the 2019 Nova Scotia Baseline Study (see Appendix B). To develop these curves, Navigant relied on surveys of 1000 residential and 200 BNI customers. These surveys presented decision makers with numerous "choices" between technologies with low up-front costs, but high annual energy costs, and measures with higher up-front costs but lower annual energy costs. Navigant fitted generalized logit models to customer willingness to pay survey results by technology cost bin and sector to develop the set of curves, which Navigant used in this study.

As the curves show, the proportion of customers who will accept different payback periods for an energy efficiency investment is different for residential and BNI customers.[10] The model uses this information to simulate how customers in each sector will accept measures with differing payback periods.

Since the payback time of a technology can change over time, as technology costs and/or energy costs change over time, the "equilibrium" market share can also change over time. The equilibrium market share is therefore recalculated for every year of the forecast to ensure the dynamics of technology adoption take this effect into consideration. As such, "equilibrium" market share is a bit of an oversimplification and a misnomer, as it can itself change over time and is therefore never truly in equilibrium, but it is used nonetheless to facilitate understanding of the approach.

6.2 Calculation of the Approach to Equilibrium Market Share

Two approaches are used for calculating the approach to equilibrium market share, one for technologies being modeled as retrofit (RET) measures, and one for technologies simulated as replace-on-burnout (ROB) or new construction (NEW) measures.[11] The *Modelling Plan for Nova Scotia Energy Efficiency and Demand Response Potential Studies* (see Appendix A) discusses the approach to equilibrium market share in more detail.

6.3 Behavioural Measures

Behaviour measures typically impose little to no direct costs to the participant[12] and their rate of adoption is highly dependent on the marketing and incentive efforts taken by program administrators. Given these unique characteristics of behaviour measures, the payback acceptance curves and technology diffusion models have limited applicability to these types of measures. As such, this study models the adoption of behaviour measures in terms of an equilibrium saturation level relative to economic potential, and a given amount of time to reach that equilibrium state. Equilibrium saturation levels were derived from Navigant's review of mature behavioral programs in North America.

6.4 Energy Efficiency Investment Strategy

EfficiencyOne elected to view market potential without imposing any explicit budget constraints on the simulated results. The implication of this decision is that market potential is only constrained by stock turnover and customer willingness to adopt efficient measures. Without future budget constraints, the program administrator spending falls out naturally from the input assumptions for per-unit-of-savings incentive and administrative costs and a given year's level of market savings, without tying spending to a given budget level. In this study, the per-unit-of-savings incentive and administrative spending levels are fixed at the same levels (in real dollars, compared with nominal dollars) over the study horizon. Therefore, changes in spending (in real dollars) only reflect a changing mix and magnitude of savings among measures. Importantly, Navigant broke out administrative spending into variable and fixed components according to guidance from EfficiencyOne. Fixed administrative spending was specified at the portfolio level, and thus was not allocated back down to measures or sectors for cost effectiveness or net benefits calculations, but was included in total portfolio spending, cost effectiveness, and net benefits calculations.

---

[10] These payback curves represent customer payback acceptance in aggregate across each sector. In practice, customer behaviour can vary across sub-sectors. However, there is minimal industry-wide data available on customer payback acceptance at the sub- sector level.

[11] Each of these approaches can be better understood by visiting Navigant's technology diffusion simulator, available at: http://forio.com/simulate/navigantsimulations/technology-diffusion-simulation.

[12] Participants may incur indirect costs through implementation of adjustments to typical operations in response to energy information feedback (e.g., through upgrading a water heater). However, estimating these indirect costs requires additional data on the actions taken by the participant beyond participating in the behavioural program and is beyond the scope of this analysis.

6.5 Energy Efficiency Incentive Strategy

Per EfficiencyOne's guidance, and as discussed with the DSM Advisory Group, this study calculates measure-level incentives based on targeted payback basis. A targeted payback incentive represents the dollar amount provided for each measure that would reduce the customer's simple payback to a specified time (years). Since a single targeted payback is set for each sector and end use, the model bounds the actual incentive provided to each measure to be at least 10% of the incremental measure cost, and to not exceed more than 100% of the incremental measure cost.

6.6 Re-Participation

The model assumes that 85% of program participants re-adopt energy efficient measures after the end of the efficient measures' expected useful lifetimes. This implies that efficient measures generally do not revert to a minimum code or lower efficiency level. As such, the model's cost accounting incurs an incentive cost upon the initial conversion of a minimum code or lower efficiency measure to an efficient measure, but it does not incur incentive costs when replacing incumbent equipment that was already updated to efficient equipment during the study horizon. Thus, incremental savings are counted only for new program participants, and 85% of these savings are summed up year over year to represent cumulative potential. For the 15% of program participants that revert to the baseline after the effective useful life of the measure, this savings is removed from the cumulative potential to reflect the in-situ condition at each time-step.

Behaviour measures, such as home energy reports, are an exception to this approach. When a behaviour measure is re-adopted at the end of its expected useful lifetime, the incentives provided for those measures are added to total program administrator spending. The rationale is that similar savings opportunities provided by behaviour measures are only available with ongoing support and/or administration from the program administrator. Since ongoing program administrator support is required to achieve behaviour measure savings, the incentives provided to repeat adopters are incurred multiple times throughout the study horizon.

6.7 Energy Efficiency Model Calibration

Any model simulating *future* product adoption faces challenges with "calibration," as there is no future world against which one can compare simulated results to actual results. Engineering models, on the other hand, can often be calibrated to a higher degree of accuracy since simulated performance can be compared directly with performance of actual hardware. Unfortunately, DSM potential models do not have this luxury, and therefore must rely on other techniques to provide both the developer and the recipient of model results with a level of comfort that simulated results are reasonable. For this study, Navigant took a number of steps to ensure that forecast model results were reasonable, including:

- Identifying the subset of potential measures that were included in historic ENS program offerings in order to have a basis for comparison with historic program achievements.
- Ensuring similar trends and magnitudes between EfficiencyOne's historical sector and end use-level savings and simulated sector and end use-level savings from the measure subset in the model's base year. 2017 historical achievements were used in the calibration process as they represent the most recent available data.
- Detailed three-year (2016-2018) backcasting for a small subset of the most influential lighting measures in ENS programs – LED Troffers, Screw-in LEDs, and Linear Replacement Lamps.

Before making comparisons of model results to historic achievements, it was first necessary to identify the potential measures that were included in ENS historic program offerings. The simulated savings from this subset of potential measures became the basis for comparing modelled savings to historic savings during the calibration process. It is important to note that although the team calibrated to historical results for this subset of measures, the model's results for *total* market potential may significantly differ from EfficiencyOne's historically achieved program savings. This occurs because the study includes additional detailed three-year (2016-2018) backcasting for a small subset of the most influential lighting measures in ENS programs – LED Troffers, Screw-in LEDs, and Linear Replacement Lamps.

Before making comparisons of model results to historic achievements, it was first necessary to identify the potential measures that were included in ENS historic program offerings. The simulated savings from this subset of potential measures became the basis for comparing modelled savings to historic savings during the calibration process. It is important to note that although the team calibrated to historical results for this subset of measures, the model's results for *total* market potential may significantly differ from EfficiencyOne's historically achieved program savings. This occurs because the study includes additional measures that have historically not been included in programs, but may exclude certain historical measures as well. This discrepancy can cause calibrated base year potential to be lower or higher than historic program data.

To obtain close agreement with EfficiencyOne's historic savings across a wide variety of metrics, Navigant adjusted incentive levels, technology diffusion coefficients and payback acceptance curves. Calibration required an iterative process of modifying the aforementioned parameters until all goals of calibration were reasonably satisfied. For example, the marketing effectiveness parameters are the key lever for calibrating the magnitude of historic savings for each sector and end use combination, whereas the word-of-mouth parameter strongly influences how rapidly adoption and savings ramp up over time. Navigant varied these diffusion parameters within the commonly observed ranges until simulated savings were trending reasonably compared with historic savings at the sector level.

To summarize, the calibration process ensures that forecast potential is grounded against real-world data considering the many factors that determine likely adoption of DSM measures, including both economic and non-economic factors.

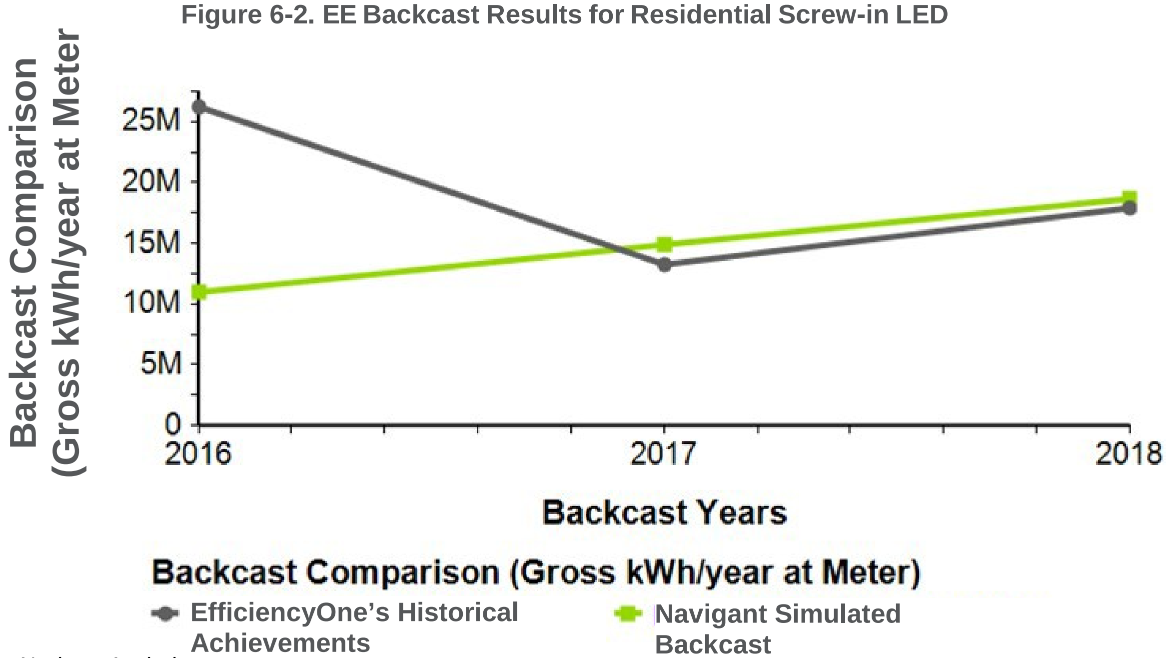
6.7.1 Detailed Backcasting

To further explore model validation, Navigant worked with EfficiencyOne to obtain three years of historic data on savings, units installed, and annual incentive levels for several high-impact measures: Screw-in LEDs for residential, and Linear Replacement Lamps and LED Troffers for BNI. In this exercise, Navigant used the DSMSim™ model to simulate adoption of these measures in the backcast period, feeding the model only information on available stocks, incentive levels, and estimated historical (2016) awareness. If the model accurately depicts the system that it attempts to simulate, results (Navigant Simulated Backcast) should be on the same order as actuals (EfficiencyOne's Historical Achievements).

It is worth noting that because DSMSim™ is a structural systems dynamics model, without regression or optimization routines to guarantee fitting, the results below represent the characterization of the system – structural limits on stock, the behavior of customers in response to price, and the role of awareness in technology adoption - rather than explicit best-fit parameter tuning. This result gives Navigant a high degree of confidence in the structure and function of the model and its applicability to energy efficiency technology adoption in Nova Scotia.

Figure 6-2 shows the fit of the backcast simulation to residential screw-in LEDs. The model was not able to explain the high savings achieved in 2016, which were higher than 2017 levels despite a lower incentive. This could be due to a one-time marketing push, or factors exogenous to the model, such as local economic trends, or contractor activity. However, both 2017 and 2018, as well as the slope of these years demonstrates a strong fit, perhaps more characteristic of “normal” market conditions.

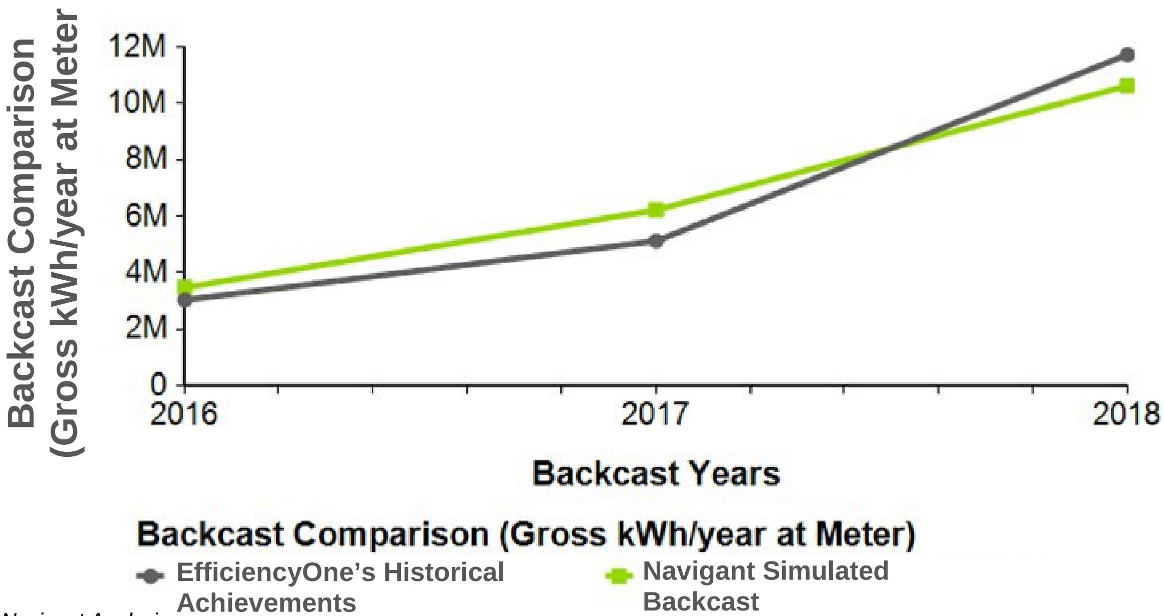
Figure 6-2. EE Backcast Results for Residential Screw-in LED



Source: Navigant Analysis

Figure 6-3 shows the backcasting results for LED Troffers in the BNI sector, demonstrating a close fit in both the individual annual adoptions, and the overall trend. It is worth noting that the slope between 2017 and 2018 is slightly higher in the historical achievements, perhaps suggesting that there are minor non-economic factors that might cause the adoption of LED Troffers to be slightly higher than one would expect based on economics alone. However, due to the small size of this difference, and the uncertain attribution of this observation, Navigant did not attempt to model these non-economic effects in the potential study results.

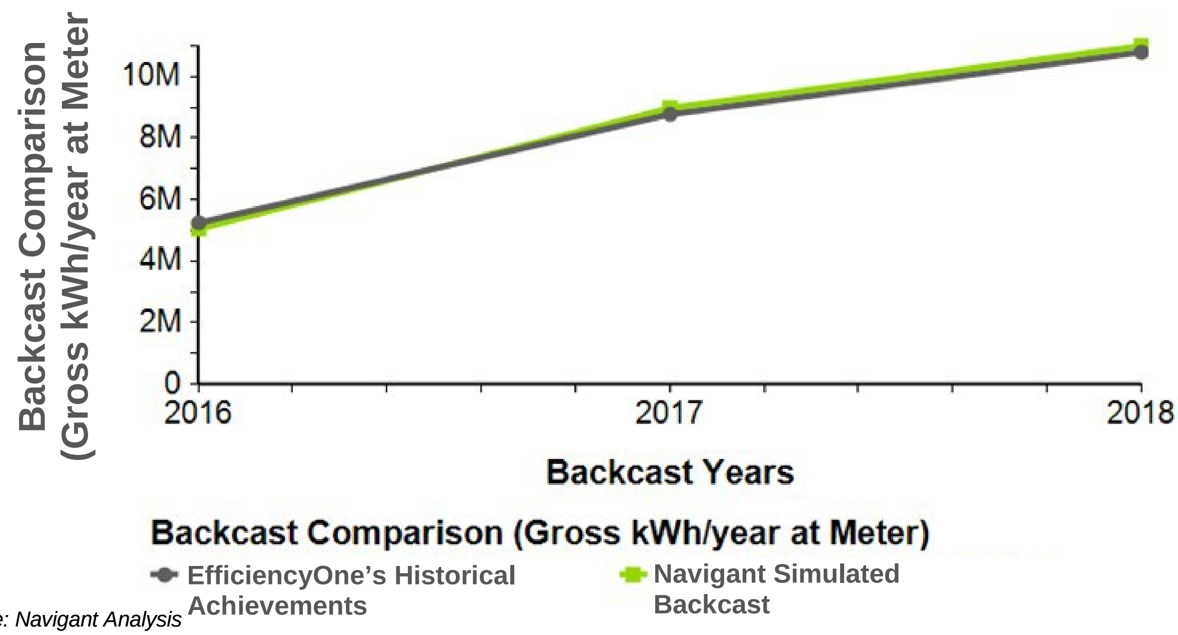
Figure 6-3. EE Backcast Results for BNI LED Troffer



Source: Navigant Analysis

Figure 6-4 shows the fit for BNI Linear Replacement Lamps during the backcasting period. Both the trajectory and the individual year estimates for the historical savings are quite good, with no noteworthy deviations. While Bass diffusion models are often used to simulate emerging technologies, one of the known features of Bass diffusion models is their ability to fit more mature markets (past the inflection point) with a high degree of confidence. Both the high penetration of these measures in Nova Scotia, and the historic trend, is indicative that BNI Linear Replacement Lamps are past the inflection point. In the absence of other factors, Nova Scotia can expect slower growth in these measures in the future as market saturation increases.

Figure 6-4. EE Backcast Results for BNI Linear Replacement Lamps



Source: Navigant Analysis

7. REFERENCE FORECAST APPROACH

The reference scenario (base) was developed through the calibration process detailed in Section 5. The targeted paybacks used as the incentive strategy were set during this calibration and act as the basis for adjustments when developing alternative scenarios. Three alternative scenarios were developed through adjustments to targeted payback times, marketing effects, and administrative spending relative to the reference scenario. Administrative spending was increased or decreased according to the scenario change to the marketing coefficient. The four alternative scenarios' configurations are detailed below.

7.1 Scenario Configuration

Navigant developed three alternative achievable scenarios relative to the reference (Base Scenario). These four scenarios, in addition to the PAC test-based Economic potential, form the five scenarios discussed with the DSM Advisory Group.

- Max Achievable Scenario
    - Targeted Payback – 0 years for all measures
    - Marketing Effect – 200% of reference scenario at the sector and end use level
- Mid Scenario
    - Targeted Payback – Half of reference scenario at the sector and end use level
    - Marketing Effect – 150% of reference scenario at the sector and end use level
- Low Scenario
    - Targeted Payback – Double of reference scenario at the sector and end use level
    - Marketing Effect – 50% of reference scenario at the sector and end use level

8. ENERGY EFFICIENCY MARKET POTENTIAL RESULTS BY SCENARIO

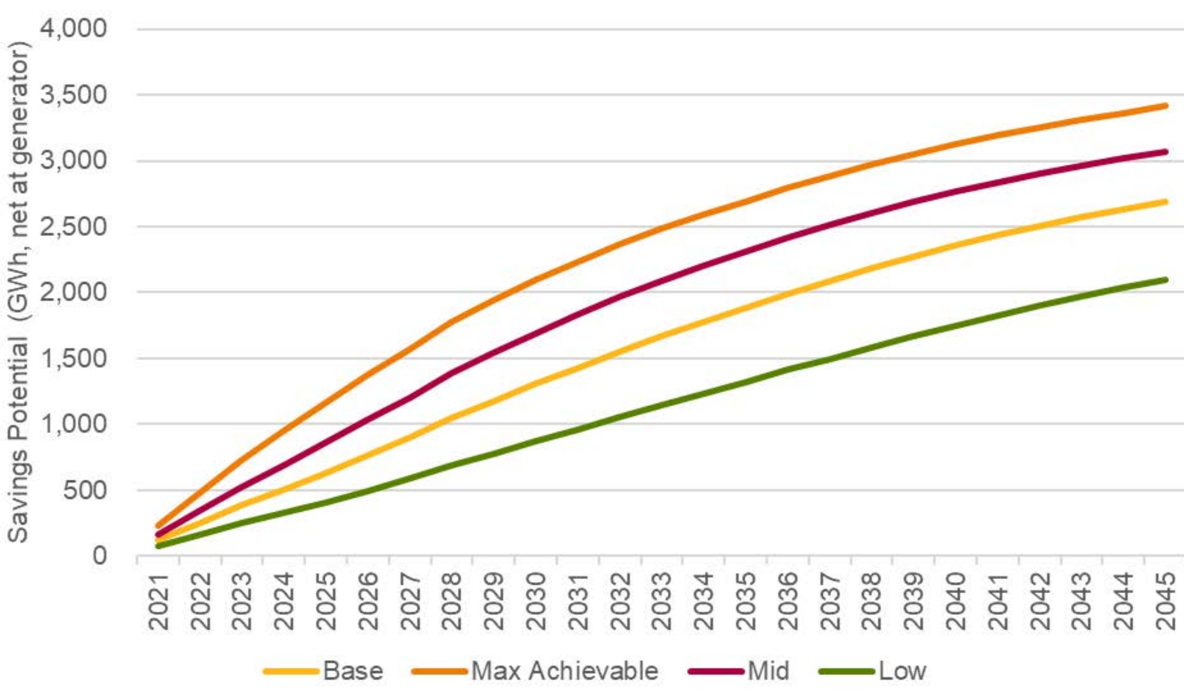
This section provides the market potential results calculated by the model at varying levels of aggregation, using the TRC benefit-cost test as a screen set to 0.7. At-the-meter, net savings results are shown by sector, end use category, and by highest-impact measures.

8.1 Comparison of Energy Efficiency Savings by Potential Type

Values shown below for market potential are termed “cumulative market” potential, in that these represent the accumulation of each year’s annual incremental market potential (e.g., an annual incremental market potential of 0.8% per year for ten years would result in a cumulative market potential of 8.0% of forecast consumption if all efficient equipment had measure lives of at least ten years). It is important to note that as measures installed in earlier years reach the end of their effective useful lives (EUL), these are removed from the cumulative potential. It is then assumed that 85% reparticipate (get added back into potential with a reset EUL), while the remaining 15% are included in available stock for later adoption.

As shown in Figure 8-1, the cumulative market potential, net at generator, for each scenario, which accounts for the rate of DSM acquisition, increases steadily throughout the study period, reaching 2,100 GWh in 2045 for the low scenario and around 3,415 GWh in 2045 for the maximum achievable scenario. The base case reaches 2,690 GWh in 2045, which equates to 35% of the economic potential. The mid case reaches 3,070 GWh in 2045.

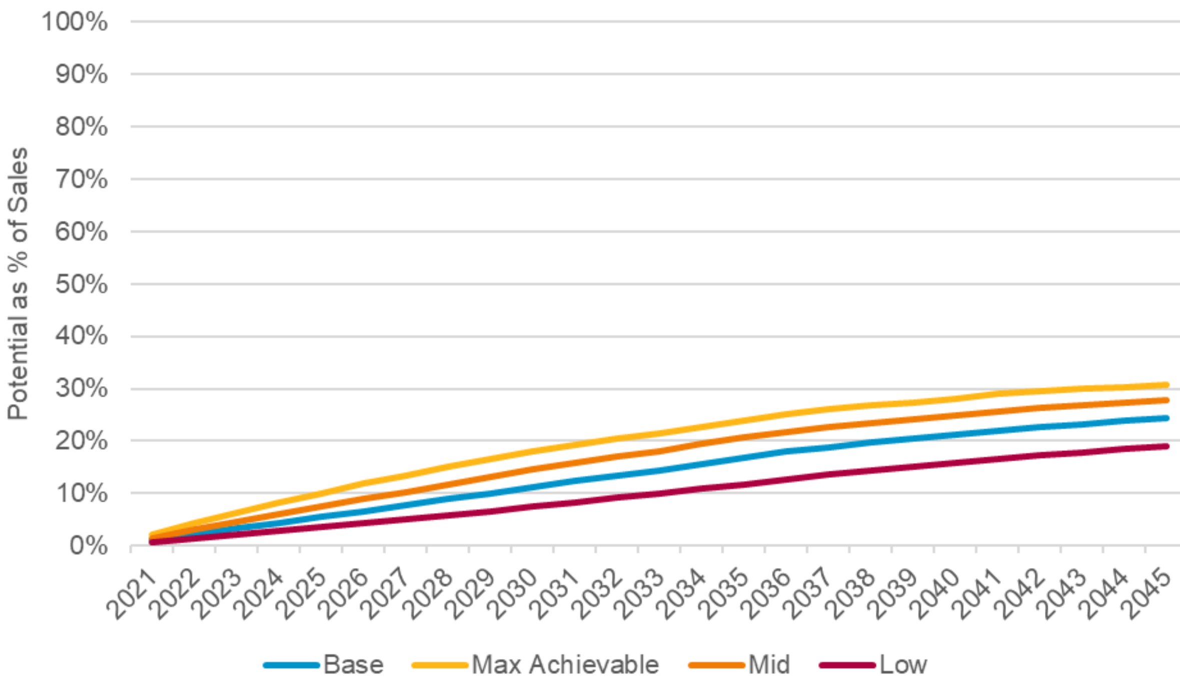
Figure 8-1. EE Market Potential, Cumulative Electricity Savings, by Scenario (GWh, net at generator)



Source: Navigant analysis

Under the cost effectiveness screen requiring each measure to meet or exceed a TRC ratio of 0.7, base scenario market potential increases from 1.1% in 2021 to 22.3% in 2045 of forecast electricity consumption, as shown in Figure 8-2. In 2045, the low, mid and maximum achievable scenarios cumulate to 19.0%, 27.7% and 30.8%, respectively.

Figure 8-2. EE Market Potential, Cumulative Electricity Savings, by Scenario, as a Percent of Sales (%)

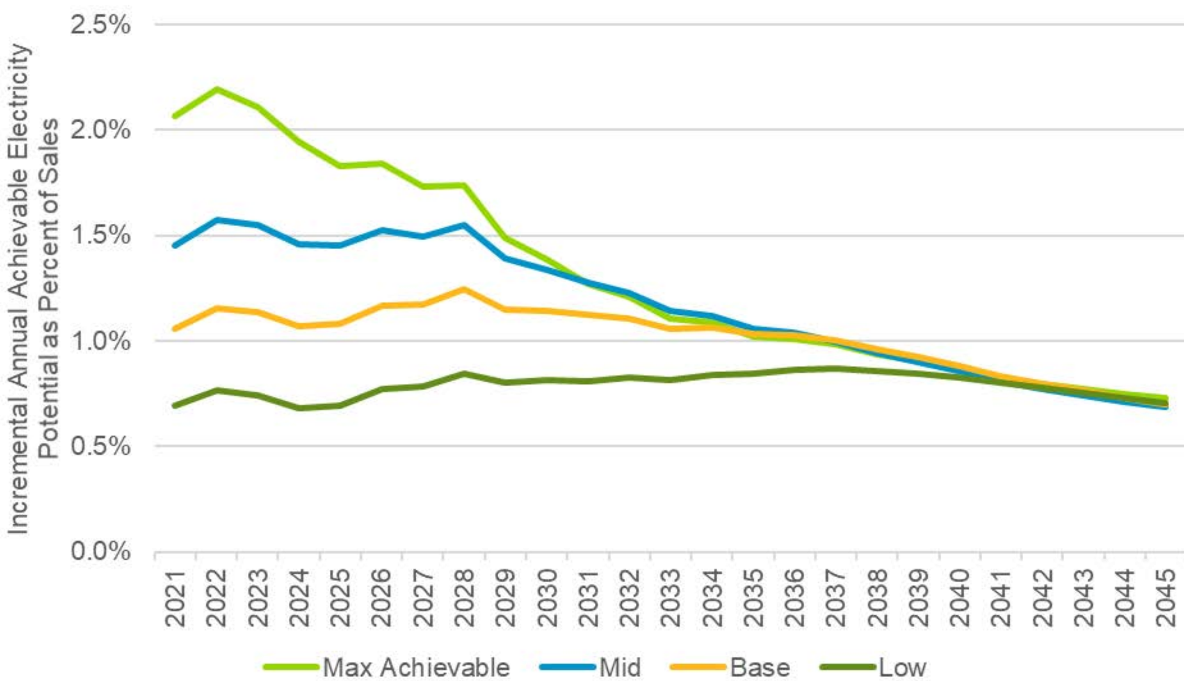


Source: Navigant analysis

Figure 8-3 show incremental annual electricity savings as a percent of sales for each scenario. The base scenario achieves 1.1% of sales in 2021 and decreasing to 0.7% by 2045 with a maximum of 1.2% in 2029. Each scenario exhibits similar trends with initially high and growing incremental annual potential followed by reductions in potential through time. This downward slope is caused by efficient technology saturation in certain end uses—such as BNI lighting—and code and standard impacts.

The convergence of the scenarios' incremental percent of sales throughout the second half of the study period is due to the nature of the residential and BNI sector percent of sales. The residential sector shows significant saturation in the first 10 years of the study period for the maximum achievable and mid scenarios. Therefore, incremental annual potential crosses the lower (base and low cases) investment scenarios as those continue to gain market share at a slower rate. However, the commercial sector does not show this saturation therefore, the incremental annual potential stays constant in relation to each other through the study period. These trends cancel each other out when viewing the total portfolio incremental achievable. If the trends continue, the scenarios would likely diverge with maximum achievable being lower annually than the other scenarios after the 25-year study period.

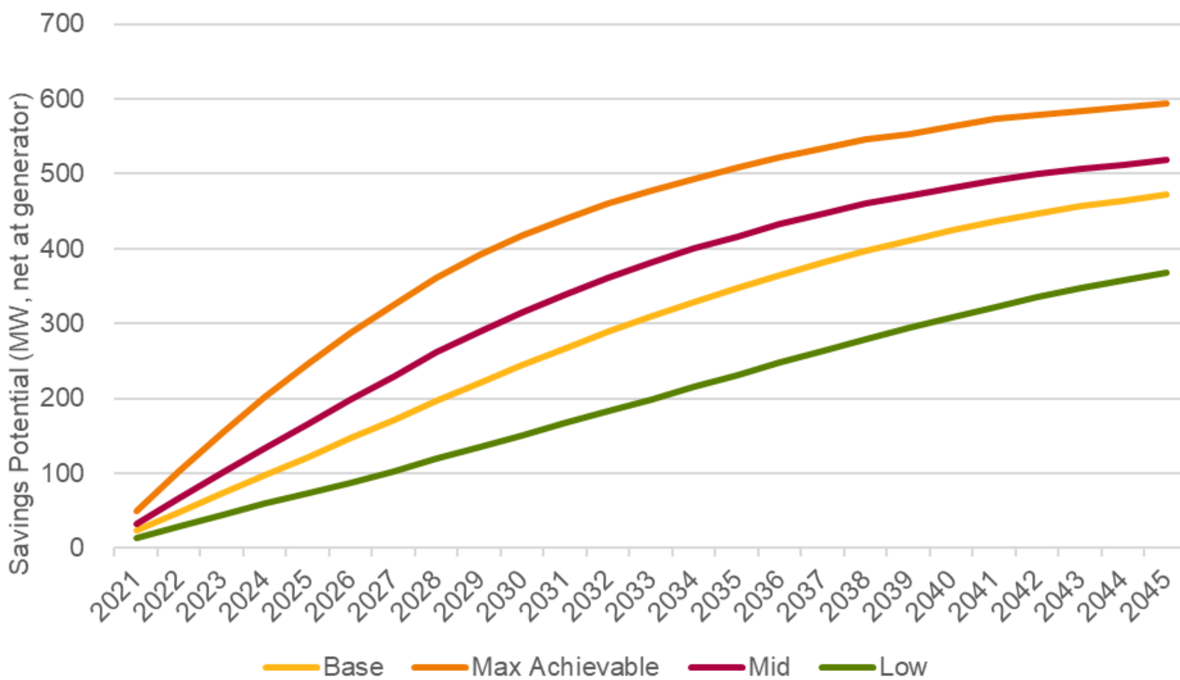
Figure 8-3. EE Market Potential, Incremental Electricity Savings by Scenario, as a Percent of Sales (%)



Source: Navigant analysis

Figure 8-4 shows the cumulative winter peak demand potential, net at generator, by scenario. These demand savings are auxiliary impacts from the installation of energy efficiency measures, whereas the demand savings from demand-focused measures are estimated in a separate analysis on demand response potential. The market potential increases steadily throughout the study period for each scenario, reaching 470 MW in 2045 for the base scenario. By 2045, the base scenario market potential reaches 22% of the economic potential.

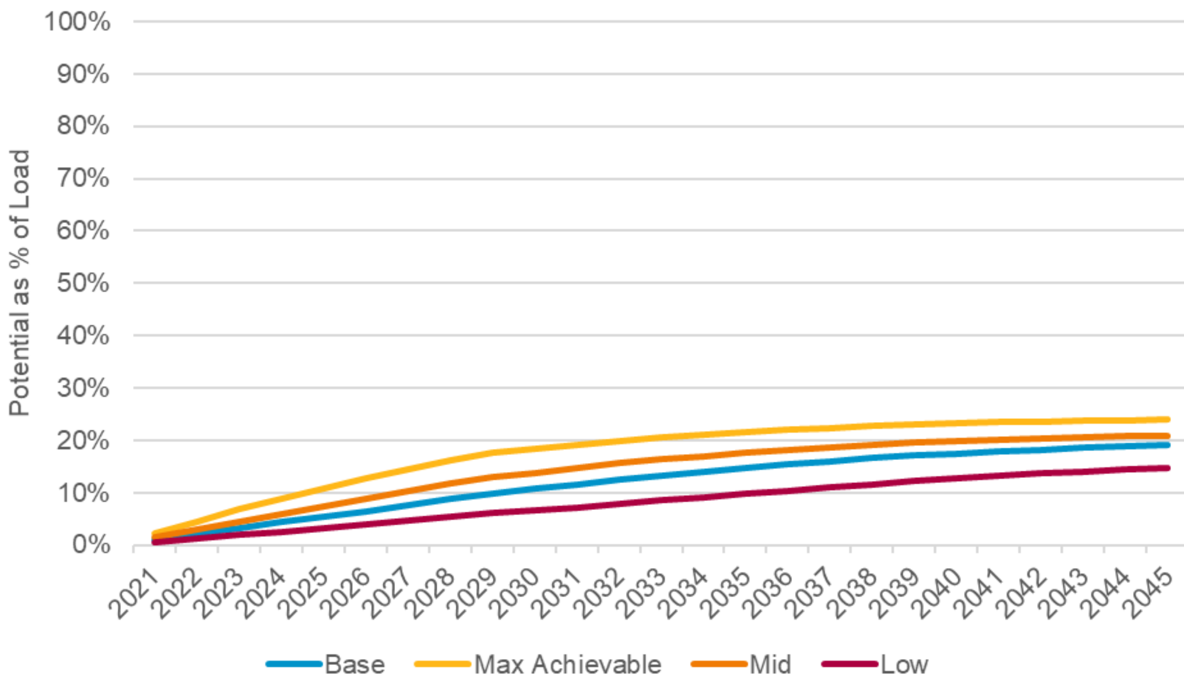
Figure 8-4. EE Market Potential, Cumulative Winter Peak Demand Savings (MW, net at generator)



Source: Navigant analysis

Figure 8-5 shows the cumulative winter peak demand potential by scenario as a percent of load. The base scenario cumulates to 1.0% in 2021 and 19.0% in 2045.

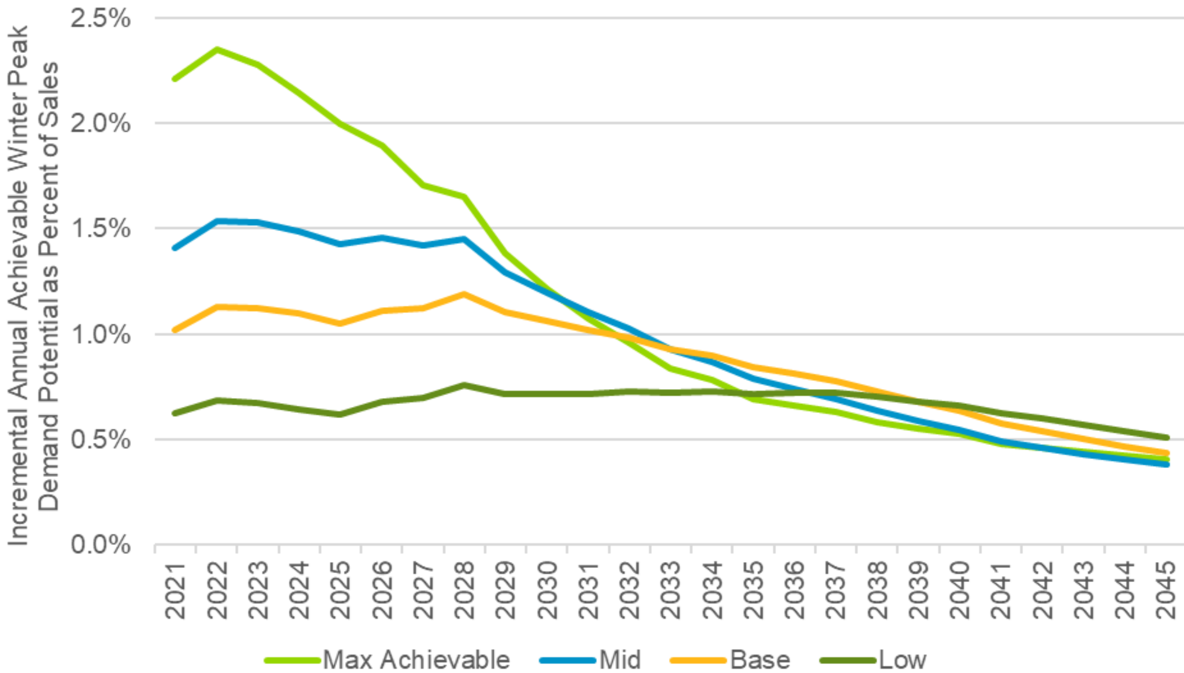
Figure 8-5. EE Market Potential, Cumulative Winter Peak Demand Savings, by Scenario, as a Percent of Load (%)



Source: Navigant analysis

Figure 8-6 shows incremental winter peak demand savings by scenario as a percent of sales. The base scenario achieves 1.0% of consumption in 2021 and drops to 0.4% by 2045 with a peak of 1.2% in 2028. A similar trend is exhibited to incremental electricity potential with a downward trend through time. This is due to efficient technology saturation and costs and standards increases through time.

Figure 8-6. EE Market Potential, Incremental Winter Peak Demand Savings by Scenario, as a Percent of Load (%)

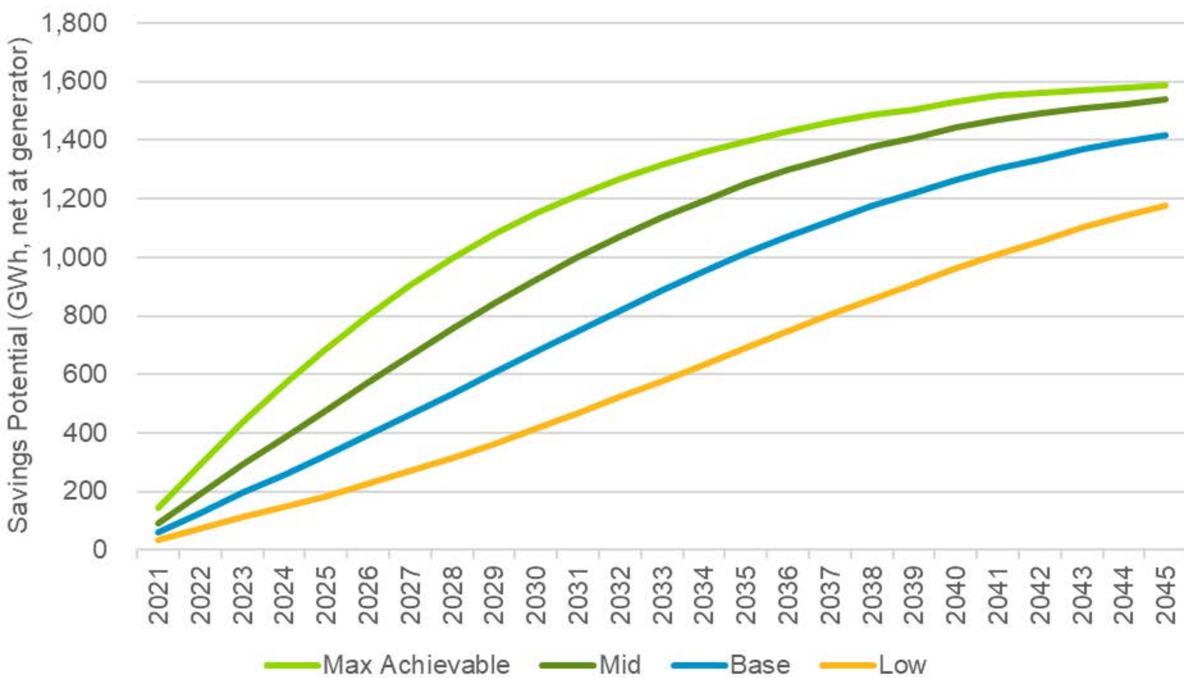


Source: Navigant analysis

8.2 Energy Efficiency Potential Results by Sector

Figure 8-7 shows the magnitude of cumulative electricity market savings potential, net at generator, by scenario for the residential sector. The base case reaches 1,415 GWh in 2045. This represents 38% of economic potential in that year. In 2045, the low, mid and maximum achievable scenarios reach 1,175, 1,540 and 1,590 GWh, respectively.

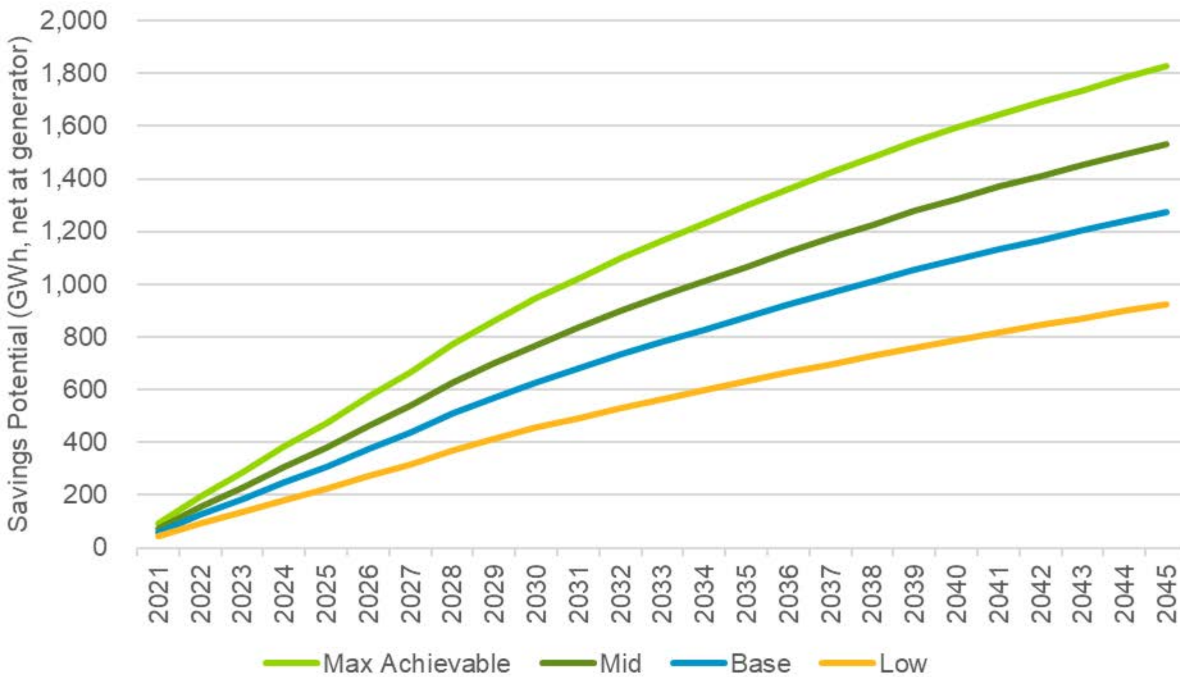
Figure 8-7. EE Residential Market Potential, Cumulative Electricity Savings (GWh, net at generator)



Source: Navigant analysis

Figure 8-8 shows the magnitude of cumulative electricity market savings potential, net at generator, by scenario for the BNI sector. The base case reaches 1,275 GWh in 2045. This represents 32% of economic potential in that year. In 2045, the low, mid and maximum achievable scenarios reach 925, 1,530 and 1,825 GWh, respectively.

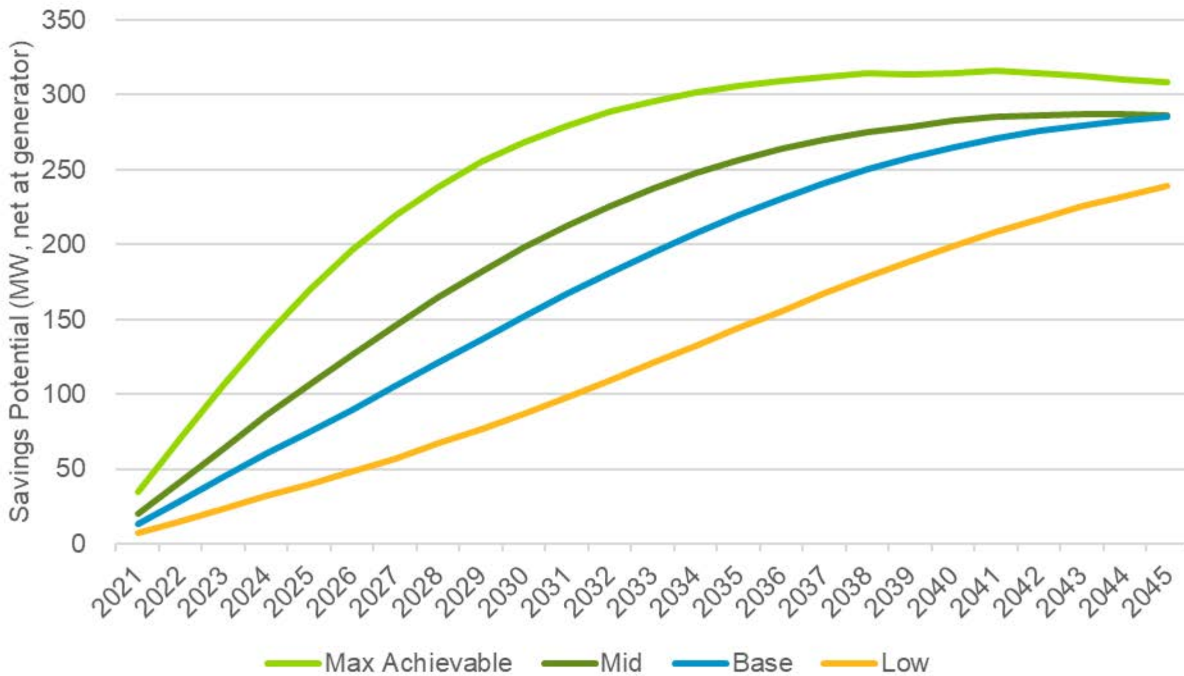
Figure 8-8. EE BNI Market Potential, Cumulative Electricity Savings (GWh, net at generator)



Source: Navigant analysis

Figure 8-9 shows the magnitude of cumulative winter peak demand market savings potential, net at generator, by scenario for the residential sector. The base case reaches 285 MW in 2045. This represents 19% of economic potential in that year. In 2045, the low, mid and maximum achievable scenarios reach 240, 285 and 308 MW, respectively.

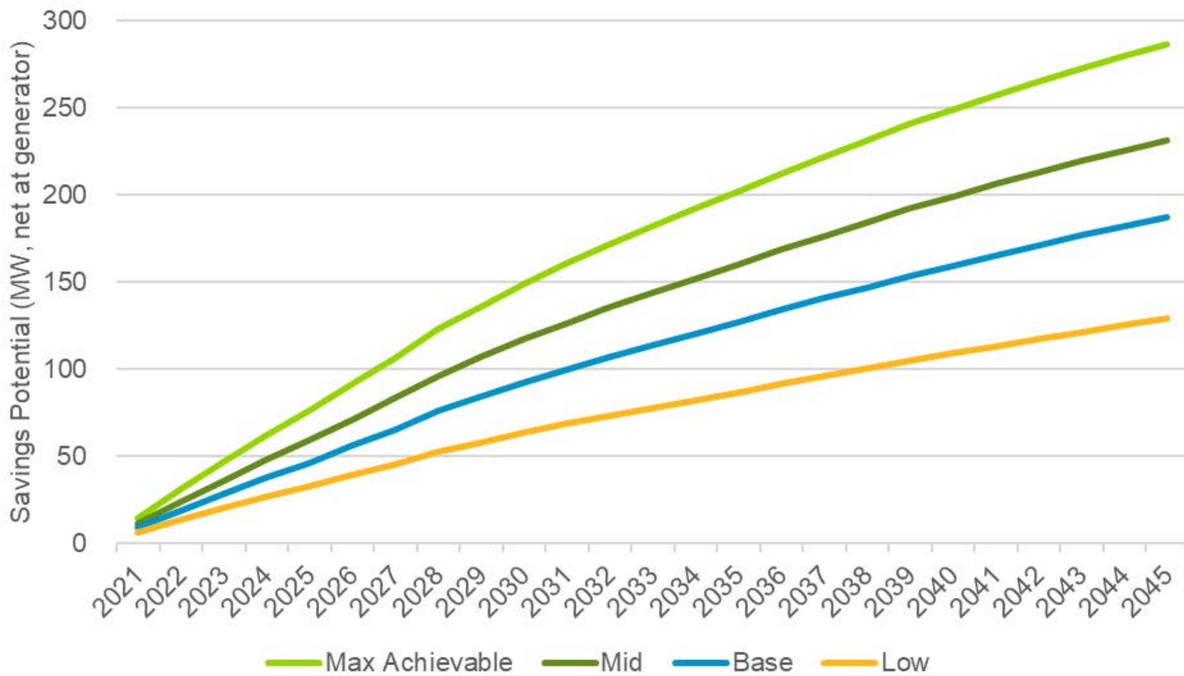
Figure 8-9. EE Residential Market Potential, Cumulative Winter Peak Demand Savings (MW, net at generator)



Source: Navigant analysis

Figure 8-10 shows the magnitude of cumulative winter peak demand market savings potential, net at generator, by scenario for the BNI sector. The base case reaches 185 MW in 2045. This represents 30% of economic potential in that year. In 2045, The low, mid and maximum achievable scenarios reach 130, 230 and 285 MW respectively.

Figure 8-10. EE BNI Market Potential, Cumulative Winter Peak Demand Savings (MW, net at generator)

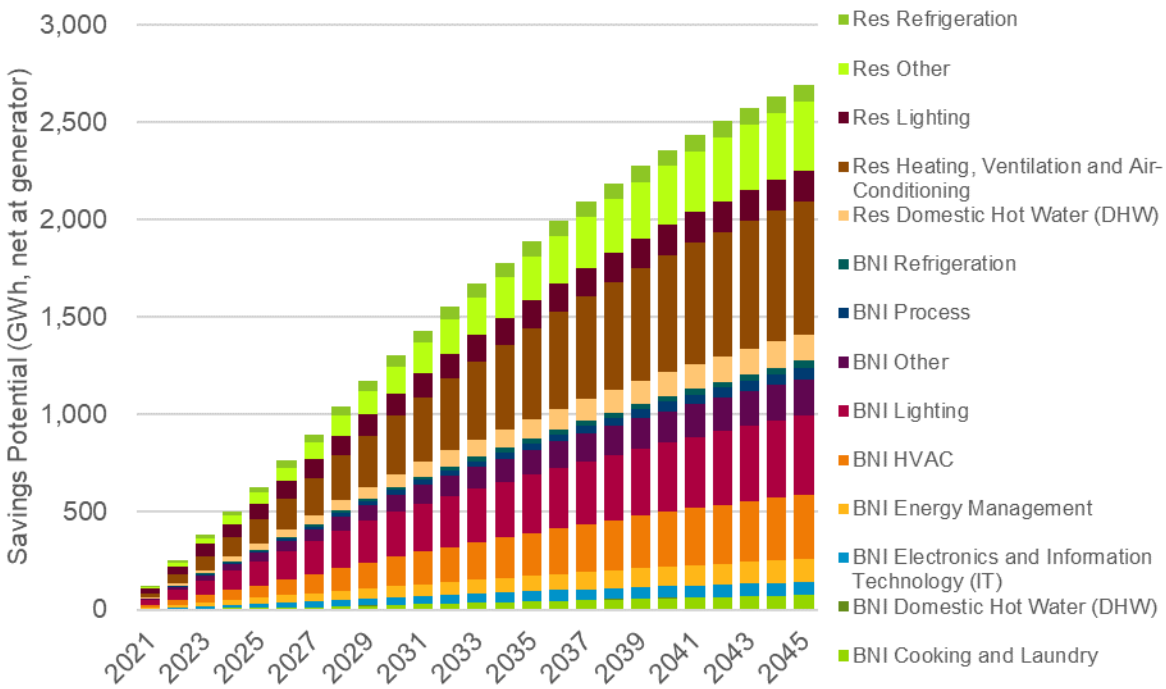


Source: Navigant analysis

8.3 Energy Efficiency Potential Results by End Use

Figure 8-11 shows the electricity market savings potential, net at generator, across end uses. The dominant end uses are Res HVAC and BNI lighting. A wide variety of technologies add to the BNI lighting savings led by LED troffers and linear replacement lamps. Res HVAC is led by whole home retrofits.

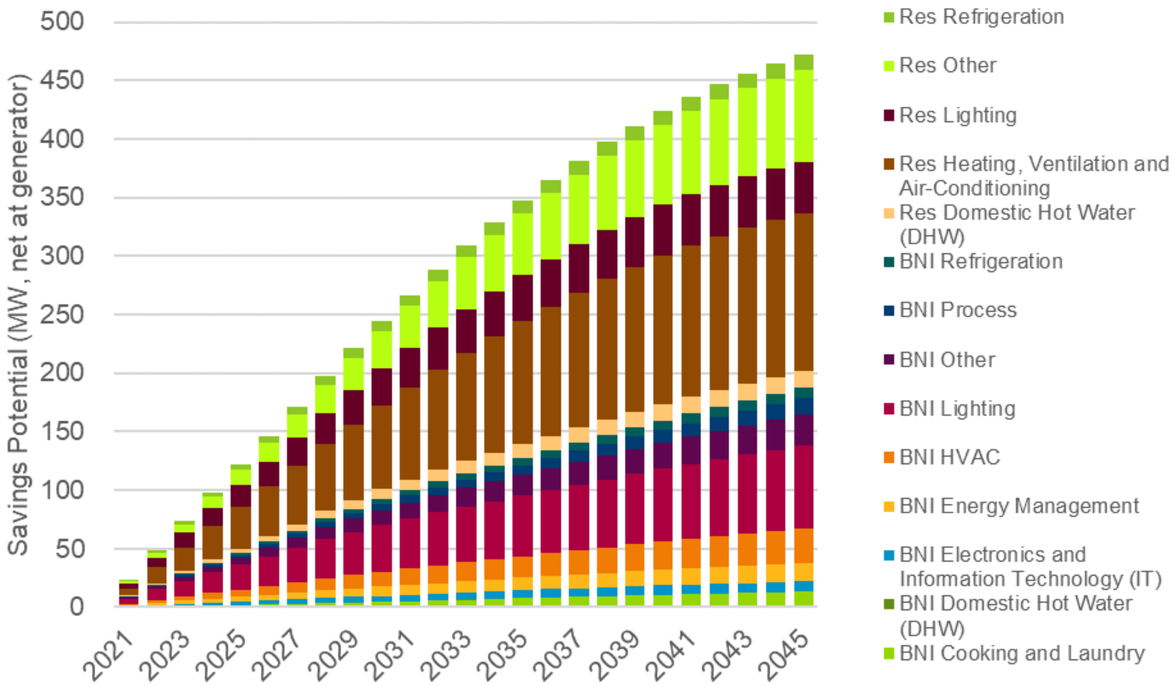
Figure 8-11. EE Base Case Market Potential, Cumulative Electricity Savings by End Use (GWh, net at generator)



Source: Navigant analysis

Figure 8-12 shows the winter peak demand market savings potential, net at generator, across end uses. The dominant end uses are BNI lighting and Res HVAC. A wide variety of technologies add to the BNI lighting savings led by LED troffers and linear replacement lamps. Res HVAC is led by whole home retrofits.

Figure 8-12. EE Base Case Market Potential, Cumulative Winter Peak Demand Savings by End Use (MW, net at generator)

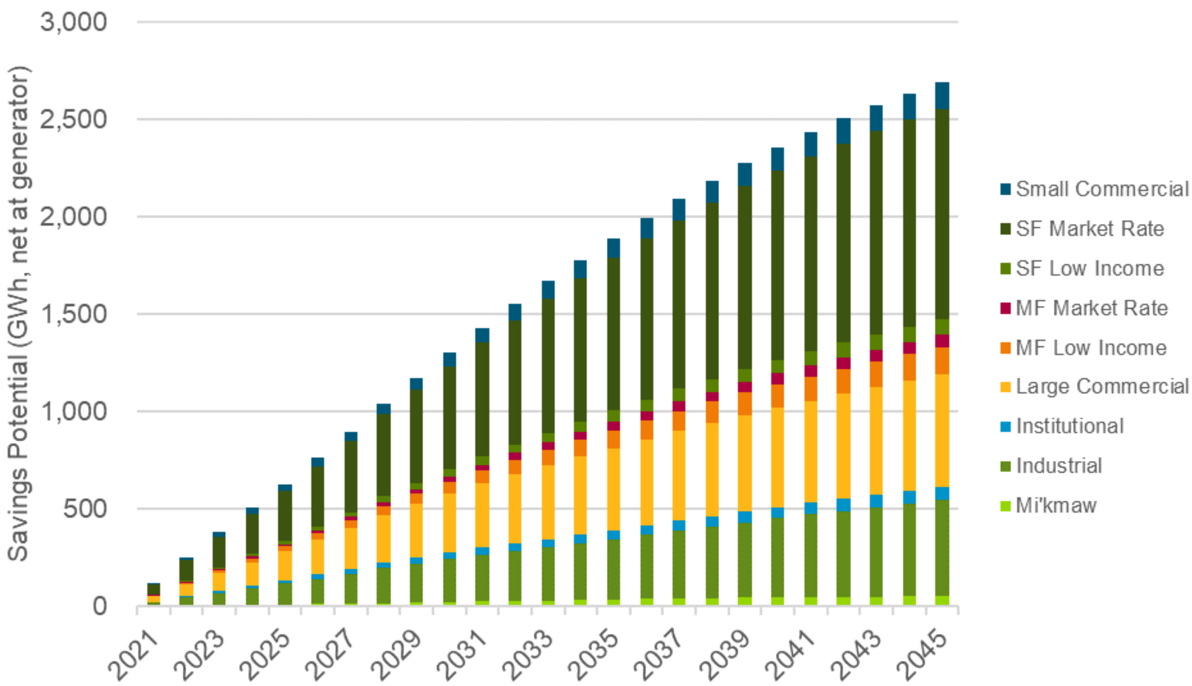


Source: Navigant analysis

8.4 Energy Efficiency Potential Results by Customer Segment

Figure 8-13 shows the electricity market savings potential, net at generator, across customer segments. The dominant segment is residential single-family market rate, followed by industrial and large commercial. Other segments show less savings due to relatively small stocks. The segment cumulation increases proportionally through the study period, with no significant changes in which segment is dominant through time. Additional details and tabular data for customer segment level results are provided in Appendix F.

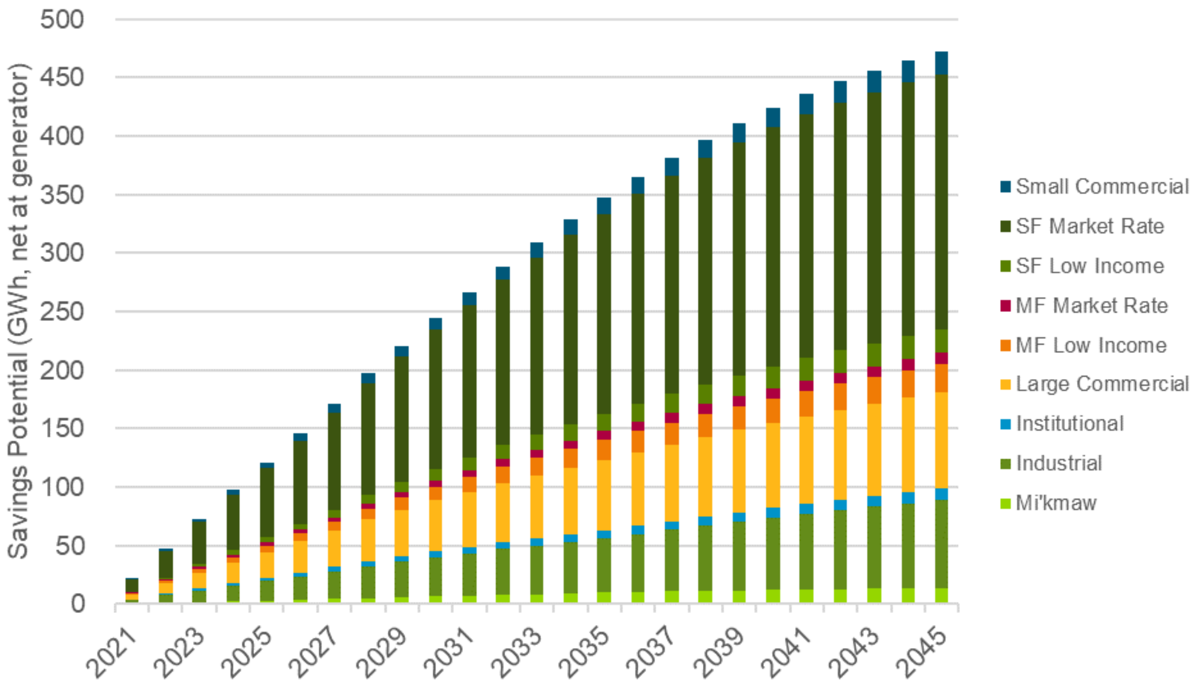
Figure 8-13. EE Base Case Market Potential, Cumulative Electricity Savings by Customer Segment (GWh, net at generator)



Source: Navigant analysis

Figure 8-14 shows the winter peak demand market savings potential, net at generator, across customer segments. Similar to electricity, the dominant segments are residential single-family market rate, industrial, and large commercial. The segment cumulation increases proportionally through the study period, with no significant changes in which segment is dominant through time. Additional details and tabular data for customer segment level results are provided in Appendix F.

Figure 8-14. EE Base Case Market Potential, Cumulative Winter Peak Demand Savings by Customer Segment (MW, net at generator)

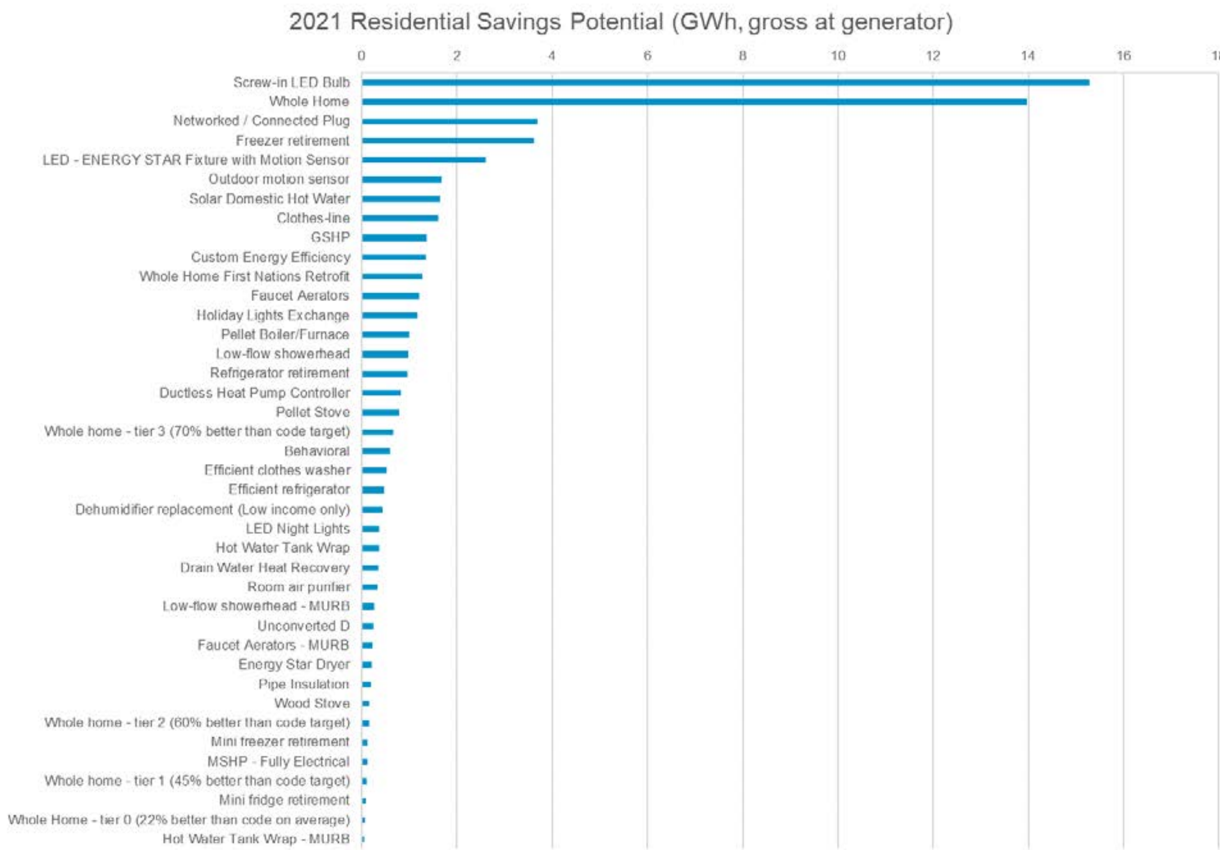


Source: Navigant analysis

8.5 Energy Efficiency Potential Results by Measure

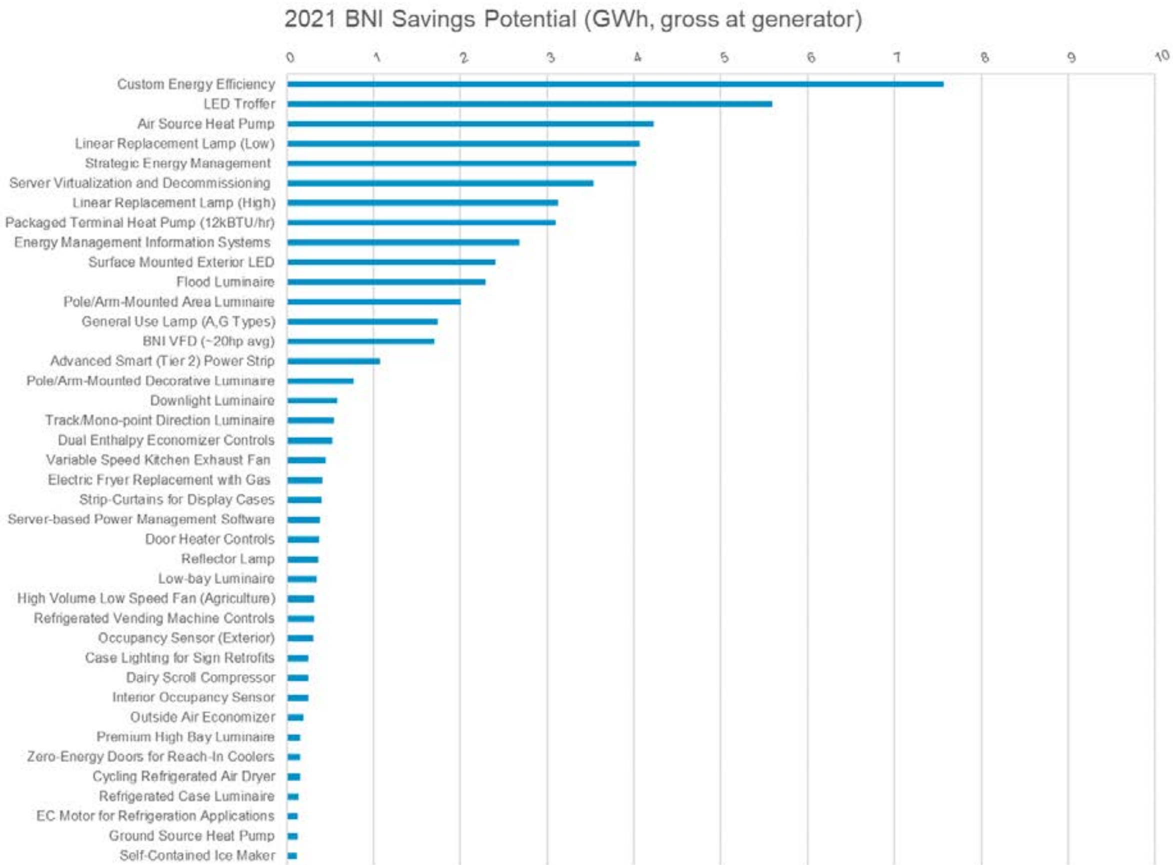
Figure 8-15 and Figure 8-16 show that many of the top ten electricity saving measures, net at generator, in 2021 come from the Res HVAC, Res Lighting, and BNI Lighting end uses. Residential screw-in LED Bulb ranks as the highest electricity-saving market potential measure for the residential sector while custom energy efficiency leads BNI. Savings drops sharply as the top 10 measures provide more than 50% of top 40 measure achievable savings in the residential sector. The BNI sector shows a more gradual decline in savings potential by measure, however, the top 20 measures still dominate total savings.

Figure 8-15. EE Base Case Market Potential, 2021 Top 40 Residential Measures for Electricity Savings (GWh, net at generator)



Source: Navigant analysis

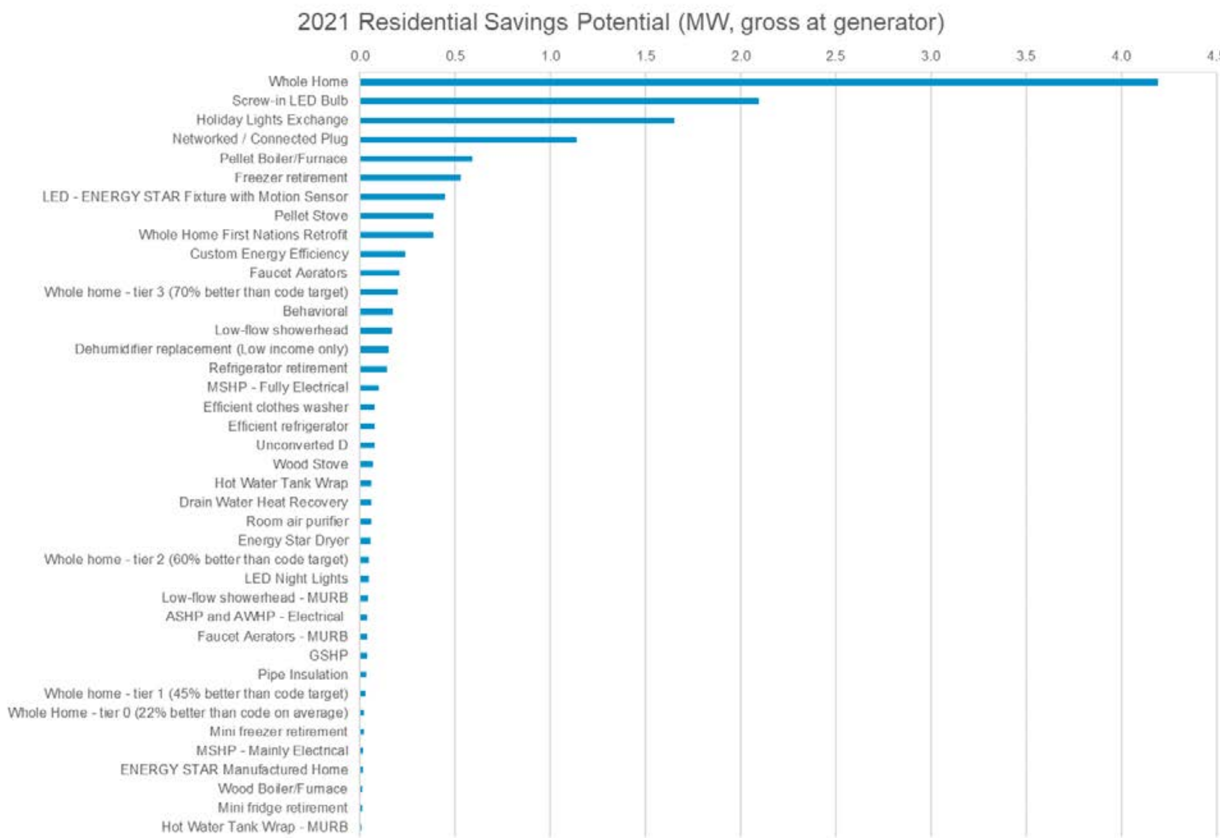
Figure 8-16. EE Market Potential, 2021 Top 40 BNI Measures for Electricity Savings (GWh, net at generator)



Source: Navigant analysis

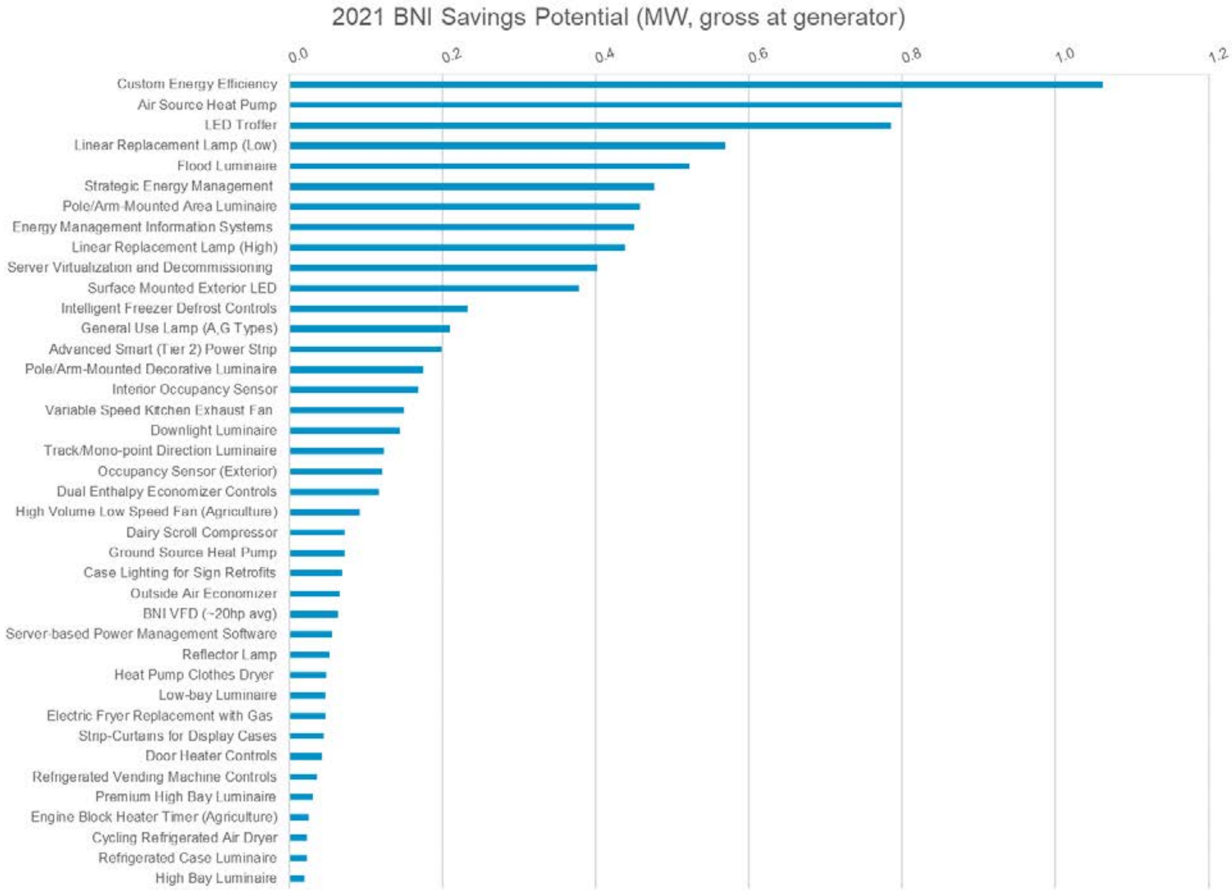
Figure 8-17 and Figure 8-18 show that many of the top ten winter peak demand saving measures, net at generator, in 2021 come from the Res HVAC, Res Lighting, and BNI Lighting end uses. Residential whole home ranks as the highest demand-saving market potential measure for the residential sector, far exceeding any other measure. In the residential sector, savings drops sharply as the top 10 measures provide more than 75% of top 40 measure achievable savings. Custom energy efficiency leads the BNI sector, however, the distribution of potential savings by measure is much more evenly distributed than residential.

Figure 8-17. EE Base Case Market Potential, 2021 Top 40 Residential Measures for Winter Peak Demand Savings (MW, net at generator)



Source: Navigant analysis

Figure 8-18. EE Base Case Market Potential, 2021 Top 40 BNI Measures for Winter Peak Demand Savings (MW, net at generator)



Source: Navigant analysis

8.6 Cost Effectiveness Tests and Investment

The cost effectiveness approach is consistent with the methodology Navigant used for the economic potential presented in Section 4. Figure 8-19 shows the benefit-cost test ratios for the achievable base case, by sector and for the portfolio for each benefit-cost test. The benefit-cost test ratios are significantly greater than 1.0 for all benefit-cost test types at the sector and portfolio level across all analysis years, with the exception of the Rate Impact Measure (RIM) test, which has benefit-cost tests less than 1.0 for certain years and sectors.

Figure 8-19. EE Base Case Market Potential, Benefit-Cost Test Ratios for the Portfolio and by Sector

Sector	Year	Total Resource Cost Test	Program Administrator Cost Test	Participant Cost Test	Rate Impact Measure Test
BNI	2021	3.67	3.95	3.37	1.11
	2025	4.11	4.62	3.68	1.15
	2030	4.61	5.47	3.97	1.20
	2035	4.82	5.87	4.05	1.22
	2040	4.59	5.63	4.01	1.17
	2045	4.56	5.72	4.13	1.13
Residential	2021	3.87	5.43	4.50	0.85
	2025	3.78	5.31	4.50	0.84
	2030	3.73	5.46	4.51	0.84
	2035	3.59	6.53	4.33	0.84
	2040	3.35	5.83	4.30	0.78
	2045	3.18	5.12	4.33	0.72
Portfolio	2021	3.38	4.09	4.07	0.92
	2025	3.48	4.35	4.25	0.91
	2030	3.57	4.67	4.37	0.92
	2035	3.51	5.23	4.27	0.93
	2040	3.37	4.82	4.22	0.89
	2045	3.03	4.25	4.27	0.76

Figure 8-20 presents the net benefits for the achievable base case, by sector and for the portfolio under each benefit-cost test. Coinciding with the benefit-cost test ratios, net benefits are positive in all cases, with the exception of the RIM test.

Figure 8-20. EE Base Case Market Potential, Cost Test Net Benefits for the Portfolio and by Sector (million $)

Sector	Year	Total Resource Cost Test	Program Administrator Cost Test	Participant Cost Test	Rate Impact Measure Test
BNI	2021	$56.82	$58.73	$58.57	$7.80
	2025	$69.61	$72.49	$69.67	$12.14
	2030	$81.19	$86.57	$77.75	$17.79
	2035	$77.42	$83.43	$72.43	$18.45
	2040	$83.84	$90.27	$82.83	$16.34
	2045	$79.29	$85.83	$82.81	$12.04
Residential	2021	$81.87	$90.09	$137.62	-$18.77
	2025	$110.82	$122.30	$204.16	-$28.37
	2030	$131.20	$146.37	$262.53	-$35.16
	2035	$123.45	$144.97	$264.42	-$31.76
	2040	$96.17	$113.55	$246.42	-$37.96
	2045	$72.14	$84.69	$226.34	-$40.71
Portfolio	2021	$132.70	$142.83	$196.20	-$16.96
	2025	$172.93	$187.28	$273.84	-$23.73
	2030	$203.55	$224.11	$340.28	-$26.21
	2035	$192.27	$219.79	$336.85	-$21.92
	2040	$171.85	$195.66	$329.25	-$29.78
	2045	$144.20	$163.29	$309.15	-$35.90

Source: Navigant analysis

Figure 8-21 presents the modelled investment for the achievable base case, by sector and investment type. All investment values are presented here as nominal dollars. For the base case, total investment levels range between $40 million and $65 million annually throughout the 25-year study period, with a peak of $64 million in 2028.

To estimate portfolio fixed administrative costs through time, Navigant used approximately 50% of total administrative spending in the base case. The values for this investment type change year-over-year due to the changes in measure mix delivery and market conditions as modeled in this study. This investment type is fixed and not associated with a specific measure or program, therefore, it does not affect the measure level cost-effectiveness screening. Additionally, because this investment is an estimate of the minimum required fixed administrative to deliver programs, it is held constant between achievable scenarios. Investment details for each scenario are provided in Appendix F.

Figure 8-21. EE Base Case Investment, by Investment Type for the Portfolio (nominal million $)

Year	Incentives	Variable Program Administrative Costs	Fixed Program Administrative Costs	Portfolio Total
	nominal million dollars			
2021	$32.74	$5.84	$5.99	$44.57
2022	$36.30	$6.54	$6.73	$49.57
2023	$36.93	$6.73	$6.91	$50.57
2024	$39.08	$7.17	$7.36	$53.61
2025	$39.49	$7.44	$7.50	$54.44
2026	$43.44	$8.06	$8.20	$59.70
2027	$42.97	$8.27	$8.48	$59.73
2028	$46.24	$8.76	$8.98	$63.98
2029	$42.48	$8.51	$8.71	$59.70
2030	$43.99	$8.64	$8.84	$61.46
2031	$37.13	$8.68	$8.76	$54.58
2032	$37.23	$8.70	$8.88	$54.81
2033	$36.04	$8.58	$8.77	$53.39
2034	$37.21	$8.61	$8.74	$54.57
2035	$37.03	$8.51	$8.61	$54.15
2036	$37.85	$8.49	$8.59	$54.93
2037	$38.36	$8.42	$8.60	$55.38
2038	$37.92	$8.26	$8.47	$54.65
2039	$37.79	$8.12	$8.33	$54.24
2040	$37.69	$7.95	$8.16	$53.80
2041	$36.10	$7.67	$7.87	$51.64
2042	$35.76	$7.51	$7.71	$50.98
2043	$35.28	$7.34	$7.54	$50.16
2044	$34.84	$7.18	$7.38	$49.39
2045	$34.41	$7.03	$7.23	$48.68
Total	$954.30	$197.02	$201.33	$1,352.65

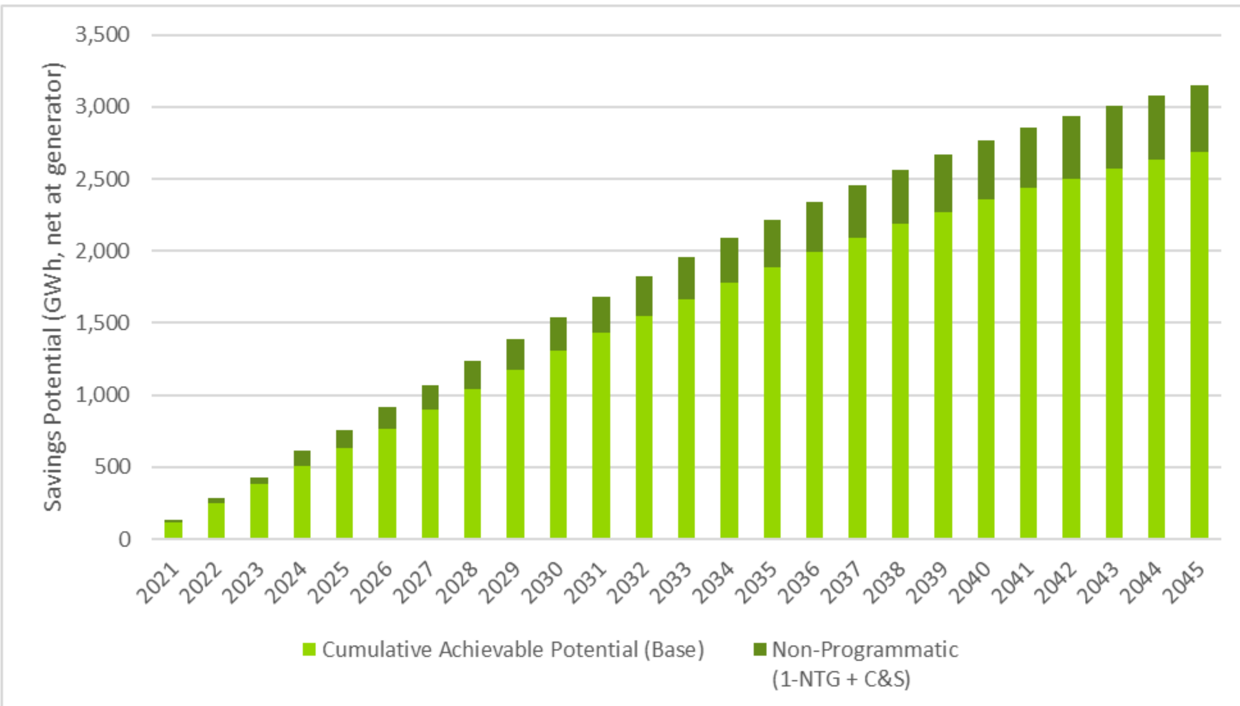
Source: Navigant analysis

8.7 Non-Programmatic Savings

For this study, Navigant defines non-programmatic savings as reductions in savings potential due to codes and standards, and freeridership. It is important to note that savings potential for codes and standards do not represent total impacts due to C&S outside of DSM programs, just effects on program savings potential.

The technical and economic savings shown throughout this report are net of codes and standards savings, while the achievable potential scenarios are net of both codes and standards, and freeridership. Figure 8-22 shows the cumulative base case achievable potential stacked with cumulative non-programmatic savings. Therefore, the cumulative potential values shown below will be higher than those shown in Section 6. Non-programmatic savings yields 11% of total savings in 2021, and peaks at 17% in 2025. This increase is seen in 2024 and is caused by the inclusion of screw-in lighting standards changes. This corresponds to the decrease in residential achievable potential seen in 2024 in Section 6.

Figure 8-22. Cumulative Achievable Potential (Base Case) and Non-Programmatic Electricity Savings (GWh, net at generator)



Source: Navigant analysis

8.8 Hourly Loadshape Disaggregation

At the request of the DSMAG stakeholder group, Navigant developed 8760 profiles for base case achievable potential savings to align with NS Power's IRP end-use inputs. The results of this analysis are provided in Appendix G. This data has been summarized in the appendix at the sector level due to the volume of data.

9. ENERGY EFFICIENCY MARKET POTENTIAL SENSITIVITY ANALYSIS RESULTS

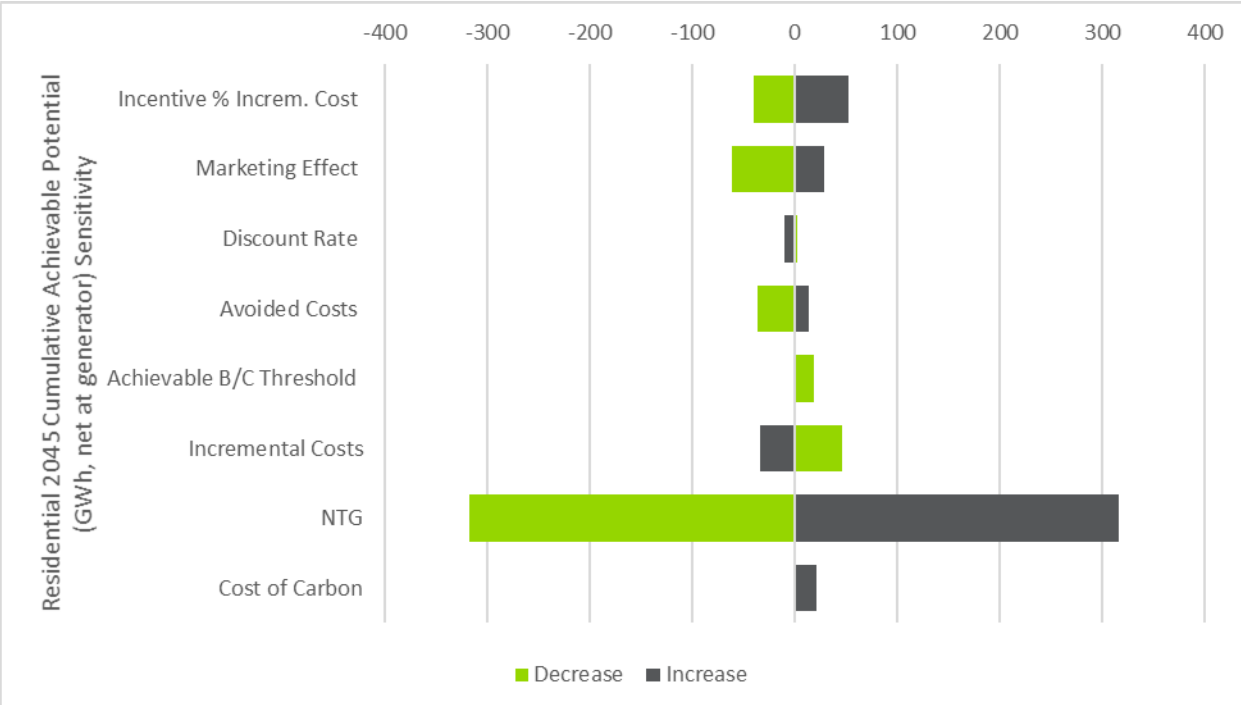
In order to demonstrate the response of the base achievable forecast to incremental changes in inputs, Navigant conducted a parametric sensitivity analysis on the cumulative achievable energy savings potential at the end of the forecast horizon (2045) in the Base scenario. To determine the sensitivity of the results to seven input variables, Navigant varied each parameter by +/-25%, except for the price of CO_2 and the achievable potential B/C screening thresholds, both of which were only varied unidirectionally. CO_2 prices were varied from $0 to $100/metric tonne, and the achievable screening threshold was varied by -25%. It is worth noting that because the model has multiple non-linear components, the effects of varying a parameter is often asymmetrical. For each sensitivity, all other variables were held constant, allowing individual effects to be observed.

Residential achievable potential sensitivity is shown in Figure 9-1. Of the seven parameters tested, the residential cumulative potential by 2045 is the most sensitive to net-to-gross ratio, marketing effects, and incentive changes. Marketing effects influence the growth of customer awareness, and along with incentives are a primary pathway that program administrators use to influence the adoption of efficient measures. The stronger down-side response is suggestive of a more mature residential market – skewed by several large measures like screw-in LEDs. On the other hand, the response to varying incentive levels has the opposite effect because of the ability for incentives to push more nascent technologies like network connected plugs into a steeper part of the payback curve. This effect demonstrates the non-linearity of customer price response. The net-to-gross ratio influences measure TRC ratio, and therefore whether a measure is included in the achievable potential (passes the 0.7 TRC screening threshold). Additionally, net-to-gross ratio directly impacts the unit energy savings. This direct impact on savings values manifests in greater sensitivity than other model inputs, however, any reductions in net-to-gross ratio (as a result of an increase in freeridership) would be captured in the non-programmatic savings.

By contrast, the avoided costs and discount rates have comparably small impacts on the achievable potential with the same percentage-wise variation because these only influence the screening of the measure by acting indirectly through the TRC. Thus, it requires a change in the avoided costs of more than 25% to change the TRC benefit-cost ratio by 25% because of the diluting influence of incremental costs, net to gross ratios, and administrative costs – all of which effect the benefit/cost ratio as well. As can been seen by the larger sensitivity to carbon price than avoided costs, the $100/metric tonne of carbon adder equated to more than a 25% increase in the avoided costs as they impact analysis in the same way.

Incremental costs have a relatively large effect on potential because of their role in determining the market shares between measures in a competition group as well as the TRC screen. Relative to BNI, more measures switch between passing TRC screening or not when the incremental costs are changed (this is also true for avoided costs), generating a larger response.

Figure 9-1. EE Residential 2045 Cumulative Achievable Potential Sensitivity (GWh, net at generator)

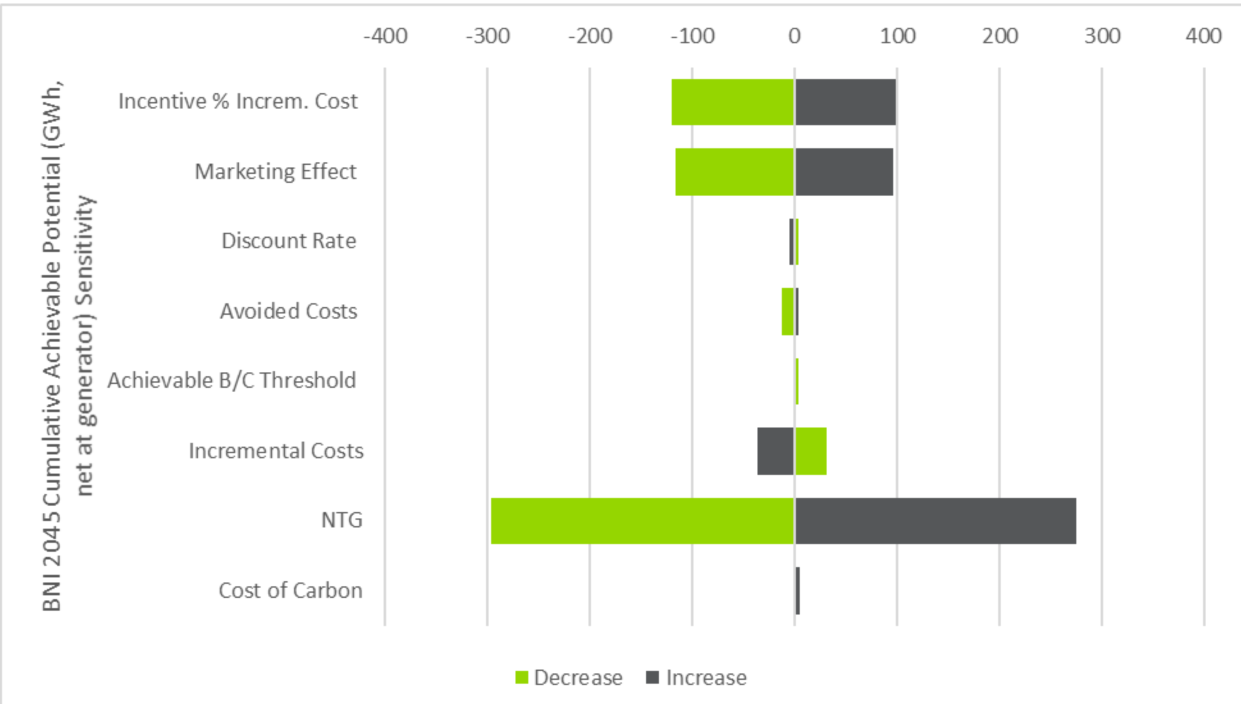


Source: Navigant analysis

BNI sensitivities are shown in Figure 9-2. Overall the response of the cumulative BNI achievable potential to the chosen parameter variations is similar to residential, both in order of importance, and magnitude of the response. The most important difference is the larger sensitivity in BNI to both marketing and incentive changes. This is due more to the location of important BNI measures, such as LED troffers, and strategic energy management at steep-sloping areas in the payback curve where diminishing returns do not kick in, and the response can be symmetric.

Similarly, because awareness in BNI tends to be higher overall, but is not yet 100% for several key measures (particularly in lighting and HVAC), significant positive or negative feedback can be triggered through marketing, yielding a sharper response. The same effect observed in residential around avoided costs and discount rates is true for BNI – because these inputs work through the TRC and are influenced by other factors, they tend to be second-order effects when there are not large measures that are near a tipping point.

Figure 9-2. EE BNI 2045 Cumulative Achievable Potential Sensitivity (GWh, net at generator)



Source: Navigant analysis

10. DEMAND RESPONSE METHODOLOGY

Navigant developed demand response potential and cost estimates using a bottom-up analysis. The analysis utilizes primary data from Nova Scotia Power and relevant secondary sources of information, as documented in the appendices and the input workbook that accompanies this report (see Appendix C). Navigant customized its DRSim^{TM} model, which uses this data as inputs, for this study. The following subsections detail Navigant's DR potential and cost estimation methodology, as summarized in Figure 10-1. The methodology is as follows:

1. Characterize market for DR potential by quantifying the number of eligible customers
2. Estimate coincident winter peak load by customer class and building type over the study period (2021 – 2045)
3. Define and characterize DR options, and map applicable options to relevant customer classes and/or building types
4. Develop participation levels, unit load reductions, and cost assumptions for each DR option, by customer class and building type combination
5. Present potential estimates, annual costs, levelized costs and cost-effectiveness results by DR option, customer class and building type
6. Conduct scenario analysis and present DR potentials, annual costs and cost-effectiveness results by scenario

Figure 10-1. DR Potential Assessment Steps

Step 1: Market Characterization	• Characterize market for DR potential estimation: Number of customers and coincident peak load estimates by customer class and building type
Step 2: Develop Baseline Projections	• Define peak and develop baseline peak demand projections over the study period.
Step 3: Define DR Options	• Define and characterize DR options (i.e. technologies) and map applicable options to relevant customer classes.
Step 4: Develop Key Assumptions for Potential and Costs	• Develop assumptions for participation, unit load reduction, and itemized cost for each DR option.
Step 5: Estimate Potential and Costs, and Assess Cost-Effectiveness	• Present potential estimates, annual costs, levelized costs, and cost-effectiveness results by DR option and customer segments.
Step 6: Scenario Analysis	• Present potential results by scenario, which consider variations in incentive assumptions, marketing intensity, and program participation.

Source: Navigant

10.1 Demand Response Market Characterization

Market characterization is the first step in the DR potential assessment process. The market characterization process for the DR assessment aimed to segment the market appropriately for the analysis. Specifically, Navigant aggregated data on key pieces of information, such as customer count and peak load, by customer segment and end-use to use as inputs into the model. Navigant based the segmentation on the examination of NS Power's rate schedules and the customer segments established in the energy efficiency potential study.

Figure 10-2 presents the different levels of market segmentation for DR potential assessment. The segmentation by customer size, according to demand values, is based on NS Power rate classes. Navigant also used Dun & Bradstreet (DnB) customer data that indicated the breakdown of BNI customers and sales by business type to disaggregate customer count and peak demand estimates.

Figure 10-2. Market Segmentation for DR Potential Assessment

Level	Description
Level 1: By Sector	• Residential • Commercial and Industrial (BNI) • Electric Vehicles (EV)
Level 2: By Customer Class [13]	• Residential • BNI » Small Commercial » Large Commercial » Small Industrial » Large Industrial » Interruptible Rider [14] • Electric Vehicles
Level 3: By Building Type [15]	• Residential » Residential LI » Residential • BNI » Manufacturing » Miscellaneous » Offices » Retail Trade » Services » Market Rate • Electric Vehicles

Source: Navigant

Level 1: Sector

Navigant segmented customers into residential and BNI sectors. Additionally, Electric vehicles (EVs) are considered in aggregate across all customer classes since the EV forecast did not specify the distribution of EVs across the various customer segments.

Level 2: Customer Class

Navigant further segmented the BNI customer class into five categories based on the demand values following NSP's rate schedules. These size categories are also referred to as the BNI customer class. The segmentation by size was necessary as the type of DR program offer varies by customer size.

[13] Mapping between customer classes and NS Power rate classes is provided in Figure 13-3.

[14] Customers on Interruptible Riders were called out separately to identify the potential associated with these customers.

[15] Mapping between building types and Dunn & Bradstreet (DnB) business types is provided in Figure 13-3.

Navigant did not segment residential customers by demand since the variation of demand values across residential customers is low. Electric vehicle owners also were not segmented further. Mapping between NS Power rate classes to those used in the DR study are provided in Figure 10-3.

Figure 10-3. Mapping Between Nova Scotia Power Rate Class and DR Study Customer Class

Mapped Customer Class in DR Potential Study	Nova Scotia Power Rate Class
Residential	Residential
Small Commercial	Small General General
Large Commercial	Large General
Small Industrial	Small Industrial
Large Industrial	Medium Industrial Large Industrial
Interruptible	Interruptible Rider

Source: Navigant

Level 3: Customer Segment

Navigant further segmented BNI customers into segments or building types by mapping the DnB business types to the building types considered in the analysis. Mapping between NS Power building and business types is provided in Figure 10-4.

Figure 10-4. Mapping Between Nova Scotia Power Building Type and Business Type

Building Type (Used in analysis)	Business Type[16]
Offices	Finance, Insurance, And Real Estate
	Public Administration
Retail Trade	Retail Trade
Services	Services
Manufacturing	Manufacturing
	Agriculture, Forestry, And Fishing
	Construction
	Other Service Industries
	Transportation, Communications, Electric, Gas, And Sanitary Services
	Wholesale Trade
	Charitable Premises

Source: Navigant

10.2 Demand Response Baseline Projections

The next step after market segmentation was to develop baseline projections for the number of accounts and associated winter peak demand by customer class and segment over the potential analysis period. The baseline projections aimed to define and forecast customer data for the study period, similar to the market

[16] These business types were sourced from the DnB dataset provided by EfficiencyOne.

characterization in the EE assessment. Navigant selected 2018 as the base year for the study, since it is the latest year for which full market data is available at the time of the analysis. The baseline projections for the number of accounts and peak demand were developed at the following levels:

- Number of accounts
  - By customer class and building type
- Winter peak demand projections
  - By customer class, building type and end use

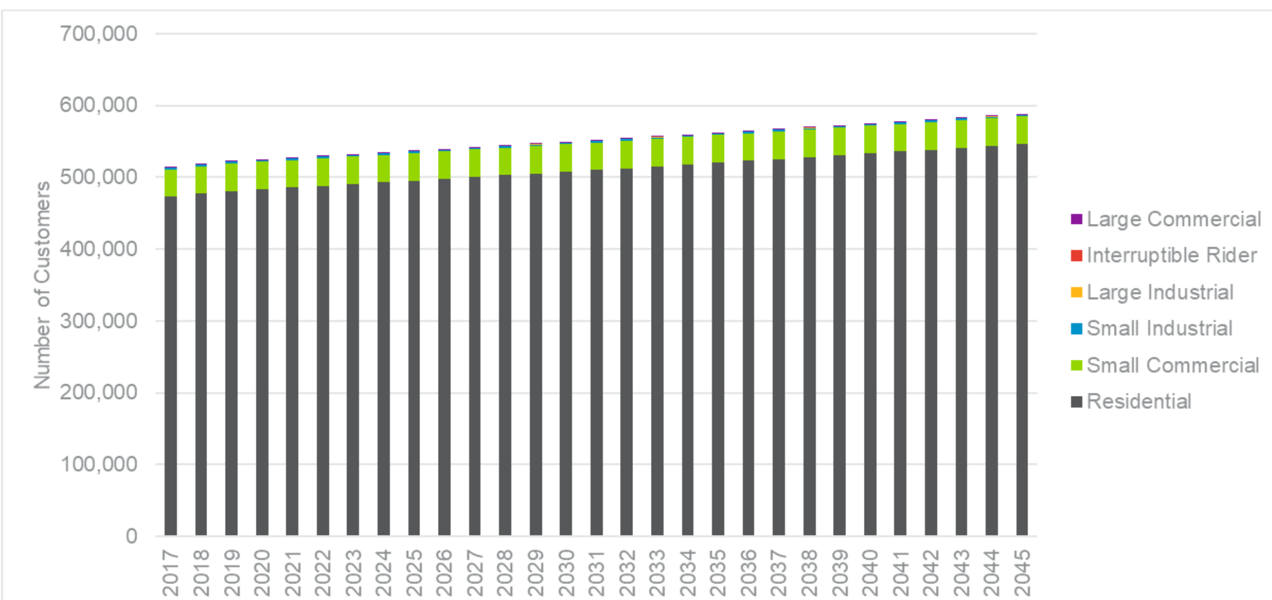
10.2.1 Customer Count Projections

The steps to generate customer count projections include:

- Separate out Interruptible Rider customers using BNI account counts by rate class
- Exclude Outdoor Recreational Lighting, Unmetered, GRLF, RTP, Shore Power
- Disaggregate customer counts 2020-2022 Plan Rate and Bill Impact Analysis customer counts using NS Power data on BNI account counts by business types
- Blend Municipal customers, assuming the same distribution as NS Power customers
- Disaggregate Residential accounts into Market Rate, Low Income, and Charitable Premises using NS Power data on Charitable Premises and Low-Income rates
- Blend Municipal customers, assuming the same distribution as NSP customers
- Disaggregate Residential accounts into Market Rate, Low Income, and Charitable Premises using NSP data on Charitable Premises and Low-Income rates

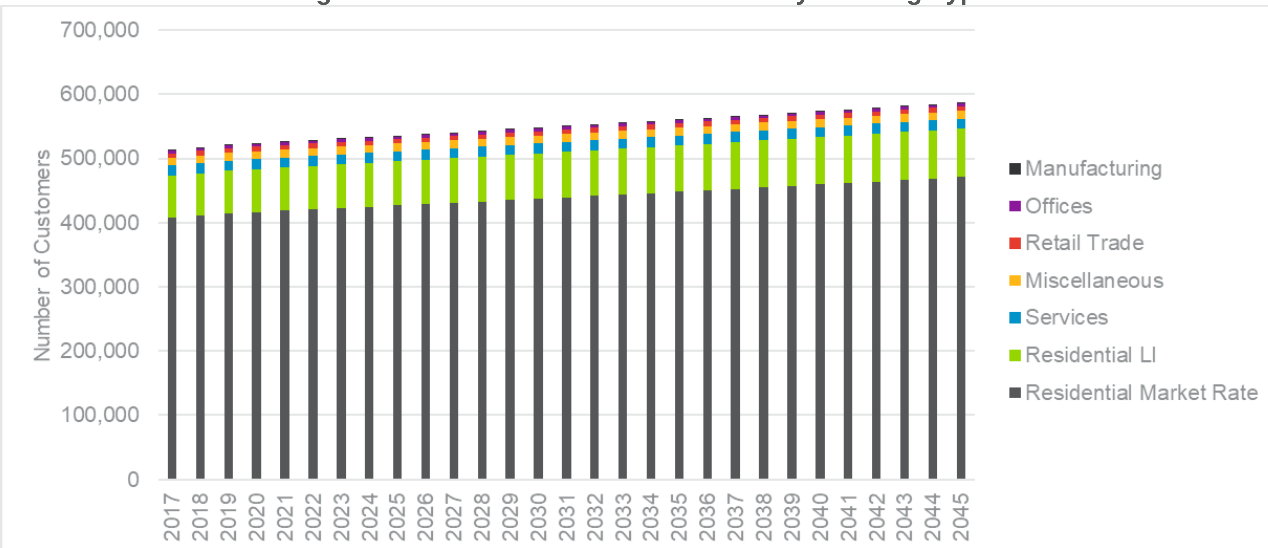
Figure 10-5 and Figure 10-6 summarize the account count projections by customer class.

Figure 10-5. Customer Count Forecast by Customer Class



Source: Navigant

Figure 10-6. Customer Count Forecast by Building Type



Source: Navigant

10.2.2 Peak Period Definition and Peak Demand Projections

A key element of market characterization for the DR potential study is to develop disaggregated bottom-up peak demand projections by customer class, segment and end use, which serves as the foundation for the DR potential estimates. Figure 10-7 shows the stepwise approach used to develop baseline peak demand projections.

Figure 10-7. Baseline Peak Projection Steps

Define Peak Period	•Based on historical hourly system load data, the peak period was defined as 5-8pm for the months of December, January, and February
Calculate Coincident Peak Demand Factors	•Use the peak period and normalized 8760 loadshapes from a prior EfficiencyOne study conducted
Obtain End Use Shares	•Use NS Power End Use Model results to obtain end use shares for each building
Determine Energy Sales after DSM	•Subtract Navigant's EE potential study results from NS Power sales forecast before
Calculate Bottom-Up Peak Demand Projection	•Apply coincident peak demand factors and end use shares to forecasted retail energy sales to obtain demand projections for the peak period
Calibration	•Calibrate results to align with 3CP demand distribution.
Develop Separate Peak Demand Projections for EVs	•Use EV adoption forecast and estimated peak demand from charging to develop peak demand projections

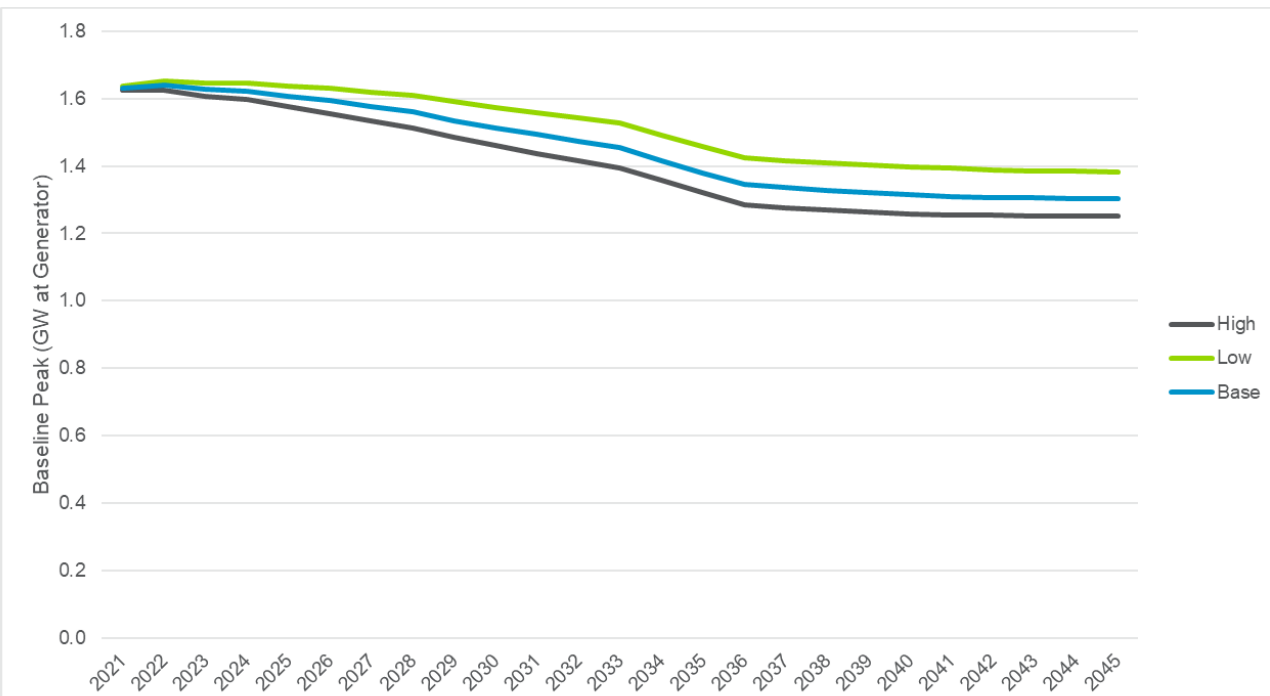
Source: Navigant

The first step in this approach was to define the peak period. Based on analysis of hourly system load data, Navigant determined that 5-8 pm for the months of December, January, and February constitute the peak period. Navigant used this definition to develop coincident peak demand estimate by customer class, building type and end use. The primary data sources for developing these estimates were 8760 system data, forecasted retail sales data, end use model results from NSP, energy efficiency potential results. Navigant used the data from these sources to develop coincident peak demand estimates by customer class and building type for the base year, and then Navigant projected these estimates for future years by scaling these values with the retail sales forecast. For coincident winter peak demand estimates for EVs, Navigant used per vehicle impacts from NSP's load forecast and vehicle adoption forecasts from the Navigant-developed Vehicle Adoption Simulation Tool (VAST).

Three different scenarios from the Energy Efficiency Potential Study were considered in the baseline winter peak projections: (1) low, (2) base, and (3) mid. These correspond to the scenarios low, base, and high, respectively, in the DR study.

Figure 10-8 shows the baseline peak projections across the various scenarios. Note that the scenario names refer to the level of energy efficiency savings assumed to occur, so the baseline peak demand for the high scenario (with highest energy savings among these three scenarios) is lower than that of the low and base scenarios. As energy efficiency savings increase in the future, peak demand is projected to decrease. It is important to note that the peak period is defined differently than in the EE study.[17]

Figure 10-8. Winter Baseline Peak Forecast by DR Scenario (GW at generator)

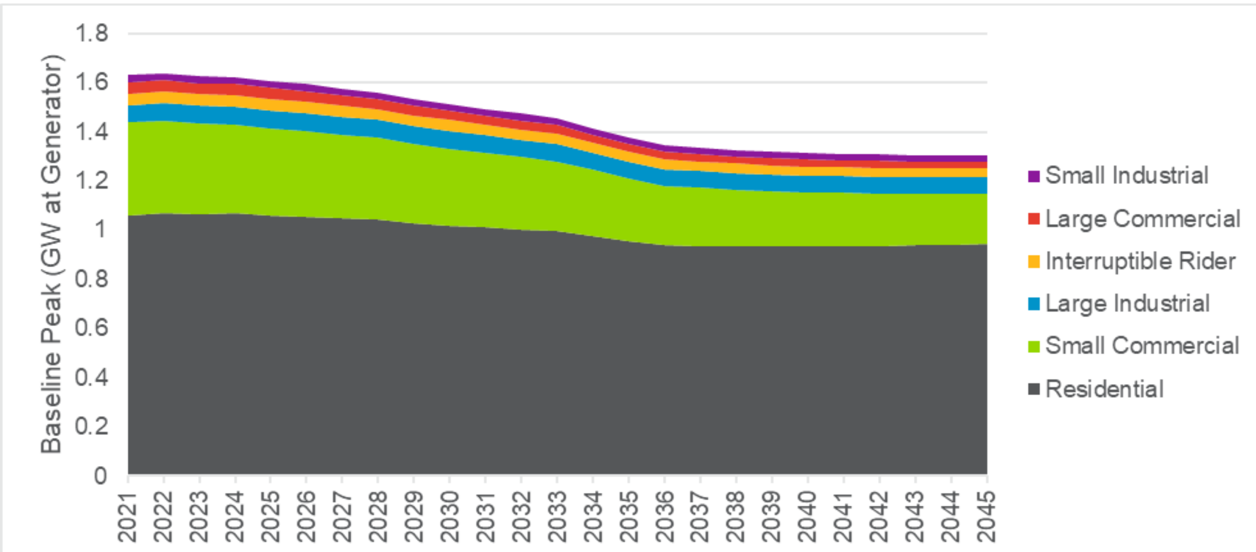


Source: Navigant analysis

[17] The baseline peak forecast represented here is different from the peak forecast by NS Power. The peak demand shown in the figure is the average peak demand over the 3-hr. peak period (5 p.m. to 8 p.m.) from December to February. This serves as the baseline peak demand for estimating load reduction impacts from DR programs. NS Power's peak forecast represents the single hour system peak demand. Therefore, the peak definition is different in the two cases. Moreover, the peak demand forecast shown in the graph represents the peak demand net of energy efficiency potential estimates from Navigant's analysis presented in this report, which is not incorporated in NS Power's peak demand forecast. The DR forecast also excludes Outdoor Recreational Lighting, Unmetered, GRLF, RTP, Shore Power, and Mining customers since these segments tend to be ineligible for DR programs.

The following baseline peak figures are for the base scenario, but the same distribution can be assumed for the other two scenarios. Figure 10-9 shows the estimated peak demand over the forecast period, broken out by customer class. Residential makes up the largest segment, followed by small commercial. The remaining four customer classes – large commercial, small industrial, large industrial, and customers on Interruptible Rider - constitute around 10% to 15% of the total peak demand.

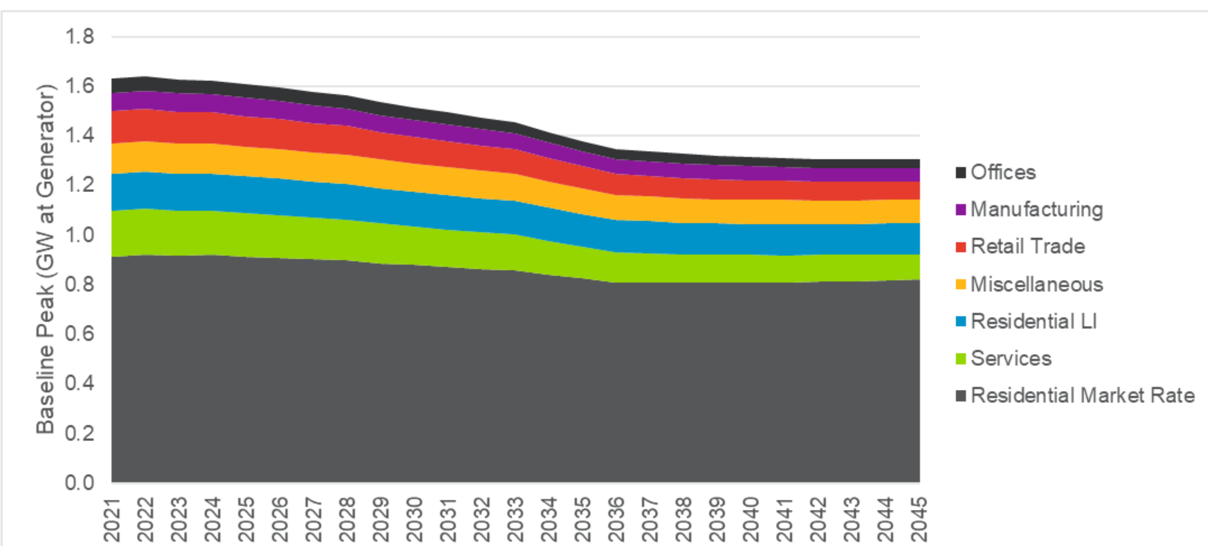
Figure 10-9. Winter Baseline Peak Forecast by Customer Class (GW at generator)



Source: Navigant analysis

Figure 10-10 shows the baseline peak forecast broken out by building type.

Figure 10-10. Winter Baseline Peak Forecast by Building Type (GW at generator)



Source: Navigant analysis

10.2.3 Battery Adoption Projections

Due to a lack of information on battery adoption projections in Nova Scotia, Navigant developed high-level battery adoption forecasts using assumptions drawn from Navigant Research reports and industry expertise.[18]

In order to project battery adoption by customer class, Navigant first estimated the size of the battery to be 5 kW and 10% of the customer demand and the capacity to be two hours, since smaller capacities tend to be more economically feasible. Then, upfront costs and O&M costs based on Navigant Research data were used to calculate equipment costs borne by the customer. Capital costs are assumed to decline at 5% per year for the next 10 years. Annual customer bill savings were determined by obtaining demand and energy charges from NS Power tariffs and calculating the demand charge savings for BNI customers and energy arbitrage values for customers with a time-varying rate. This information was used to calculate the simple payback period for each customer class, which in conjunction with payback acceptance curve,[19] determines the long-run equilibrium level of customer adoption. A non-economic adoption adder of 2.5% was added to residential customers to capture other causes of natural adoption including resiliency. The adoption was then simulated to follow a Bass-diffusion curve with a 10-year ramp rate.

Figure 10-11 presents battery capacity forecasts for select years developed using the methodology outlined in this section. The accompanying input assumptions worksheet contains values for all years.

Figure 10-11. Battery Capacity Projections (MW at meter)

Customer Class	2021 MW at meter	2030 MW at meter	2040 MW at meter
Interruptible Rider	0.2	2.5	2.6
Large Commercial	0.2	2.3	2.4
Large Industrial	0.4	3.7	3.8
Residential	6.2	67.5	73.0
Small Commercial	0.9	9.0	9.2
Small Industrial	0.0	0.2	0.2
Grand Total	7.9	85.2	91.2

Source: Navigant analysis

10.2.4 Electric Vehicle Projections

The forecasts produced for this report are derived from Navigant's Vehicle Adoption Simulation Tool (VAST™). VAST™ integrates a provincial-level systems dynamics routine driven by technology attributes including the total cost of vehicle ownership, range, fueling characteristics, and customer behaviour, and a census-tract level socio-demographic component. The systems dynamics modeling yields the forecasts for the Plug-In Electric Vehicle (PEV)[20] population of a given geography, typically the size of a province or a country. Projections on new PEV sales are generated through an enhanced Bass Diffusion framework, combining a logit technology competition model that generates the long-run equilibrium market share for

[18] Battery projections are typically an input to the DR analysis but are not necessarily developed as part of the analysis. Due to a lack of information/data on battery projections in Nova Scotia, Navigant developed high-level battery projections using a relatively simple approach that estimates battery adoption based on simple payback analysis. Detailed modeling of battery projections was outside the scope of the DR study.

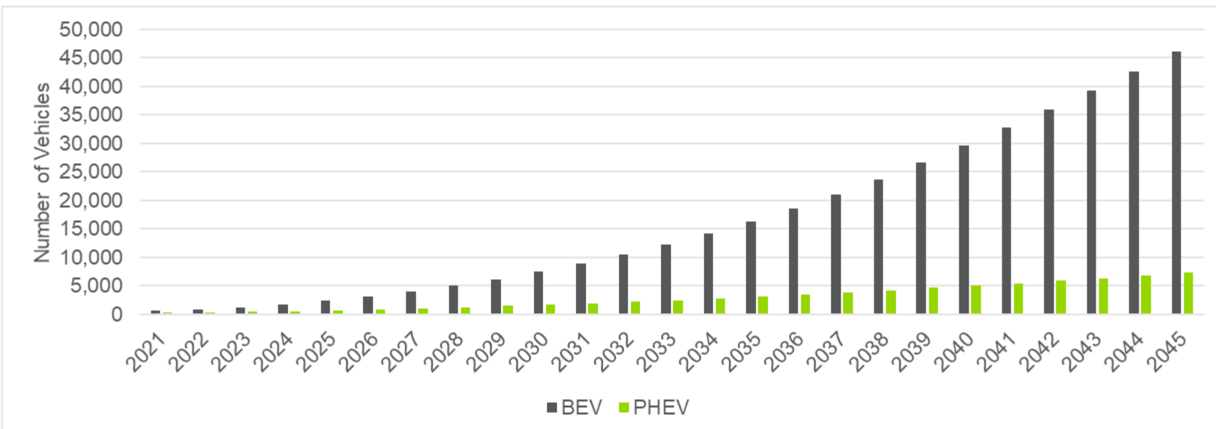
[19] Payback acceptance curves are based on Navigant studies on battery adoption for utilities in other jurisdictions.

[20] PEVs include Battery Electric Vehicles (BEV) and Plug-In Hybrid Electric Vehicles (PHEV), but not Hybrid Electric Vehicles (HEV).

each powertrain, vehicle class, and ownership combination, with a Bass Diffusion model simulating the growth in technology awareness over time.

Nova Scotia is low on the adoption curve with only 130 PEVs on the road as of late 2018. In 2030, approximately 1% of all vehicles on the road are predicted to be PEVs. By 2045, the forecast shows 1,300,000 total vehicles in Nova Scotia, of which approximately 4% are PEVs, shown in Figure 10-12. Battery electric vehicles (BEVs) are expected to have higher market penetration than plug-in hybrid electric vehicles (PHEVs) with an 80/20 split in 2030.[21]

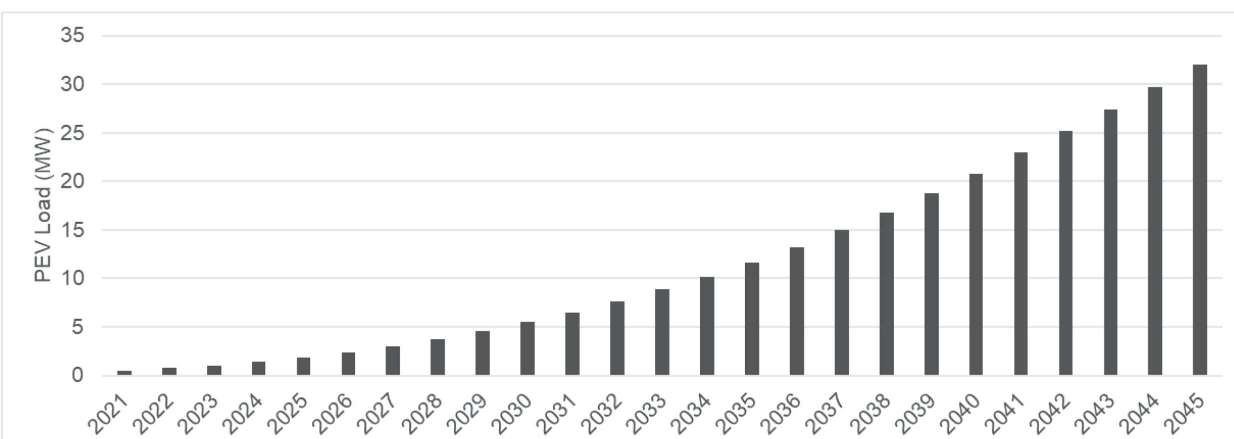
Figure 10-12. Vehicle Adoption Forecast from VAST™



Source: Navigant analysis

Load projections are estimated using a 0.6 kW/vehicle impact value from NSPI's 2019 Load Forecast report, which assumes that charging management programs will be in place. Figure 10-13 presents the forecasted load impacts from PEVs.

Figure 10-13. Demand Impacts from PEVs



Source: Navigant analysis, NSPI 2019 Load Forecast

[21] The decision to use EV forecasts using Navigant's VAST model was based on discussions with EfficiencyOne, and supported by Nova Scotia Power

10.3 Characterization of Demand Response Options

Once the baseline peak demand projections were developed, the next key step in the DR potential assessment was to characterize the different types of DR options that could be utilized to curtail winter peak demand. Figure 10-14 summarizes the DR options included in the analysis. Figure 10-15 lists the sub-options that represent specific end uses and control technologies under the broad program types, referred to as DR options. The DR options are representative of the commonly deployed DR programs in the industry, including end use load curtailment through manual and automated methods, load shifting to behind-the-meter (BTM) batteries, control of EV charging, critical peak pricing (CPP), and behavioural demand response (BDR).

Figure 10-14. Summary of DR Options Considered in Study

DR Option	Brief Description	Eligible Customer Classes	End Use
DCL Direct Load Control	Control of electric loads by a thermostat and/or load control switch.	Residential Small Commercial Small Industrial	Electric Furnace[22] Heat Pump[23] HVAC[24] Hot Water
BNI Curtailment	Firm capacity reduction commitment. $/kW payment based on delivered capacity, administered through third party aggregators.	Large Commercial Large Industrial Interruptible	HVAC Lighting Water Heating Total Facility
BTM Battery Control	Use of batteries for load shifting and dispatching to the grid.	All classes	Batteries
EV Charging Control	Charging modulation to reduce EV demand during peak periods	EV	EV
Critical Peak Pricing (CPP)	A rate schedule with significantly higher peak prices to discourage consumption during peak times	All classes	Total Facility
Behavioral Demand Response (BDR)	Targeted notifications and incentives are provided to customers to encourage peak shaving	Residential	Total Facility

Source: Navigant

[22] Electric furnace and heat pump apply to residential. For small commercial and industrial, Navigant refers to the end use load type as HVAC.

[23] *Ibid.*

[24] *Ibid.*

Figure 10-15. Summary of DR Sub-Options

DR Option	DR Sub-Option	End Use
DCL Direct Load Control	DLC-Thermostat-Electric Furnace	Electric Furnace
	DLC-Thermostat-Heat Pump	Heat Pump
	DLC-Thermostat-HVAC	HVAC
	DLC-Switch-Water Heating	Hot Water
BNI Curtailment	BNI Curtailment-Manual HVAC Control	HVAC
	BNI Curtailment- Auto-DR HVAC Control[25]	HVAC
	BNI Curtailment- Central Lighting Control	Lighting
	BNI Curtailment- Advanced Lighting Control	Lighting
	BNI Curtailment- Water Heating Control	Water Heating
	BNI Curtailment- Industrial	Total Facility
BTM Battery Control	BTM Battery Control	Batteries
EV Charging Control	EV Charging Control	EV
Critical Peak Pricing (CPP)	CPP with enabling technology	Total Facility
	CPP w/o enabling technology	
Behavioral Demand Response (BDR)	Behavioral Demand Response	Total Facility

Source: Navigant

The Direct load control (DLC) option is applicable to residential and small BNI. The sub-options included under this option target space heating and electric water heating. For residential customers, both heat pump and electric furnace heating controls using thermostats were considered, along with switch-based control for electric water heating. For small BNI customers, DR sub-options included similar control technology as residential.

The BNI Curtailment option represents demand reductions through control of a variety of end uses at customer facilities using a combination of manual and automated control mechanisms. This option applies to large BNI customers. BTM batteries are considered for all customer classes to shift facility load during peak demand periods. EV control includes reduction in EV load through charging interruptions during the peak demand period.

CPP applies to all customer classes and impact rate structures to shift usage away from peak hours in a year. The dynamic rate represented in this analysis is a Critical Peak Pricing (CPP) with a 6:1 critical peak to off-peak price ratio. The analysis considered impacts from CPP rates without any enabling technology and in combination with enabling technology (enabling technology refers to thermostats for residential and

[25] Automated Demand Response (Auto-DR) is a platform to automatically activate a pre-programmed load reduction strategy in response to a signal from a Demand Response Automation Server (DRAS). Load is curtailed by the customer's building management or Supervisory Control and Data Acquisition (SCADA) system after being triggered by a signal that is sent from NSP's control room to the vendor's operations center, and on to the customer's facility. Customer always retains the ability to override the curtailment sequence in the event a site cannot participate in a specific demand response dispatch. Auto-DR ensures higher reliability of response without manual intervention.

small commercial and small industrial customers, and Auto-DR for the remaining customer classes). Industry experience suggests that the impact of the rate is enhanced when paired with enabling

technology. The study assumes an opt-in type of offer for CPP for the base scenario and requires customers to have a smart meter for them to be on the rate.[26] Hence the start year for the rate offer is 2022, after completion of smart meter deployment.

Behaviour DR (BDR) shares similar characteristics to the behavioural energy efficiency program offer, where customers are behaviourally motivated to reduce their energy use during peak demand periods through feedback on their performance and peer comparisons. BDR is assumed to be offered on an opt-in basis and requires smart meters.

10.4 Key Assumptions for Demand Response Potential and Cost-Effectiveness Assessment

The final step in Navigant's assumptions development process was to estimate programmatic inputs such as participation rates, unit load reductions and costs for the DR options (see Appendix C). These are key variables that feed the DR potential and cost calculations. These assumptions were based on similar DR potential studies and program performance data/information from DR programs in other jurisdictions, as well as professional judgement by Navigant. Figure 10-16 summarizes the key DR potential and cost estimation variables considered in this study. The DR analysis input assumptions, provided as Appendix C to the report, presents detailed documentation of the basis for these assumptions.

Figure 10-16. Key Variables for DR Potential and Cost Estimates

Key Variables	Description
Participation Rates	• Percentage of eligible customers enrolled in DR programs by DR Options, DR sub-options, customer class and building types • Participation ramp (rate at which the program ramps up to steady state participation over a specified period)
Unit Impacts	• kW reduction per device for DLC (residential and small BNI customers) • Percent of enrolled load by end use/total facility/battery for DLC (Large BNI customers), BNI Curtailment, BTM Batteries, and EV Control
Costs	• One-time fixed costs related to program development • One-time variable costs for customer recruitment and program marketing, equipment installation and enablement • Recurring fixed and variable costs such as annual program admin. costs, customer incentives, O&M, etc.
Global Parameters	Program Lifetime, Discount Rate, Inflation Rate, Line Losses, Avoided Costs [27]

Source: Navigant

[26] The DR analysis assumed "default with opt-out" type of offer under the High Scenario and the same opt-in type of offer for the low scenario. This is further discussed under the scenario descriptions later in this chapter.

[27] Generation and Energy avoided costs are from the 2014 Integrated Resource Plan for NS. The T&D costs were provided to EfficiencyOne by NS Power in 2018. An implicit assumption in this study is that the avoided costs developed for NSP's peak period definition is applicable to the peak definition used in this study. Navigant recognizes that this may not be the case, however it is out of scope of this study to redefine the avoided costs.

Navigant calculated both technical and market potential associated with implementing DR programs for this study.

Technical potential refers to the theoretical maximum potential under 100% participation of the eligible load. Navigant calculated technical potential by multiplying the eligible load/customers by the unit impact for each sub-option. An important caveat is that, by definition, technical potential calculation does not consider participation overlaps. Technical potential across the various sub-options are not additive and should not be added together to obtain a "total" technical potential. Therefore, the technical potential estimates for each DR sub-option should be considered independently. The technical potential calculation is summarized through Equation 2.

Equation 2. DR Technical Potential

$$\begin{aligned} \mathit{Technical\ Potential}_{DR\ Sub\ Option,End\ Use,Year} \\ = \mathit{Eligible\ Load}_{DR\ Sub\ Option,Segment,End\ Use,Year} \\ * \mathit{Unit\ Impact}_{DR\ Sub\ Option,Segment,Year} \end{aligned}$$

Navigant calculated achievable potential by multiplying achievable participation assumptions (subject to program participation hierarchy discussed below) by the technical potential estimates. Achievable potential also accounts for customer opt-out during DR events. The achievable technical potential calculation is summarized through Equation 3.

Equation 3. DR Achievable Potential

$$\begin{aligned} \mathit{Market\ Potential} \\ = \mathit{Technical\ Potential}_{DR\ Sub\ Option,Segment,End\ Use,Year} \\ * \mathit{Achievable\ Participation\ Rate}_{DR\ Sub\ Option,Segment,Year} \\ * (1 - \mathit{Event\ Opt\ Out\ Rate})_{DR\ Sub\ Option,Year} \end{aligned}$$

In addition to the potential estimates, Navigant developed annual and levelized costs by DR options and sub-options and conducted cost-effectiveness assessment of these options and sub-options. Development of DR program annual and levelized costs involve itemization of the various cost components, such as one-time program development costs, DR-enablement costs, equipment costs, participant marketing and recruitment costs, annual program administration costs, O&M costs, and customer incentives.

10.4.1 Demand Response Base Case Assumptions

10.4.1.1 Participation and Hierarchy

Participation assumptions are based on review of similar programs offers and relevant secondary sources of information, such as publicly-available DR potential studies and evaluation reports from other jurisdictions and DR program databases such as the U.S. Federal Energy Regulatory Commission (FERC) National DR Program Survey database. [28] As mentioned previously, the accompanying Excel spreadsheet for DR assumptions provided to EfficiencyOne include detailed documentation of the participation assumptions (see Appendix C). The participation assumptions are developed by customer class and DR option, and represent steady-state participation levels after the program is fully ramped up. Based on standard industry assumptions, Navigant assumes a 5-year S-shaped ramp for the DR options. Therefore, these steady-state participation values are assumed to be reached after that ramp period.

[28] http://www.ferc.gov/industries/electric/indus-act/demand-response/dem-res-adv-metering.asp

For achievable potential estimates, Navigant accounted for participation overlaps among different DR options offered to the same customer class through a participation hierarchy represented in Figure 10-17.

The participation hierarchy helps avoid double counting of potential through common load participation across multiple programs and is necessary to arrive at an aggregate potential estimate for an entire portfolio of DR programs. CPP is considered lower in the hierarchy than the incentive-based options[29]. The hierarchy order is based on the dispatchability of the options and the reliability around the load reductions, with the most reliable and dispatchable resource placed at the top and the least reliable resource at the bottom.

Figure 10-17. Program Hierarchy to Account for Participation Overlaps[30]

Level in Hierarchy	DR Option	Eligible Customers
1	BTM Battery Control	Customers with dispatchable batteries.
2	DLC (for Residential and Small BNI) or BNI Curtailment (Large BNI)	Customers without dispatchable batteries.
3	CPP	Customers without dispatchable batteries and not enrolled in DLC or BNI Curtailment.
4	Behavioural DR	Customers without dispatchable batteries and not enrolled in DLC or CPP

Source: Navigant

10.4.1.2 Unit Impact Assumptions

The unit impacts specify the amount of load that could be reduced during a DR event once customers are enrolled in a DR program. Unit impacts can be specified either directly as “kW reduction per participant” or as “% of enrolled load”.

Only residential DLC impacts for space heating (both electric furnaces and heat pumps) are specified as kW reduction per device. All other unit impacts are specified as “% of enrolled load”.

The model inputs data provided in Appendix C to the report presents the unit impact assumptions used for potential estimation and includes detailed documentation for the basis of these assumptions. For BNI Curtailment, unit impacts are developed by DR sub-option as the unit impact values are tied to the end uses and the type of control. For example, the load reductions associated with Manual HVAC control and Auto-DR HVAC control are different and are specified accordingly.[31]

[29] This assumption applies to the Base and Low scenarios. However, for the High scenario, where CPP is offered as a default rate with opt-out, it is placed at the top in the hierarchy.
[30] EV control is outside the hierarchy because it only applies to EVs.
[31] The unit impacts assume that DR events are called over a 3-hr. duration (based on 5-8 p.m. peak period determination). If NS Power would like to call events over a longer duration, it may be possible to recruit additional customers and stagger the dispatch in batches with 3-hr. dispatch duration for each batch. Moreover, if participants were to be dispatched in batches, the net load reduction would be uncertain given that the snapback effect from customers dispatched during the previous batch would nullify some of the load reductions from the batch being dispatched. The modeling framework used in this analysis does not incorporate these considerations.

10.4.1.3 Program Costs and Related Assumptions for Cost-Effectiveness

Navigant developed detailed itemized cost assumptions for each DR option to assess annual program costs and calculate levelized costs for each option. These cost calculations feed into the cost-effectiveness assessment of DR options using the TRC test. The DR analysis input assumptions file presents detailed itemized cost assumptions used in this study and documents the basis for these assumptions.

The cost assumptions fall into the following broad categories:

- **One Time Fixed Costs**, specified in terms of $/DR option, which include the program start-up costs, including for example, the software and IT-infrastructure related costs, and associated labor time/costs (in terms of FTEs) incurred to set up the program.
- **One Time Variable Costs**, which include marketing and recruitment costs for new participants, and enabling technology costs associated with control and communications technologies to enable DR. The enabling technology cost is specified either in terms of "$/new participant" on a per site basis, or as "$/kW of enabled load reduction" on a participating load basis.[32]
- **Annual Fixed Costs,** specified in terms of $/year, which primarily includes FTE costs for annual program administration and ongoing IT related costs not included in the one-time fixed category above.
- **Annual Variable Costs,** which primarily includes customer incentives, specified either as a fixed annual incentive amount per participant ($/participant/yr.), or in terms of load reduction ($/kW reduction), depending on the program type. It also includes additional O&M costs that may be associated with servicing technology installed at customer premises.

Other than the itemized program costs, the key variables for cost-effectiveness calculations in the model are:

- **Discount rate** of 6.84% [33], used for Net Present Value (NPV) calculations.
- **Line loss** values between 4.5% and 14.7% depending on customer class, which is used to bring up the potential at customer meter to the generator for cost-effectiveness assessment.[34 33]

For assessing the DR benefits, Navigant used the avoided wholesale capacity costs and avoided distribution transmission capacity costs from 2014 IRP, with 2018 estimate of transmission and distribution avoided costs from NSP. Figure 10-18 summarizes the benefits and costs considered in the cost-effectiveness assessment of DR options and sub-options.

Figure 10-18. Summary of Benefit-Cost Streams for TRC in DRSim™

Benefits	Costs	Transfer[34]
Wholesale Avoided Capacity Costs	Program Development Cost	Incentives
Avoided Transmission Capacity Costs	Program Administrative Cost	
Avoided Distribution Capacity Costs	Program Delivery Cost	
	Marketing & Recruitment Cost	
	Technology Enablement Cost	
	O&M Cost	
	Participant Cost	

[32] The enabling technology costs represents the incremental costs associated with controls and communications for making the device DR-enabled. These costs are not expected to decline meaningfully over time, and are modelled as being static.
[33] This is the 2019 NS Power WACC/AFUDC value from the WACC AFUDC Application.
[34] These are sourced from NS Power 2014 Cost of Service Study (COSS) - Exhibit 9A.

The cost-effectiveness assessment takes a long-term perspective. Only DR options that had TRC benefit-to-cost ratios of 1.0 or greater were deemed cost-effective and included in the potential estimates. Chapter 11 presents cost-effectiveness results.

10.4.2 Descriptions of Scenarios and Related Assumptions

Navigant developed achievable potential estimates under three scenarios – base, high, and low. These scenarios represent variations in the following input assumptions:

- **Baseline peak demand projections**: The baseline peak demand projections for DR for the base, high, and low scenarios correspond to the base, mid, and low scenarios for the energy efficiency potential estimates respectively. The baseline peak demand projections are highest for the low scenario since the energy efficiency potential savings are lowest corresponding to that scenario. Similarly, the baseline peak demand projections for DR potential estimates are lowest under the high scenario (corresponding to the energy efficiency mid scenario). The base case baseline peak demand projections lie in between the low and high peak demand projections.

- **Saturation values for heat pumps:** A key input for estimating the DR potential for residential space heating are the saturation values for electric furnaces and heat pumps. The energy efficiency potential analysis provided variations in market adoption for heat pumps under the three scenarios (highest adoption of heat pumps under the high scenario for DR [35] and lowest adoption of heat pumps under the low scenario for DR [36]). These variations in market adoption from the energy efficiency potential analysis were fed into the saturation assumptions to calculate DR potential.

- **Programmatic assumptions:** In addition to these two input variations, the scenarios represent variations in the following programmatic assumptions, summarized in Figure 10-19. The high scenario drivers are higher incentives and higher marketing expenditures over the base scenario, which in turn result in higher enrollment in DR programs. Conversely, for the low participation scenario, enrollment in DR programs is lower than the base case due to lower levels of incentives and marketing expenditures. The percentage changes represented here are based on Navigant's industry insights from similar analysis in other jurisdictions. These percentages reflect that residential and small BNI customer participation in DR programs is more sensitive to variations in incentives and marketing spend than those for the larger BNI customers.

[35] The high scenario for DR corresponds to the mid scenario in the EE potential analysis.

[36] The low scenario for DR corresponds to the low scenario in the EE potential analysis.

Figure 10-19. Summary of Changes in Programmatic Assumptions Across Scenarios

Scenario	Applicable Customer Class	% change in incentives over Base Case	% change in marketing costs over Base Case	% change in participation over Base Case
High	Residential	+50%	+50%	+15%
	Small Commercial, Small Industrial	+50%	+50%	+20%
	Large Commercial, Large Industrial, and Interruptible	+50%	No change	+10%
Low	Residential	-50%	-50%	-30%
	Small Commercial, Small Industrial	-50%	-50%	-40%
	Large Commercial, Large Industrial, and Interruptible	-50%	No change	-15%

Source: Navigant analysis

For CPP specifically, Navigant assumed that the CPP rate is offered as “default with opt-out” under the high scenario, while both base case and low scenario assume an opt-in type of offer for CPP. Consequently, under the high scenario, CPP is placed at the top of the participation hierarchy and other options apply to customers who opt-out of the CPP rate.[37] Additionally, under a default rate offer, the unit impacts for CPP are lower than unit impacts under opt-in type offer. This assumption is supported by findings from a database of pricing programs and pilots with different types of offers, developed by the Brattle Group.[38] Accordingly, the high scenario in this analysis assumes a lower unit impact for CPP than the base and low scenarios.

[37] Note that residential low-income segment customers are excluded from the CPP offer in all cases. CPP has a pretty steep critical peak to off-peak price ratio and unlikely to be offered to low-income customers for fear of penalization if these customers are not able to reduce demand during critical peak period.

[38] https://www.portlandgeneral.com/-/media/public/our-company/energy-strategy/documents/2016-02-01-demand-response-market-research.pdf

11. DEMAND RESPONSE POTENTIAL AND COST-EFFECTIVENESS RESULTS

This chapter presents the DR potential and costs results based on the approach described in Section 10. Navigant presents detailed base case results at different levels of granularity by DR options, DR sub-options, customer classes, and building types. Under the base case, Navigant begins by providing a preview of the potential results before screening for cost-effectiveness using achievable participation rates. Next, Navigant presents cost-effectiveness results and the achievable potential associated with cost-effective options only at different levels of granularity. Under scenario analysis, Navigant indicates how the cost-effectiveness results change across scenarios and present potential and cost result comparisons across the scenarios.

Accordingly, this chapter presents the analysis results in the following order:

1. Base Case potential results for all DR options included in the analysis (before cost-effectiveness screening)
2. Base Case cost-effectiveness and levelized cost results for all DR options
3. Base Case potential results by DR options, DR sub-options, customer class and building type for cost-effective DR options only
4. Base Case annual cost results by cost-effective DR options
5. Scenario analysis results with comparison of cost-effectiveness and achievable potential results

In addition to these achievable potential results, Section 11.1 includes technical potential results from the analysis. Technical potential assumes 100% participation of eligible customers in DR options and represents the theoretical upper limit for potential. Since the technical potential assessment does not account for participation overlaps and a program hierarchy, the DR option potential estimates are not additive and therefore Section 11.1 presents standalone technical potential results for individual DR options.

Economic potential is not considered because the DR analysis operates differently from the EE analysis; it is not a system dynamics stock-turnover model but is rather based on programmatic assumptions specified in the input sheet. Economic potential in the EE analysis reflects whether a measure is economic in absence of a utility program or utility investment. However, DR measures would not exist without a utility program. Measures in DRSim are not competing for market share, so cost-effectiveness can only be considered at the program level.

11.1 Demand Response Technical Potential Results

Navigant calculated the technical potential for implementing DR programs for this study. Technical potential refers to the theoretical maximum potential under 100% participation of the eligible load. Navigant calculated technical potential by multiplying the eligible load or eligible customers by the unit impact for each sub-option.

An important caveat is that, by definition, a technical potential calculation does not consider participation overlaps. **Technical potential across the various sub-options are not additive** and should not be added together to obtain a total technical potential. Therefore, the technical potential estimates for each DR sub-option should be considered independently. The technical potential calculation is summarized through Equation 4.

Equation 4. DR Technical Potential

$$Technical\ Potential_{DR\ Sub\ Option,End\ Use,Year} = Eligible\ Load_{DR\ Sub\ Option,Segment,End\ Use,Year} * Unit\ Impact_{DR\ Sub\ Option,Segment,Year}$$

Figure 11-1 shows technical potential results by DR Sub-Option. Savings for each customer class can be viewed in the "Technical Pot_Option" tab in the accompanying DR Results workbook (see Appendix D). There are two general trends for technical potential savings over time, depending on the customer class and DR option. For DR impacts based on % of load reduced, the savings trends will track the baseline peak forecast, and for DR impacts based on kW reduction per unit, the savings trends track the account forecast projections.

Figure 11-1. Technical Potential by DR Sub-Option

Source: Navigant analysis

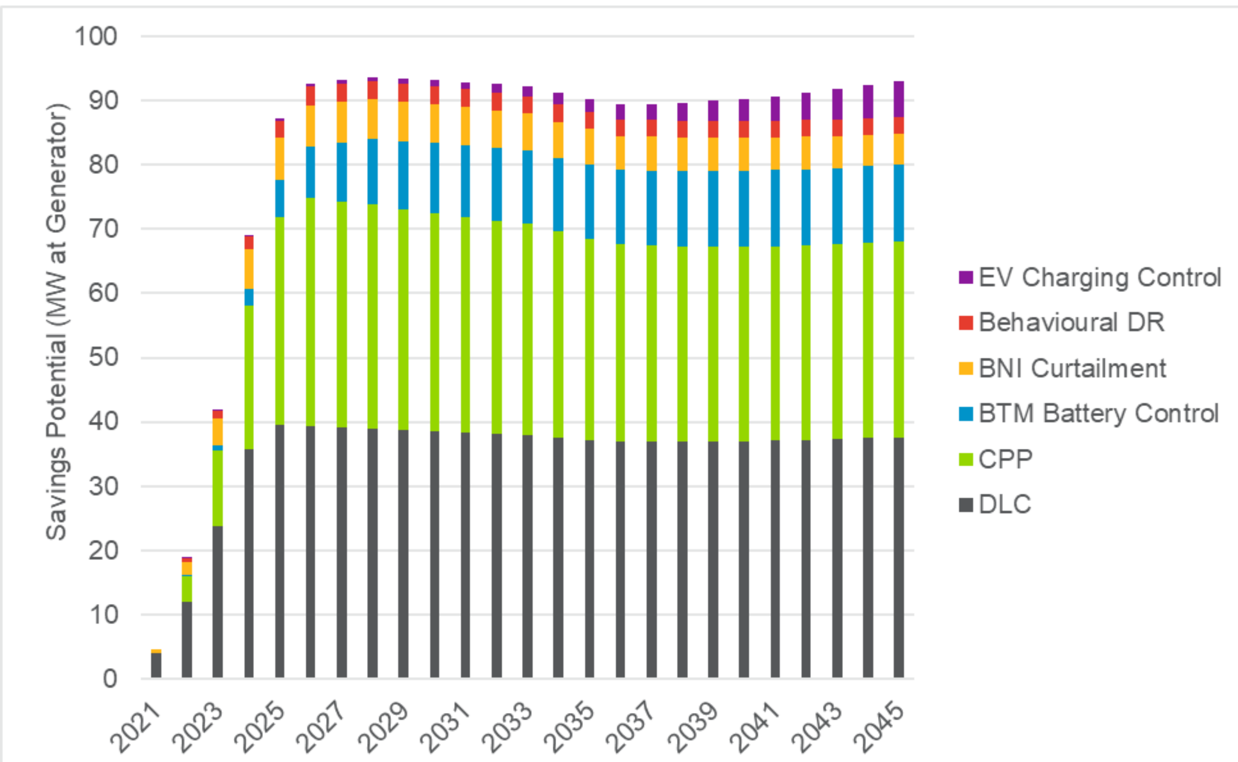
11.2 Demand Response Base Case Achievable Potential Results

This section presents achievable potential results for all DR options included in the analysis before screening for cost-effectiveness. The purpose is to provide the full spectrum of potential estimates for all DR options. Subsequent sections in this chapter will consider only the cost-effective DR options and provide a deeper dive into those potential results.

11.2.1 Achievable Potential Results by Demand Response Option

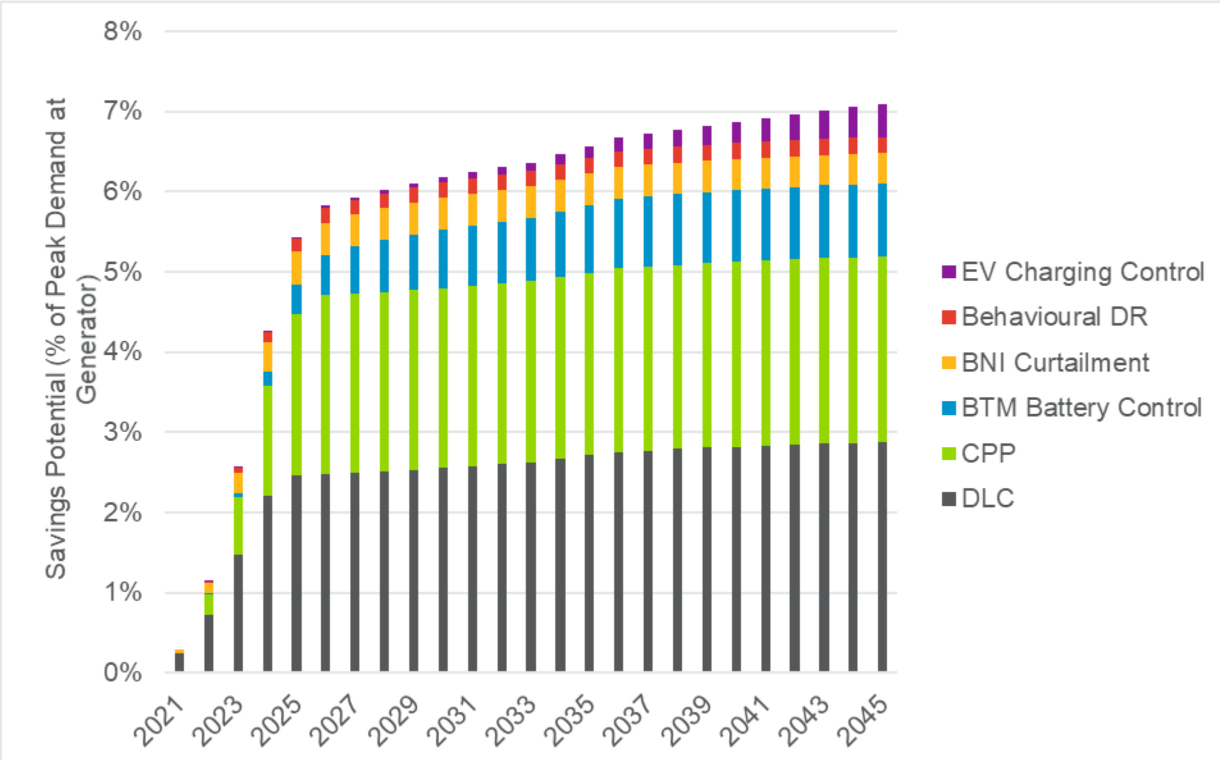
Figure 11-2 shows the MW breakdown of the DR achievable potential by DR option. Figure 11-3 shows the achievable potential as a percentage of Nova Scotia Power's peak demand. DR potential is estimated to increase to 93 MW by 2027 and settles to 92 MW by 2045. Under the base scenario, the achievable potential comprises more than 6% of Nova Scotia's peak demand in 2027 and reaches more than 7% by 2045 as the demand reduction impacts from the energy efficiency measures reduce the overall peak demand.

Figure 11-2. DR Achievable Potential by DR Option (MW at generator)



Source: Navigant analysis

Figure 11-3. DR Achievable Potential by DR Option (% of Peak Demand)



Source: Navigant analysis

11.3 Demand Response Base Case Cost-effectiveness Assessment Results

This section presents base case cost-effectiveness results by DR option based on the Total Resource Cost (TRC) test. Navigant also calculated the cost-effectiveness results based on the Program Administrator Cost (PAC) test.

11.3.1 Benefit-Cost Assessment by Demand Response Option

Figure 11-4 shows the TRC benefits, costs (in NPV 2020 dollars) and benefit-cost (BC) ratios calculated for each DR option, as well as the results from the PAC test. All DR options are cost-effective, other than Behavioral DR, BTM Battery Control, and EV Charging control. Benefit-cost ratios calculated using the PAC test tend to be lower because incentives are included as a cost, while the TRC considers incentives as a transfer payment. The benefit-cost ratios for CPP and BDR do not change across the cost tests because these DR options do not incur incentive costs.

Figure 11-4. DR Benefit-Cost Assessment by DR Option (TRC and PAC Test Benefit-Cost Ratios)

DR Option	Benefits (NPV 2020 million $)	Costs (NPV 2020 million $)	TRC Test Benefit-Cost Ratio	PAC Test Benefit Cost Ratio
CPP	65.05	25.23	2.58	2.58
DLC	81.47	66.60	1.22	1.06
BNI Curtailment	12.67	11.03	1.15	0.87
Behavioural DR	5.52	5.78	0.96	0.96
BTM Battery Control	19.17	22.91	0.84	0.73
EV Charging Control	3.05	11.08	0.28	0.26

Source: Navigant analysis

11.3.2 Demand Response Levelized Costs & Supply Curves

Figure 11-5 shows the levelized costs and the corresponding 2045 achievable potential for all DR options. The levelized costs consider the TRC costs and are calculated using the potential at generator. In terms of ascending order of levelized costs:

- CPP is the least cost option at $79/kW-yr., with 30 MW potential in 2045
- DLC follows at $173/kW-yr., with highest potential in 2045 at 38 MW
- BNI Curtailment ranks next at $185/kW-yr., with a much lower contribution than CPP (5 MW in 2045)
- BDR has the lowest potential among the DR options (2.6 MW in 2045), and costs around $221/kW-yr. This is not cost effective due to assumed low impacts.
- BTM charging control costs $247/kW-yr., and is not cost effective due to the high technology enablement costs
- EV charging control is significantly higher cost due to relatively high technology enablement costs and assumed low unit impacts from EVs during the peak period

Figure 11-5. DR Base Achievable Scenario Levelized Costs vs. 2045 Potential (MW at generator)

DR Option	Levelized Costs ($/kW-yr.)	Achievable Potential (MW) (2045)	Cost-Effective Flag (DR Option)	Cumulative Cost-Effective Potential (MW) (2045)
CPP	$79.10	30.41	1	30.41
DLC	$173.03	37.58	1	67.99
BNI Curtailment	$184.92	4.89	1	72.89
Behavioural DR	$221.31	2.62	0	72.89
BTM Battery Control	$247.37	12.00	0	72.89
EV Charging Control	$755.88	5.44	0	72.89

Source: Navigant Analysis

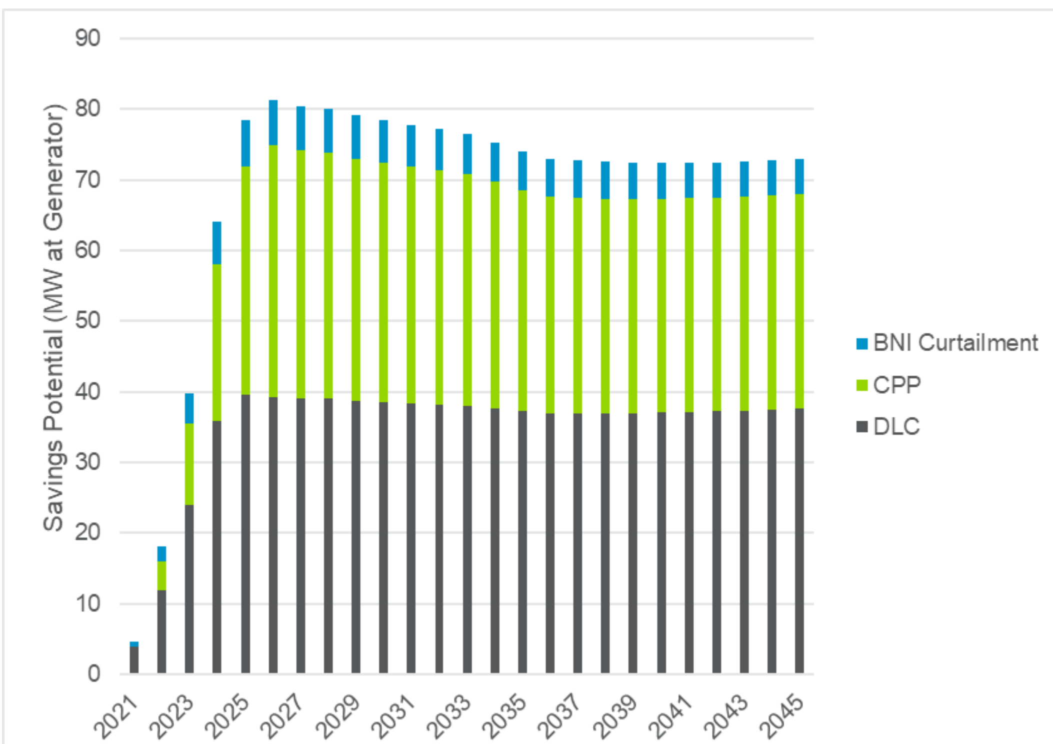
11.4 Cost-Effective Demand Response Achievable Potential Results

This section presents achievable potential results by DR options, sub-options, customer class, and building type for cost-effective DR options under the base case scenario.

11.4.1 Achievable Potential by DR Option for Cost-Effective DR Options

Figure 11-6 shows the MW breakdown of the DR achievable potential by cost-effective DR option.

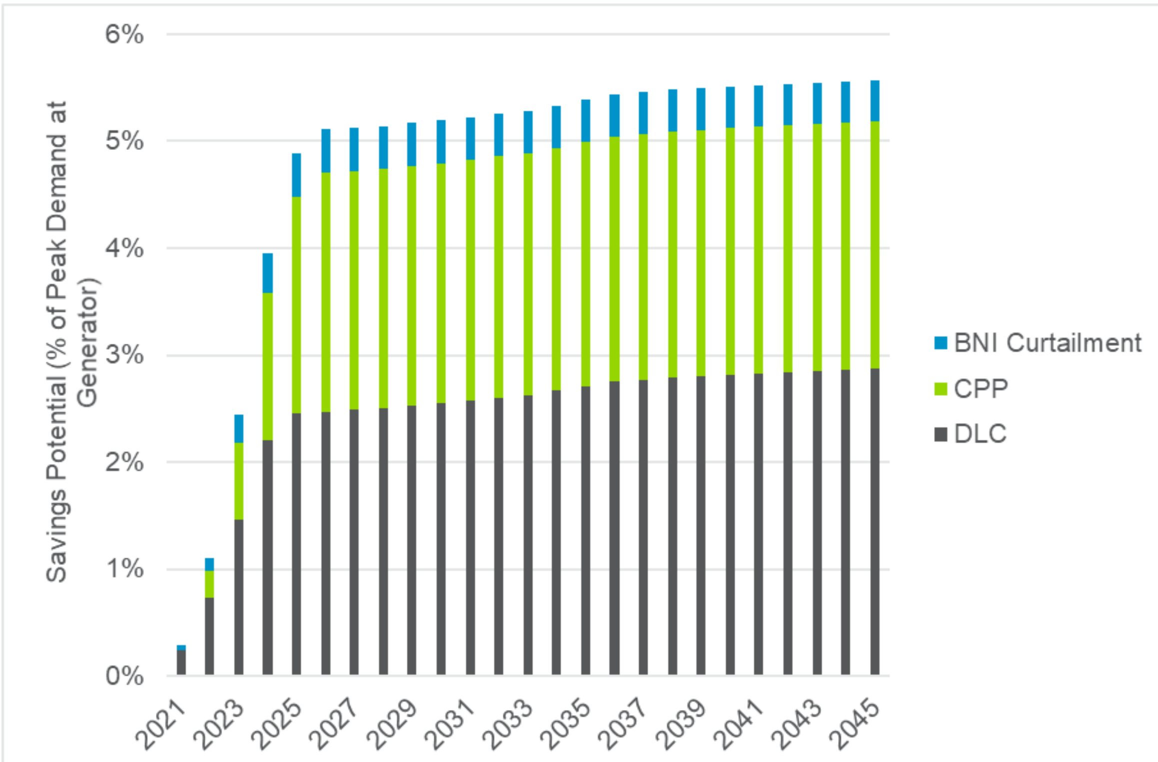
Figure 11-6. DR Achievable Potential by DR Option for Cost-Effective DR Options (MW at generator)



Source: Navigant analysis

Figure 11-7 shows the achievable potential as a percentage of Nova Scotia Power's peak demand. The cost-effective DR potential under the base case is estimated to increase steadily to about 81 MW by 2026 and then declines and plateaus at about 72 MW from 2035 onward. The decline in potential is associated with the decrease in baseline peak demand for DR with progressively higher savings from energy efficient measures. Under the base scenario, the cost-effective achievable potential steadily increases to around 5% of peak demand in 2027 and remains steady thereafter in terms of percentage reduction in peak demand. DLC constitutes almost half of the total potential followed by CPP at 42%. BNI Curtailment share is significantly smaller at around 8%.

Figure 11-7. DR Achievable Potential by DR Option for Cost-Effective DR Options (Percent of Peak Load)



Source: Navigant analysis

11.4.2 Achievable Potential by DR Sub-Option for Cost-Effective DR Options

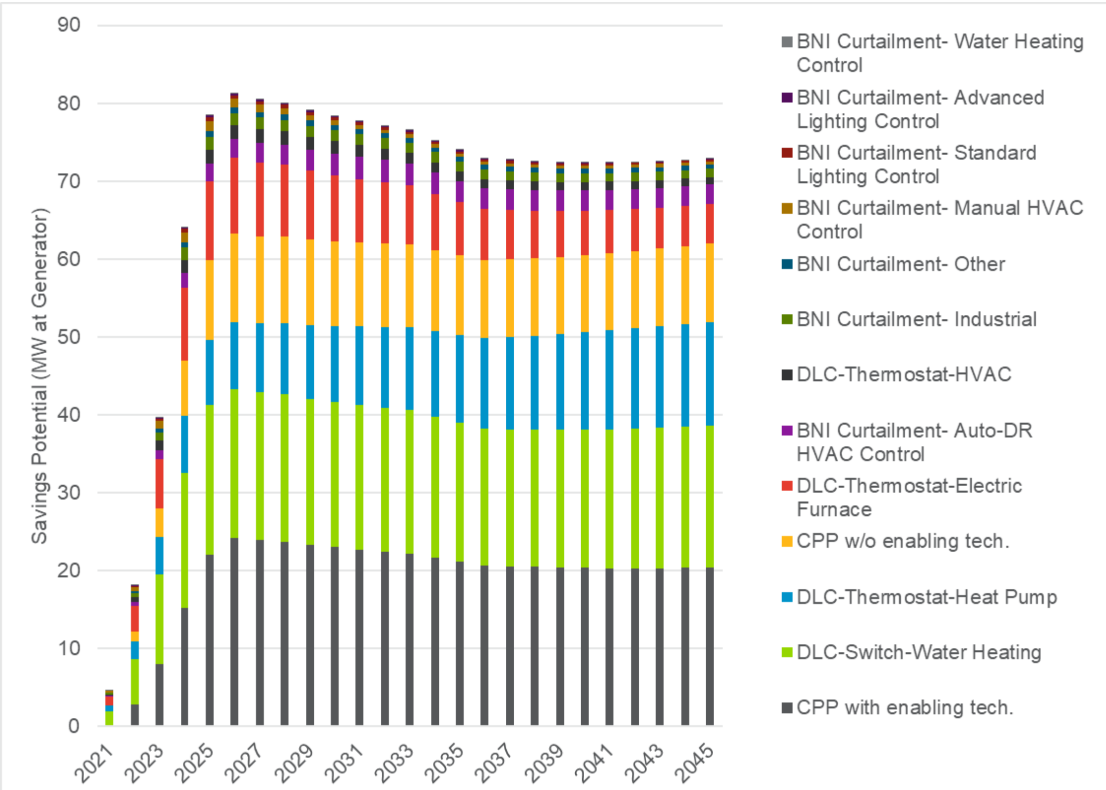
This section presents the breakdown of cost-effective potential by DR sub-option. Each sub-option is tied to a specific control technology and/or end use. Figure 11-8 shows the MW breakdown of the cost-effective DR achievable potential by DR sub-option. These results indicate the following:

- Of the total CPP potential, potential from customers with enabling technology is almost double the potential from customers without enabling technology (20 MW in 2045 from customers with enabling technology vis-à-vis 10 MW from customers without enabling technology in 2045). As discussed previously, dynamic rates, coupled with enabling technology such as thermostats for residential and small BNI customers and Auto-DR for large BNI customers can significantly increase DR impacts.

- Direct load control of water heaters makes up the second highest potential, with 18 MW in 2045 (25% of total potential). Residential direct load control of heat pumps and electric furnaces each comprise 18% and 7% of the total 2045 potential, respectively, or 13 MW and 5 MW.

- Under the BNI curtailment program, reduction associated with Auto-DR HVAC control comprise 2% of the total cost-effective potential in 2045. Industrial BNI curtailment comprises 1%. All other BNI programs comprise 1% or less of the total potential in 2045.

Figure 11-8. DR Achievable Potential by DR Sub-Option for Cost-Effective DR Options (MW at generator)



Source: Navigant analysis

11.4.3 Achievable Potential by Customer Class for Cost-Effective DR Options

This section presents the breakdown of cost-effect potential by customer class. As discussed in the methodology section, the six customer classes in this study are residential, small industrial, small commercial, large industrial, large commercial, and customers on the interruptible rider.

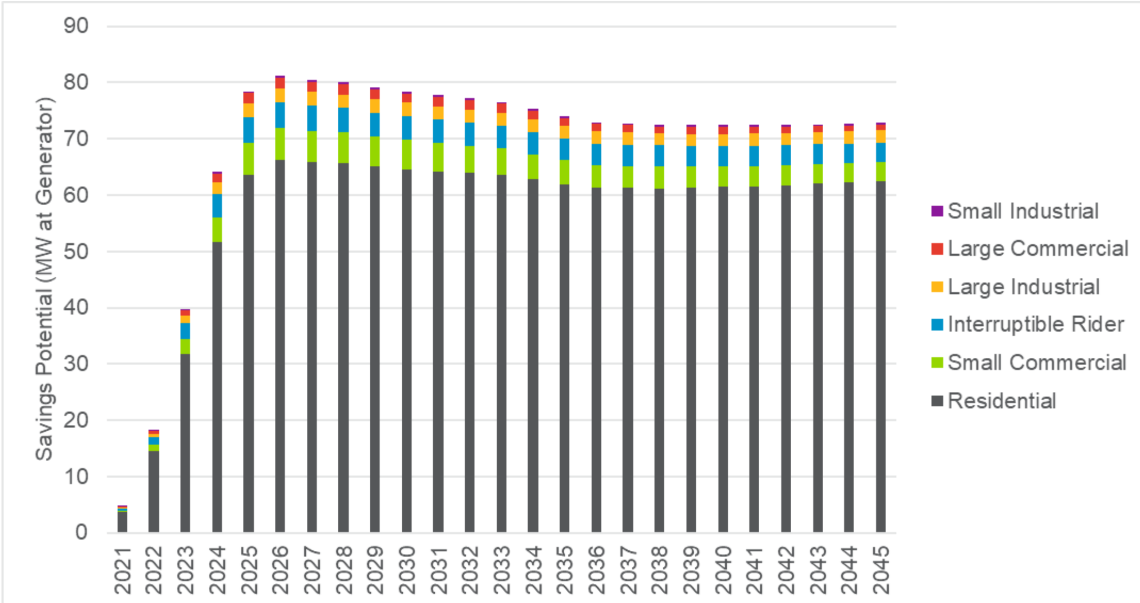
Figure 11-9 shows the MW breakdown of the cost-effective DR achievable potential by customer class, and reveals:

- Potential from residential customers makes up 62 MW or 86% of the total 2045 potential and is associated with DLC and CPP.

- Potential from interruptible rider, small commercial, and large industrial customers each comprise about 2 to 3 MW or 3% to 5% of 2045 potential. Interruptible riders were modeled in same manner as other BNI customer classes.

- Potential from large commercial and small industrial customers comprise 1 MW and 0.3 MW respectively or together comprise about 2% of the 2045 potential.

Figure 11-9. DR Achievable Potential by Customer Class for Cost-Effective DR Options (MW at generator)

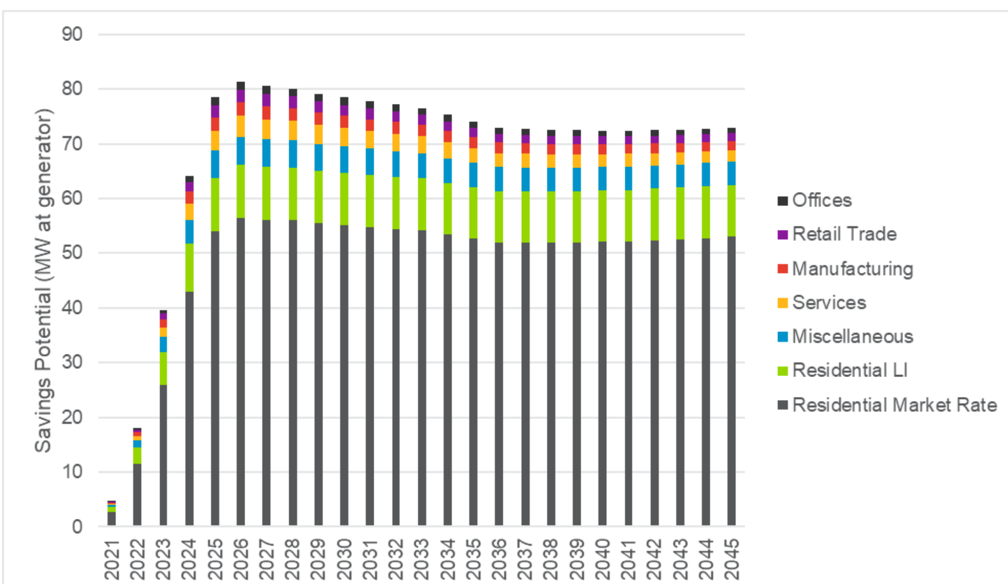


Source: Navigant analysis

11.4.4 Achievable Potential by Building Type for Cost-Effective Demand Response Options

This section presents the breakdown of cost-effective potential by building type or customer segment, shown in Figure 11-10. These results indicate that residential customers on market rate (all except low-income customers) comprise 73% (53 MW) of the total cost-effective achievable potential in 2045. This is followed by residential low-income at 13% of the total followed by the miscellaneous segment within BNI at 6% of the total 2045 potential. The contribution from other BNI segments range between 1% to 3% of the total potential.

Figure 11-10. DR Achievable Potential by Building Type for Cost-Effective DR Options (MW at generator)



Source: Navigant analysis

11.5 Demand Response Investment Levels

Figure 11-11 summarizes the annual program investment for cost-effective DR options in the base case. Results indicate the following:

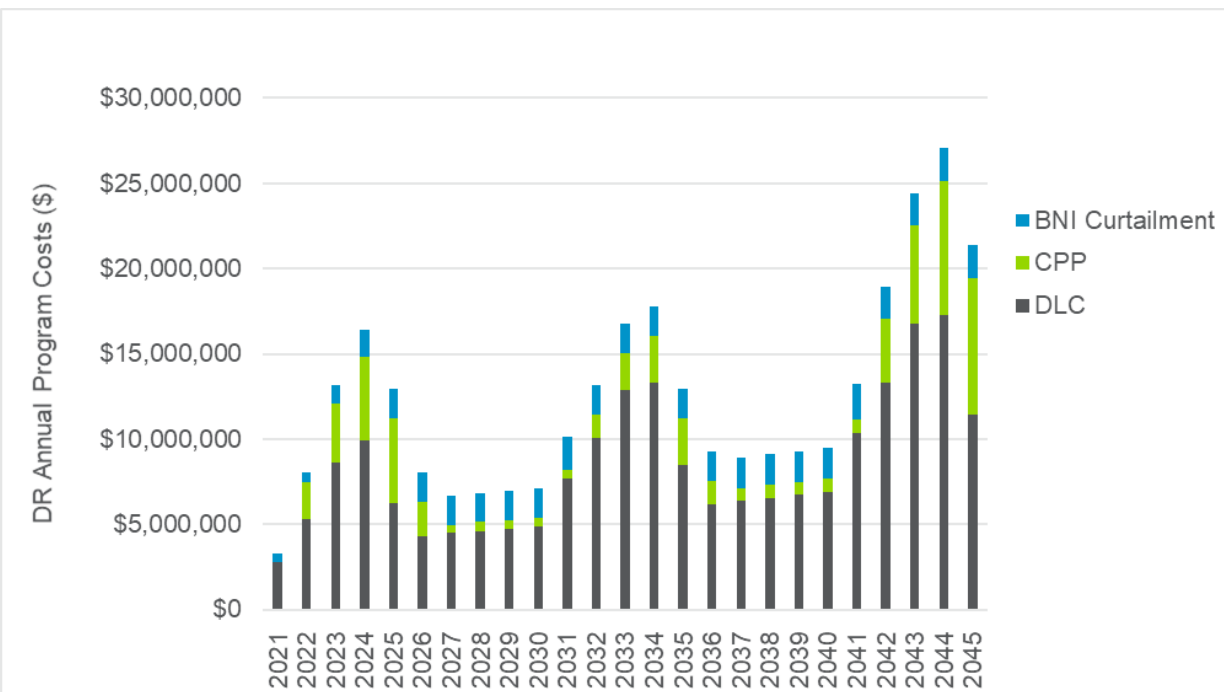
- The program investment for DLC increase steadily from 2021 to 2024 and then drop until 2026. The costs remain steady and then spike back up in 2031 because the DLC program has a life of 10 years, so technology enablement and program development costs are re-incurred at this time. From then on, costs fluctuate in accordance with program participation, which is tied to the saturation of the end-use devices (heat pumps, electric furnace, water heating), until it reaches 2041, when the program costs are re-incurred again. The two main cost components for DLC are the control equipment cost (thermostats and switches) and customer incentives for DR program participation.

- CPP program investment is relatively high during its initial ramp up between 2023 to 2026, and then drop in 2027-2028 when the program is fully ramped up. Beyond 2028, costs remain low and relatively stable. Enabling technology costs for customers that are offered the rate in conjunction with enabling technologies is a major cost component. Other significant costs are marketing and outreach to customers to enroll them in rates.

- The investment for BNI curtailment is tied directly to the potential estimates as majority of the program costs are rolled into an aggregator payment and represented as a delivery cost in terms of $/kW-yr.

- Behavioural program investment is fairly low and consistent once the program is fully ramped by 2026.

Figure 11-11. DR Annual Program Costs by DR Option for Cost-Effective DR Options ($)



Source: Navigant Analysis

11.6 Demand Response Scenario Analysis Results

As described in methodology section, in addition to the base case, Navigant modeled potential results for low and high cases. For these cases, Navigant adjusted assumed participation levels, incentive amounts, marketing spending, and equipment saturation to determine the impacts on the DR achievable potential. The peak demand forecasts also varied by case as these were tied to the different demand reduction scenario impacts from the energy efficiency potential study.

11.6.1 Comparison of Cost Results Across Demand Response Scenarios

Figure 11-12 shows the cost-effectiveness results by DR option for the three scenarios. The net present value (NPV) of benefits and costs is shown in 2020 dollars. Ratios under 1.0 are considered not cost-effective. As is evident from the results, DLC and BNI Curtailment are not cost-effective under the high scenario. This is due to the assumption that CPP will be opt-out, meaning that it will be placed at the top of the hierarchy in the model and will capture the greatest number of customers. Since there are fewer participants in DLC and BNI, the fixed costs render these two options non-cost-effective. Only CPP and BDR are cost-effective in the high scenario. The selection of cost-effective DR options remains the same for base and low scenarios.

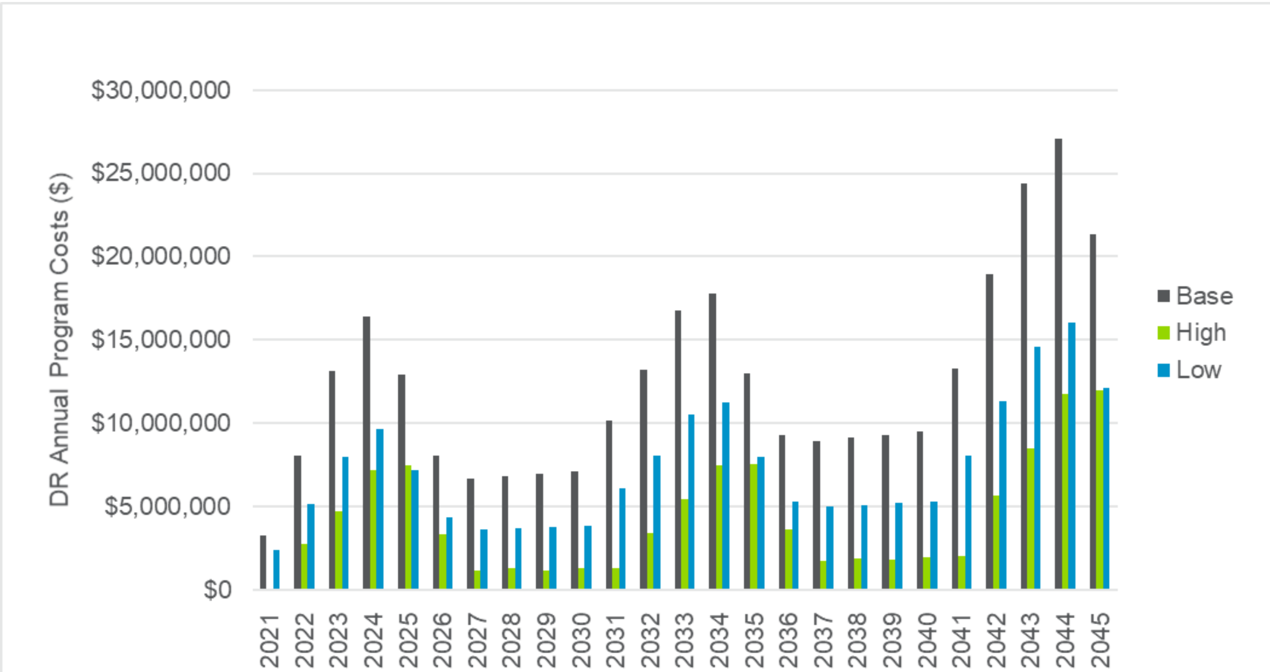
Figure 11-12. DR Cost-Effective Results by DR Options and by Scenarios

Case	DR Option	Benefits (NPV 2020 million $)	Costs (NPV 2020 million $)	TRC Test Benefit-Cost Ratio
Base	CPP	65.05	25.23	2.58
Base	DLC	81.47	66.60	1.22
Base	BNI Curtailment	12.67	11.03	1.15
Base	Behavioural DR	5.52	5.78	0.96
Base	BTM Battery Control	19.17	22.91	0.84
High	CPP	177.98	36.08	4.93
High	Behavioural DR	8.13	8.17	1.00
High	DLC	39.46	43.56	0.91
High	BNI Curtailment	9.47	10.21	0.93
High	BTM Battery Control	5.53	9.54	0.58
High	EV Charging Control	3.36	12.30	0.27
Low	CPP	49.53	14.85	3.34
Low	DLC	58.60	43.31	1.35
Low	BNI Curtailment	11.37	8.61	1.32
Low	Behavioural DR	4.49	4.81	0.93
Low	BTM Battery Control	13.49	15.38	0.88
Low	EV Charging Control	3.05	10.72	0.28

Source: Navigant Analysis

Figure 11-13 compares the annual cost results across the three scenarios. Due to DLC and BNI Curtailment becoming not cost-effective in the high scenario, annual program costs are lower in the high scenario than the base scenario. High scenario costs are only associated with CPP and behavioural DR. The low scenario costs are smaller than the base scenario costs due to lower participation levels and lower per participant incentives and marketing costs.

Figure 11-13. DR Annual Portfolio Costs by Scenarios for Cost-Effective DR Options[39]



Source: Navigant Analysis

Based on cost-effectiveness screening, the annual portfolio costs are expected to increase from:

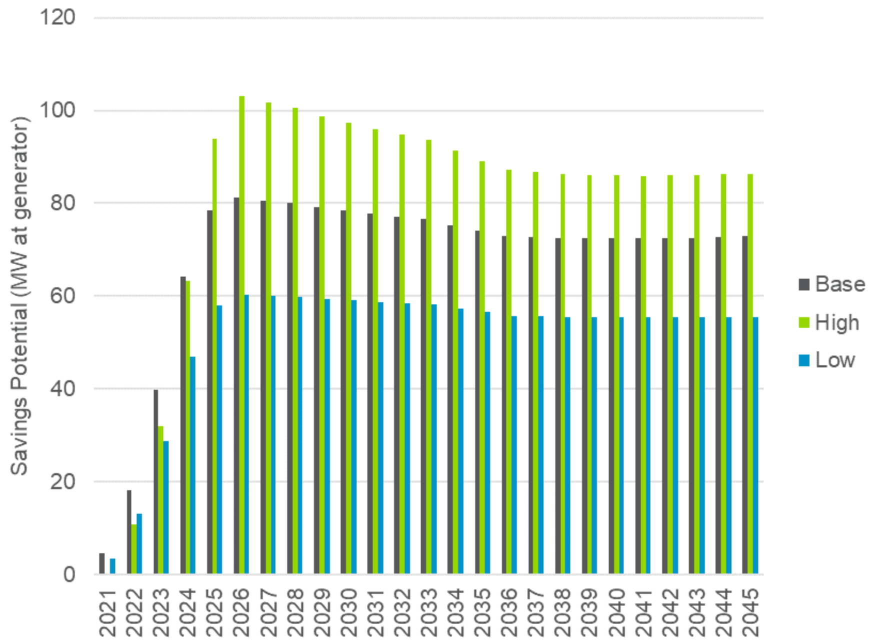
- $3.3 million in 2021 to $21.4 million in 2045 for the base scenario
- $2.7 million in 2022 to $12.0 million in 2045 for the high scenario
- $2.4 million in 2021 to $12.1 million in 2045 for the low scenario

11.6.2 Comparison of Potential Results Across Scenarios

Figure 11-14 and Figure 11-15 show a comparison of the potential results across the three scenarios. The achievable potential under the high scenario is 18% greater than the base scenario potential, while the low potential is approximately 24% lower than the base case potential. The 2045 potential under the low, base, and high scenarios represent approximately 4.0%, 5.6%, and 6.9% of NSP's peak demand in 2045, respectively.

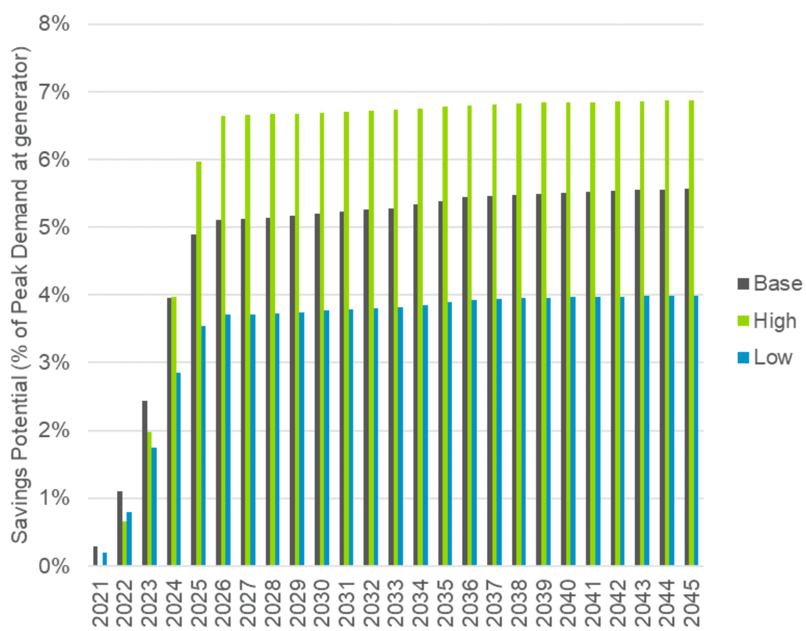
[39] DR options were screened at their respective scenario inputs using the Total Resource Cost Test.

Figure 11-14. DR Achievable Potential by Scenario (MW at generator)



Source: Navigant Analysis

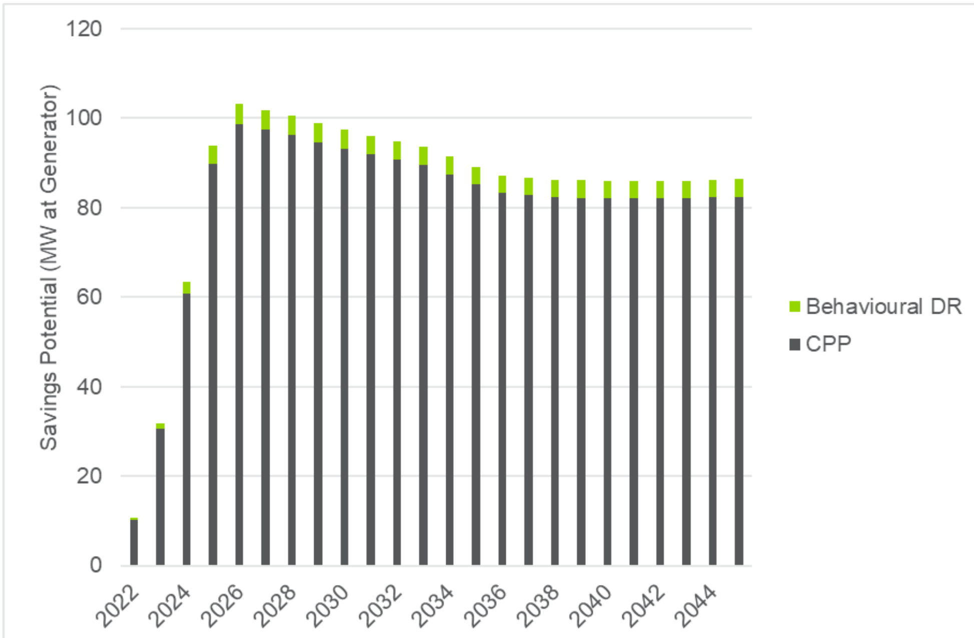
Figure 11-15. DR Achievable Potential by Scenario (Percent of Peak Demand)



Source: Navigant Analysis

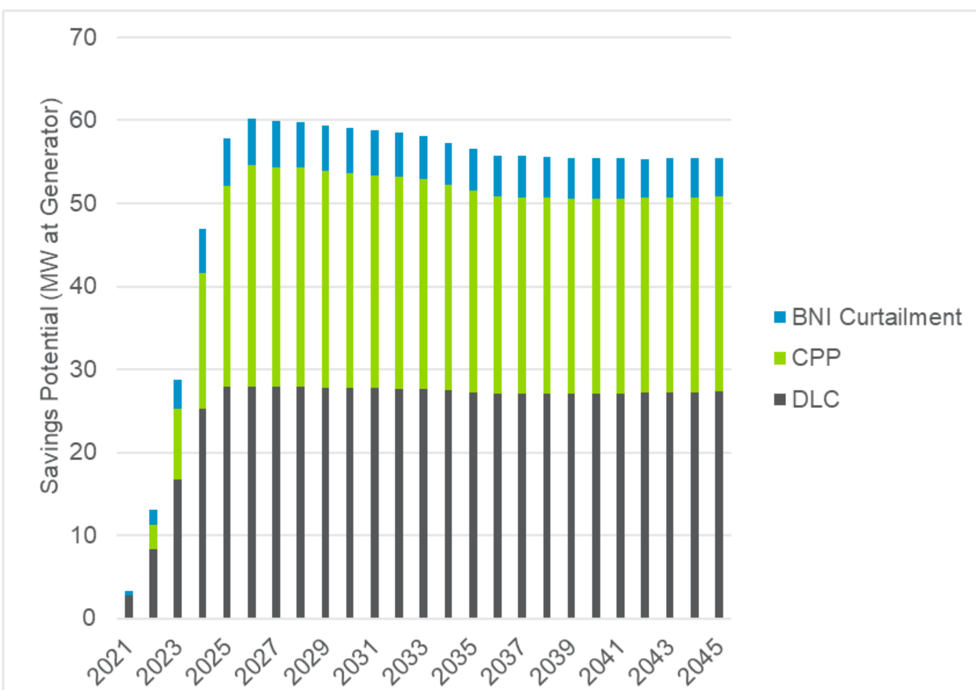
Figure 11-16 and Figure 11-17 present DR Achievable Potential for the High and Low scenarios by DR option. Default CPP in the high scenario accounts for more than 95% of the total potential. The trend for the low scenario is the same as that for base with lower contribution from all DR options.

Figure 11-16. DR Achievable Potential by DR Option, High Scenario, (MW at generator)



Source: Navigant Analysis

Figure 11-17. DR Achievable Potential by DR Option, Low Scenario, (MW at generator)



Source: Navigant analysis

11.7 Demand Response Snapback Effects

The previous discussions on potential estimates only included demand reductions during the DR event period. For DLC programs, typically, where the end use load is being directly controlled either through a switch or a thermostat, a snapback effect is commonly observed after the DR event ends. This arises because customers may increase the thermostat set point temperature for electric space heating almost immediately after the event period to make up for the loss of heat in their homes during the DR event period. Impact evaluation of DLC programs typically include snapback estimates and provide insights on snapback effects from these studies.[40] Navigant's industry experience in this area indicates that for central furnaces and heat pumps, the snapback magnitude during evening peak hours may be the same or even greater than the DR evening peak demand reduction as customer demand increases during the evening hours.

There are differences in snapback estimates between different types of space heating equipment. For example, for heat pumps, the snapback may be much more pronounced than for central furnaces. For a two-stage heat pump, the compressor operates above a certain ambient temperature to supply electric heat. But below that temperature, the compressor is no longer able to supply heat and the remaining heat is supplied by a resistance heating element, referred to as heat strip. Snapback could potentially be exacerbated because when the heat pump is cycled off for a curtailment event, the electric heat strips may then be more likely called into operation after the curtailment event. This is because the temperature differential (current vs. desired) is now greater than it would be had the heat pump been operating normally during the time of the curtailment event and the heat strips come into action since the ambient temperature is too low for compressor operation. This could potentially lead to significantly higher electricity use during the post event period for customers with heat pump. This phenomenon is not firmly established and requires additional research. Evaluation of other DLC programs indicates that there is no net increase in electricity use for customers with heat pumps because even though the snapback may be quite pronounced immediately following the event, it is likely to last for a short period. Therefore, the average snapback magnitude over a post-event period that has the same duration as the event period is likely lower than the average event period impact, alleviating concerns related to net increase in electricity use for participants with space heating control. In situations where customers might use gas and other supplemental fuels for heating, snapback effect could be mitigated by some of the other fuel types being used for heating during the event period.

For water heating load control, some pilots/programs observed greater snapback impacts than event period impacts in the evening. Although counter-intuitive, a reasonable explanation is that even when hot water is not being used, water heaters will suffer from modest stand-by losses to maintain the water set-point temperature. These stand-by losses tend to be quite small, and not coincident across households. However, all that standby consumption isn't averted, but merely shifted to the snapback period when the hot water tank is re-activated. That is, the stand-by consumption that would otherwise have been spread evenly over the event duration is aggregated into a single hour following the event, resulting in a substantially high snapback effect. However, the snapback is observed to last over a very short period. Some impact studies report the snapback during the one hour, 10 to 15 minutes following the DR event, to be almost double the average DR event period impact. However, the average snapback magnitude over the same duration as the event is expected to be lower than the average impact during the event period, alleviating concerns related to net increase in electricity use due to snapback.

[40] The Navigant team for this study referred to impact evaluation studies conducted by Navigant to draw on insights related to snapback.

12. CONCLUSION

This study has resulted in updated, expanded, and improved information on the Nova Scotia customer base and the potential for energy and demand reductions possible through energy efficiency and demand response programs and initiatives. While much energy efficiency (and demand response) potential remains, there are unique challenges in Nova Scotia in realizing this potential over the next 25 years.

12.1 Energy Efficiency

- **Near-term Electricity Savings:** The majority of near-term savings are from the Res HVAC, Res Lighting, and BNI Lighting end uses. Residential screw-in LED Bulb ranks as the highest electricity-saving market potential measure for the residential sector while custom energy efficiency leads BNI.
- **Near-term Winter Peak Demand Savings:** The majority of near-term winter peak demand saving measures come from the Res HVAC, Res Lighting, and BNI Lighting end uses. Residential whole home ranks as the highest demand-saving market potential measure for the residential sector. Custom energy efficiency leads the BNI sector.
- **Prior Energy Efficiency Success:** EfficiencyOne has effectively implemented energy efficiency programs in Nova Scotia for a decade, often exceeding goals in terms of the amount of savings achieved. As greater levels of energy efficiency are implemented in Nova Scotia and market saturation increases, it may become more challenging to harvest additional savings represented in the energy efficiency potential.
- **Significant Energy Efficiency Measure Saturation and low Net-to-Gross Ratios:** These reduce the available savings potential, particularly for efficient lighting.
- **Codes and Standards:** The challenge of continuing to capture savings from energy efficiency programs within an increasingly saturated market is exacerbated by tightening codes and standards, particularly as a result of federal lighting standards and the latest building energy codes.
- **Residential HVAC Fuel Switching:** The residential savings potential, specifically demand, is dominated by HVAC technologies. High technical and economic potential are attributed to HVAC fuel switching measures that completely remove the end-use load from a home. Although still a significant portion of potential, achievable results indicate that efficient electrification technologies, such as air source and mini-split heat pumps, are the primary drivers of future HVAC savings potential. Therefore, although fuel switching measures present a great technical opportunity for electricity and demand reduction, there are significant market barriers to customer adoption.
- **Changing Energy Efficiency Measure Costs:** Changes to the portfolio measure mix that occur due to market saturation and codes and standards changes drive incremental costs upward for many measures. More complex measures, such as advanced lighting design, luminaire level lighting controls (LLLCs) and networked/connected lighting controls, may require a more sophisticated workforce, additional training, as well as increased installation and configuration time, compared to static non-controllable lighting measures. This could result in increased incremental costs for these types of measures.

12.2 Demand Response

- **Critical Peak Pricing and Direct Load Control Dominate**: Over the 25-year period, more than 90% of the base case achievable potential savings are projected to be provided by the CPP and DLC sub-options. The remaining savings are estimated from BNI curtailment.

- **Collaboration to Achieve Savings:** The assessment of demand response identifies several DR options for the province that can provide significant demand savings over the 25-year time horizon. To realize the potential savings will require coordination between NS Power and EfficiencyOne.

APPENDIX A. Final Modelling Plan

Modelling Plan for Nova Scotia Energy Efficiency and Demand Response Potential Study

Prepared for:

EfficiencyOne

Submitted by:
Navigant Consulting, Ltd.
First Canadian Place
100 King Street West | Suite 4950
P.O. Box 64
Toronto, ON M5X 1B1 | Canada

416.777.2440
navigant.com

Reference No.: 207668
May 09, 2019

EXECUTIVE SUMMARY

This document presents an overview of the modelling methodology and approach for two Nova Scotia studies currently under development by Navigant for EfficiencyOne (E1):

1. Energy Efficiency (EE) Potential Study for the 25-year period 2021 to 2045
2. Demand Response (DR) Potential Study for the 25-year period 2021 to 2045

The main objective of the studies is to identify and quantify electricity and/or demand savings and the associated costs from energy efficiency and demand response actions, disaggregated by sector, segment, and end use. The two studies will provide data and analysis to inform the development of Nova Scotia Power's (NSP) next Integrated Resource Plan (IRP).

The purpose of this Modelling Plan is to provide an overview and details of the proposed methodology and approach to each study, to ensure alignment of expectations between Navigant and EfficiencyOne, and to inform stakeholders regarding the methodology, activities, deliverables, and timelines related to the EE and DR studies being conducted.

NAVIGANT

1. Overview of Modelling Approaches

On behalf of E1, Navigant will employ two separate Analytica-based models[1] to assess the potentials for EE and DR in Nova Scotia. The model inputs and outputs will be provided in Excel, to facilitate inspection by EfficiencyOne, regulatory intervenors and the Nova Scotia Utility and Review Board (UARB).

1.1 Energy Efficiency Potential

Navigant's Demand-Side Management Simulator (DSMSim™) model, a transparent conservation and demand-side management potential tool, will be used to carry out the EE potential analysis. We have used this tool to conduct dozens of potential studies across North America and will customize the model to meet the requirements of this study. The DSMSim™ model will estimate incremental and yearly total annual impacts of energy and peak demand savings for multiple scenarios, to be agreed upon with E1. Scenarios will be developed in conjunction with E1 and stakeholder feedback will be considered. Draft final scenarios will be communicated to stakeholders on 05/24/2019, as part of the scenarios/sensitivities and detailed assumptions package. Due to budget and timeline constraints, a maximum of five scenarios will be considered, one of which will be maximum achievable.

The DSMSim™ model accepts detailed inputs, such as the densities and saturations of measures and customer awareness and willingness factors (that drive market adoption) to adopt measures. The DSMSim™ model adheres to all the current best practices in the evaluation industry including those listed in Figure 1.

Figure 1. DSMSim™ Model – Key Features

• Option to use cost test protocols outlined in the 2001 California Standard Practice Manual (CASPM) or the subsequent 2007 revision[2] to the CASPM; or the 2017 National Standard Practice Manual[3] by the National Efficiency Screening Project
• Allows analyst to define custom cost test definitions
• Rigorous treatment of early-retirement measures, including dual baselines and deferred replacement credits[4]

[1] For more information, see http://www.lumina.com/why-analytica.

[2] California Public Utilities Commission. 2007. "2007 SPM Clarification Memo." Note the SPM has additional provisions for demand response/reduction measures, which are included in Navigant's DSMSim model.

[3] National Efficiency Screening Project, 2017. "National Standard Practice Manual for Assessing Cost-Effectiveness of Energy Efficiency Resources, Edition 1 Spring 2017.

[4] For discussion of proper evaluation of early retirement measures, see Rachel Brailove, John Plunkett, and Jonathan Wallach. "Retrofit Economics 201: Correcting Commons Errors in Demand-Side Management Cost-Benefit Analysis." Resource Insight, Inc. Circa 1990.

NAVIGANT

- Ability to handle avoided costs, retail rates, and load shape profiles at multiple levels of granularity (monthly, seasonal, annual, on/off peak)
- Handles any number of measures, programs, sectors, program periods and savings types (electricity/demand, gas, water, emissions, etc.)
- Cost-effectiveness can be evaluated at annual, bi-annual, quarterly, or monthly intervals
- Results based on planned input assumptions (incentives, administrative costs, non-energy benefits, participation, etc.) can be compared against those derived from actual values after program implementation is finalized
- If hourly load shapes are available, the model generates daily load shape profiles by day type (peak day, weekday, weekend/holiday) for baseline consumption, efficient consumption, and the resulting efficient savings
- Treats recurring incentives and administrative costs, which are common in demand response programs
- Includes an option to assign program-level administrative costs to measures within the program, while ensuring the selected cost test ratio remains above 1.0 (or a designated threshold) for each measure
- Can easily switch between net and gross savings and cost-effectiveness results
- Provides cost-effectiveness metrics at the measure, program, sector, portfolio, end use or building type level, including combinations of these levels of granularity
- Powerful sensitivity and scenario analysis capability to identify key assumptions and largest leverage points
- Provides histograms of top-saving measures, scatter plots to view savings versus costs, and supply curves
- Input data is imported from an Excel spreadsheet for portability, version control, and scenario analysis
- All summary results and intermediate calculations are immediately available in tabular or graphical form and can be exported to Excel

As a starting point, the analysis will incorporate data from the 2020-2022 DSM Plan recently submitted to the UARB for approval, as well as inputs to the 2018 Potential Study Update. Navigant will address approximately 350 energy efficiency measures [about 100 in the residential sector, and 250 for the business, non-profit, and institutional (BNI) sector] across Efficiency Nova Scotia's (ENS) portfolio as a starting point for the potential study analysis, and target a program Total Resource Cost test threshold of 1.0. Economic potential will be screened with a measure passing at 1.0 total resource cost (TRC) test. Achievable potential measures will be included with benefit/cost of 0.7 TRC or greater. We also will further consider whether a measure should or should not be included in the achievable potential. As needed, we will update the DSM Plan measures, but expect this will be done only in instances where either new information is provided, or a new measure is added compared to the recent measure set developed.

NAVIGANT

1.2 Demand Response Potential

To determine the various levels of DR achievable potential, Navigant's Demand-Response Simulator (DRSim™) model will simulate the enablement and utilization of DR options, costs, and interactions given user-defined deployment trajectories. The model will estimate DR potential, leveraging data and insights from previous E1 DSM research efforts. Programs that will be considered for the analysis include direct load control, peak time rebates, interruptible/curtailable, and behind the meter batteries.

1.3 Introduction to DSMSim and DRSim Models

Navigant's Analytica-based Demand-side Management Simulator (DSMSim™) model will be used to develop the energy efficiency potential analysis. Navigant's Analytica-based DRSim™ model will be used to conduct the demand response potential analysis. To facilitate inspection by EfficiencyOne, regulatory intervenors and the UARB, the model inputs and outputs will be provided in Excel.

2. Approach to Potentials

2.1 Approach to Energy Efficiency Potential

The EE analysis will assess three potentials (1) technical, (2) economic, and (3) achievable. The achievable potential will analyze multiple savings scenarios, including maximum achievable. Scenarios will be developed in conjunction with E1 and stakeholder feedback will be considered. Draft final scenarios will be communicated to stakeholders on 05/24/2019, as part of the scenarios/sensitivities and detailed assumptions package. Due to budget and timeline constraints, a maximum of five scenarios will be considered, one of which will be maximum achievable. Navigant will undertake the following steps to develop our estimates of potential savings:

EE Potential Step 1: Develop base year, define customer segments, define end uses, model base year consumption, develop reference case, compile global assumptions

EE Potential Step 2: Develop disaggregated energy sales forecasts for Nova Scotia for the period 2021-2045 (25 years), with forecasts broken out by customer segments and end uses

EE Potential Step 3: Define and characterize energy efficiency and demand response measures, and screen measures for cost-effectiveness

EE Potential Step 4: Calculate potential savings for all measures, with technical, economic and achievable potential for 2021-2045 (25 years)

The specific activities involved with each step are detailed in the following sub-sections.

2.1.1 Steps 1 and 2: Develop Baseline Energy Use, End Use Saturation, and Sales Forecast

The market characterization (including determining baseline energy use and end use saturation), will be one of the most critical aspects of the potential study. Market characterization will be the starting point for the development of the base year calibration and the reference case forecast. The measure inputs will be used to populate and develop the base year calibration, the reference case forecast, and the DSMSim™ model. Figure 2 outlines the key input parameters used to develop the reference case forecasts.

Figure 2. Data Collection Granularity for Base Year / Reference Forecast

Load Forecast 1. Energy forecast 2. Demand forecast	Nova Scotia Power forecasts
Customer Accounts Forecast	Nova Scotia Power forecasts
Customer Demographics	Nova Scotia customer surveys and other primary and secondary sources
Measure-level inputs 3. Fuel Shares 4. Equipment Shares 5. Saturations/Densities 6. Energy/Demand Savings 7. Codes & Standards	• Nova Scotia end use surveys • Nova Scotia program evaluation reports • Statistics Canada and NRCan data • Past potential studies
Global Inputs 8. Inflation rates 9. Discount rates 10. Avoided energy and capacity costs 11. Retail rates 12. Line loss factors 13. Non-energy impacts	• Inflation rate forward target of 2% - Bank of Canada • 2019 Approved WACC/AFUDC rate for Discount Rate • “Base-DSM” Avoided Costs from 2014 IRP, with 2018 estimate of T&D avoided costs from NS Power • 2019 Retail Electricity Rates with 2.7% escalation – As in 2014 IRP • Line loss factors from 2017 evaluation of DSM programs • No Non-Energy Impacts to be included
Incentive Level Assumptions (Achievable Potential Inputs)	ENS recent past program experience and future plans

In the first step of the market assessment, Navigant will develop a set of energy sales forecasts for electric consumption and electric peak demand, disaggregated by sector (e.g., residential and BNI), and end use. The reference forecasts will span the 25-year study period, from 2021 to 2045. The reference case will act as the point of comparison (i.e., the reference) for the calculation of the technical, economic, and achievable savings potential over the study period. The reference case forecast effectively represents the *expected* level of electricity consumption and electricity demand over the study period absent any incremental DSM activities conducted.

NAVIGANT

To develop accurate and localized forecasts, potential studies typically differentiate energy use forecasts by structural sector (e.g., residential and BNI). Navigant will further disaggregate the energy use forecasts using customer segments and end uses.

Navigant will disaggregate the reference case energy forecasts using the customer segments and end uses listed in Figure 3. DSM potential will be disaggregated by sector, end use, and building-type, and if possible, by region. Sector, end use, building type, and region are described in the following table.

Figure 3. Potential Study Customer Segments

Category	Sub-Categories
Sector	a) Residential (with low-income treated as a subcomponent) b) Business, Non-Profit and Institutional (all non-Residential customers)
End Use	c) Cooking and Laundry d) Electronics and Information Technology (IT) e) Domestic Hot Water (DHW) f) Heating, Ventilation and Air-conditioning (HVAC) g) Lighting h) Refrigeration i) Process j) Energy Management k) Other
Building Type	l) SF Market Rate m) MF Market Rate n) SF Low Income o) MF Low Income p) First Nations q) Small Commercial r) Large Commercial s) Institutional **t)** Industrial
Region	u) Based on first three characters of postal codes

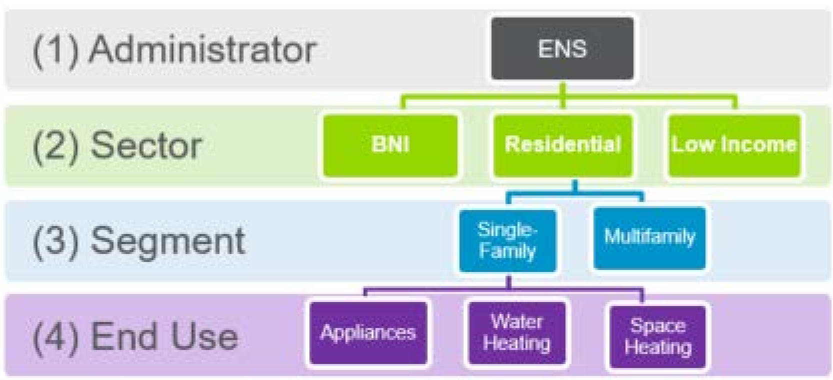
The first key output of the market characterization will be the development of the base year analysis. The base year will be calibrated against provincial (Nova Scotia Power) sales data for the most recent historical year for which sales data is available (2018 or 2017). The objective of the base year will be to establish a detailed profile of Nova Scotia electricity consumption for across all customer sectors and segments, and end uses.

NAVIGANT

We will develop the base year analysis based on a bottom-up assessment of electricity consumption. This bottom-up approach is illustrated by Figure 4. We will begin at the most granular level by analyzing end use equipment types (e.g., space heating, lighting, etc.) and the corresponding efficiencies (e.g., SEER, Efficacy, etc.), building those up to the end use level, and further up to the customer segment-level, the sector-level, and finally the administrator-level.

As illustrated by Figure 4, the energy sales forecast will be based on multiple levels (or dimensions); from the administrator level down to the equipment efficiency level. Navigant can report electricity consumption at any of the four levels of aggregations, and we will work with E1 to ensure the aggregated electricity consumption (at each level) is reasonable and well aligned with expectations.

Figure 4. Illustrative Breakdown of Energy Sales Forecast



Based on Navigant's experience conducting energy efficiency potential studies, we consider two of these levels of aggregation as the most critical:

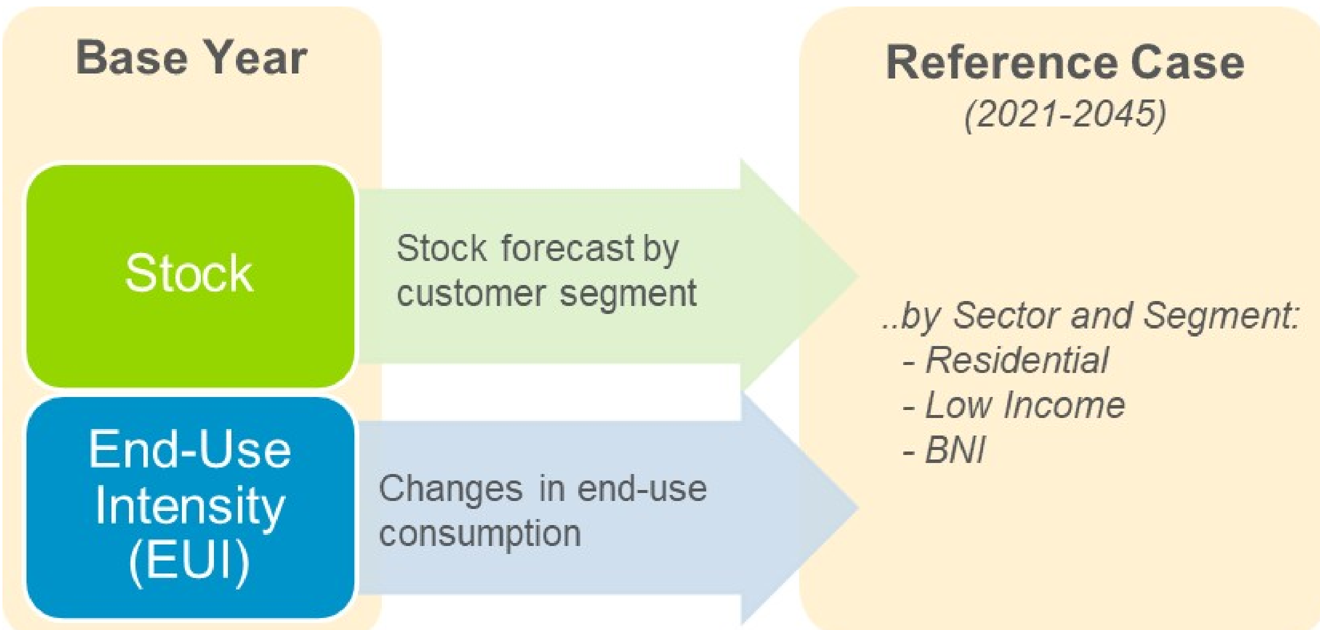
- Customer segments
- End Uses

The customer segment and end use levels are critical for all potential studies because these can introduce a high degree of complexity to the overall study and process. A potential study with many customer segments and end uses can add a significant amount of unwanted complexity if the granularity of the results does not align with project goals and programs to be implemented. However, if the customer segments and end uses are selected appropriately and are consistent with internal processes and target programs, detailed results can deliver significant value for program managers and DSM planners. Based on our experience, it is also critical that customer segments and end uses be well aligned with the availability and level of detail of the data resources available. For example, to characterize electricity consumption across a variety of BNI segments, fuel shares (e.g., electrically heated vs. gas heated buildings) and equipment shares (e.g., penetration of heat pumps, baseboard heating, etc.) should, in theory, be captured by an end use study. As part of this effort, Navigant will collaborate with E1 on the segmentation.

The next step in the base year calibration analysis involves the establishment of specific end uses for each customer sector. In general, Navigant's approach for determining appropriate end uses is based on the differences in specific activities or customer need that requires electricity, without specifying the equipment used to satisfy that need (e.g., space cooling and water heating versus central A/C and tankless water heaters).

The next step in the study is developing the reference case forecast. The significance of the reference case in the context of the potential study is that it will act as the point of comparison (i.e., the reference) for the calculation of the technical, economic, and achievable savings potential over the study period. The reference case forecast effectively represents the *expected* level of electricity demand over the period absent any incremental DSM activities offered by ENS moving forward. The reference case will use the base year analysis as the foundation for developing the forecast. This is illustrated by Figure 5.

Figure 5. Schematic of Reference Case Development



2.1.1.1 Stock Assumptions

Navigant will first develop stock growth rates based on the study's segmentation established for each customer sector. Navigant understands that as part of its load forecasting process, a utility develops a forecast of the number of residential and non-residential buildings (facilities). These forecasts will provide the foundation for estimating net building growth within the reference case forecast. Navigant will also develop forecasts of BNI floor area. Combined, these stock growth forecasts will be a direct input into the reference case forecast.

2.1.1.2 EUI Trends

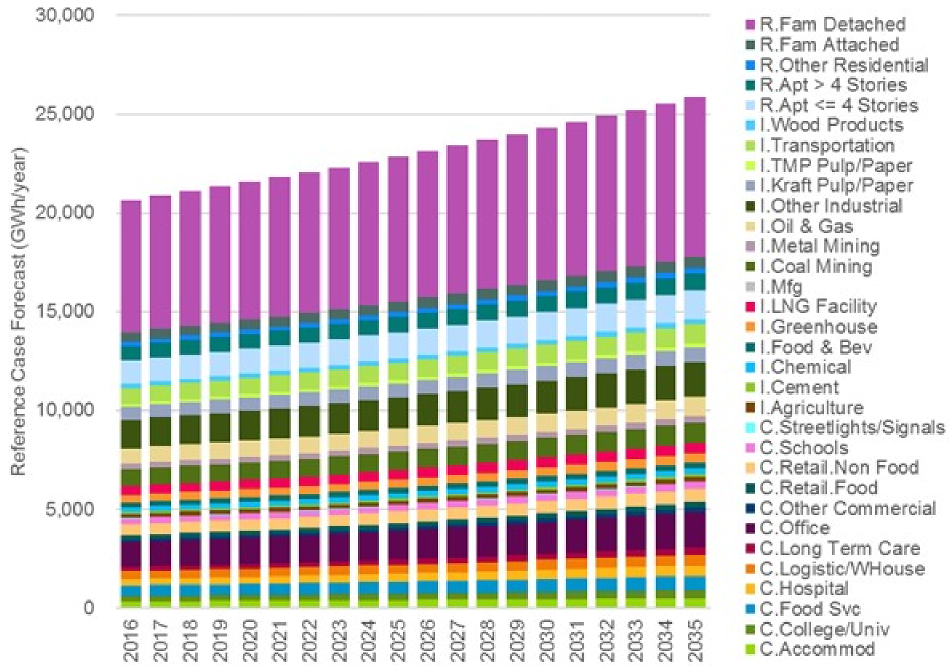
The second step of building the reference case forecast will be to establish appropriate EUI trends to be applied to each customer segment. EUI trends are intended to reflect natural changes in electricity consumption as a result of two factors: (1) natural conservation and (2) natural growth.

- Natural conservation is a well-established concept in DSM programs, and typically refers to actions taken by electricity customers—in absence of sponsored programs—to improve energy efficiency and reduce consumption.
- Natural growth refers to actions taken by electricity customers to increase consumption without the involvement of guided programs. An example of natural growth is home electronics, where customers may be increasing their electric consumption (e.g., through addition of more televisions, computers, etc.) and causing an increase in the electronics end use intensity.

For example, EUI trends in the residential sector will capture trends occurring in space heating, space cooling, water heating, appliances, lighting, etc. A critical component of the reference case forecast will be netting out “natural conservation” from building codes and appliance/equipment standards. Navigant will work with E1 and stakeholders to define the appropriate definition of natural conservation, including the impact of future codes and standards that are planned or announced. The impact of these future codes and standards can be (1) “netted out” from and not counted in the conservation potential, or (2) included in the conservation potential as a separate and unique source of savings. DSMSim™ can readily address either approach and we are flexible as to which approach should be incorporated into the reference forecast and conservation potential estimates.

The final step of the reference case forecast will be to apply the EUI trends and the stock growth rates to the base year results. The resulting forecast will be a detailed projection of electricity consumption by sector and segment. Figure 6 illustrates what the reference case forecast will look like. This figure shows a forecast of annual electricity consumption by each individual customer segment by year.

Figure 6. Illustrative Example of Reference Case Forecast of Electricity Consumption



Source: Navigant

In addition to developing the reference case forecast, Navigant will support E1 in the development of global assumptions for the potential study. These assumptions include:

- Inflation rate
- Discount rate
- Avoided energy and capacity costs
- Consumer price forecast
- Retail rates
- Line loss factors

2.1.2 Step 3: Define, Characterize and Screen Efficiency Measures

The next step in the potential estimation process is to define and characterize energy efficiency measures (EEMs). We use the terms “measures” and “technologies” to refer to any actions taken to increase efficiency or reduce demand, whether through changes in equipment, control strategies, or behaviour.

2.1.2.1 Define Efficiency Measures

Navigant's process for defining potential EEMs includes developing a comprehensive list of efficiency technologies and actions to be included under three main categories: (1) residential energy efficiency, (2) BNI energy efficiency, and (3) peak load reduction. To develop the list of measures, Navigant will draw upon existing measures used in the current ENS DSM programs and the ENS TRM, which was recently done for the 2018 ENS Potential Update and 2020-2022 DSM Plan analyses. We will also introduce "new" measures not previously offered by ENS and consider emerging measures that are expected to become commercially available in the near term. In addition, we will review recent program design and evaluation studies conducted by ENS to ensure all appropriate technologies are assessed, including any specific technologies requested by the ENS.

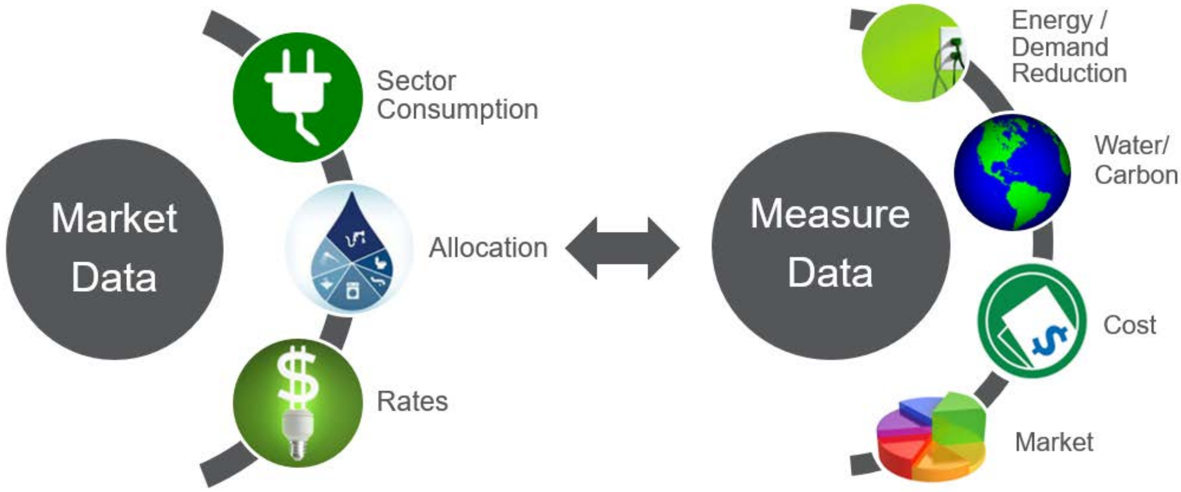
Navigant has fully characterized complete measure datasets during previous potential studies and the most recent ENS DSM Plan, and we can leverage this prior analysis to expedite the measure characterization step of this analysis, which is often the most time-consuming task in a potential study. Upon completion of the in-depth measures review and identification process, Navigant will develop a final list of "recommended" measures that will be presented to E1 and stakeholders for review and discussion, and highlight any which were not included in the 2018 ENS Potential Study Update or the 2020-2022 ENS DSM Plan.

2.1.2.2 Characterize Efficiency Measures

After Navigant and E1 have reached agreement on a final measures list, Navigant will proceed with measure characterization, as needed to supplement existing characterizations for measures in the territory. At a high level, measure characterization involves (1) identifying energy, demand, and other savings (e.g., operations and maintenance) of each measure, including changes over time; and (2) identifying costs associated with each measure, including changes over time (such as prices coming down because of greater volume sold and technology improvements). As appropriate, winter and on/off peak ratios will be determined to accurately calculate avoided cost benefits for each measure. Avoided costs from water and other fuel impacts (for any fuel-switching measures) will be included in the measure characterizations and cost-effectiveness testing.

Navigant's process for characterizing measures is illustrated in Figure 7. The figure illustrates the important links between general market characteristics and measure-level characteristics. Data regarding market characteristics (consumption, end use allocations, retail rates, etc.) are combined with measure-specific data characteristics (energy/demand reduction, water, costs, market maturity, etc.).

Figure 7. Link Between Market and Measure Characterization



Navigant largely will leverage measure characterization analyses that have been completed for prior studies to the maximum extent possible. When necessary, we will make limited updates to measure characterizations. As necessary, Navigant will vet and fully characterize each measure included in the potential study in terms of the measure's energy savings, costs, and applicability. Each characterized measure will have an estimate of typical savings and costs on a defined unit (e.g., per measure, per customer, per building, per square footage, or per 1000 square meters for the BNI sector), with explicit references to supporting documentation. Figure 8 depicts some ways Navigant will characterize each resource by estimating the following measure parameters.

Figure 8. Characterization Measure Parameters

Measure Replacement Methodology	Measure Description	Savings Estimations	Measure Costs	Measure Densities and Saturation
Each measure defined as retrofit/early retirement/dual baseline, replace on burnout (ROB), or new, to guide baseline definitions and incremental cost calculations	Technical definitions of the baseline (code or existing) and energy efficiency technology with characteristics such as efficiency. Definitions of baseline technologies will account for any anticipated changes to codes and standards.	Baseline, code, and efficient technology annual energy consumption used to calculate savings. The effect of future changes to codes and standards considered to develop a savings profile over the analysis period. We will use a single climate zone.	Incremental measure costs will be calculated based on the measure applicability and account for all material, labor, and operations and maintenance costs associated with the baseline, code, and/or efficient technology.	Densities will be defined as the number of each technology per unit (per home for residential and per sq. ft. for BNI sectors). Saturations are defined as the % penetration of the efficient technology.

2.1.3 Step 4: Develop Energy Efficiency Potential Estimates

Once the reference case forecasts and measure characterizations are complete, Navigant will develop estimates of the potential savings available for a 25-year period, from 2021-2045.

There are three general types of energy efficiency and renewable energy resource potential: (1) technical, (2) economic, and (3) achievable.

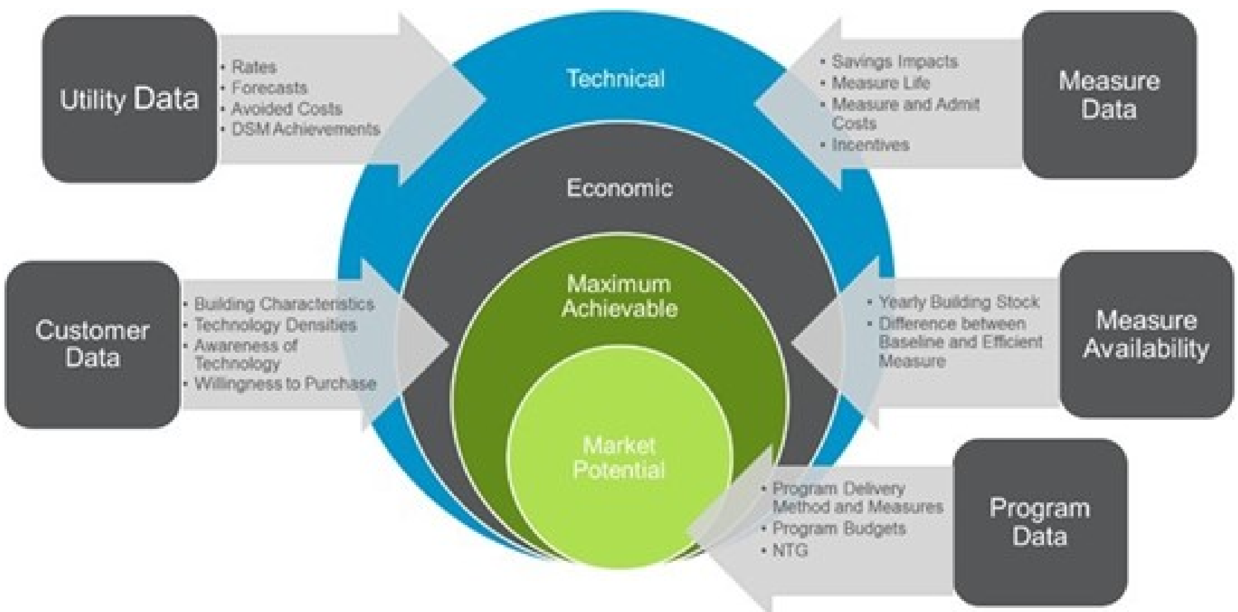
a) **Technical potential** represents what can be saved from available or emerging efficiency and renewable technologies and practices without regard to either the costs or the benefits of the measures.

b) **Economic potential** represents the fraction of the technical potential that is cost-effective under a set of technology costs and full avoided costs developed for the period of analysis.

c) **Achievable potential** represents the fraction of the economic potential that: (1) can be plausibly realized in the marketplace, given market constraints (e.g., equipment turnover rates) and the impacts of programs and policies that could be implemented; and (2) is cost-effective from the standpoint of direct utility bill savings only.

Navigant will develop potential estimates starting with technical potential, followed by economic, and then finally achievable potential. Figure 9 illustrates the key inputs and the layers of the potential modelling approach.

Figure 9. Approach to Market Potential Analysis



The analysis for technical and economic potential is modeled on the measure level only. This analysis allows for measures that can be installed, regardless of end user affinity to the measure or the cost of the measure (technical potential), to make it through the screening process. Then the next level provides a screening of the technology on the margin, only associated to the incentive/measure cost for the economic potential. Finally, the analysis can consider the program delivery which considers that overall measure/incentive cost (differs for direct install and rebate programs, for example) and the program delivery or administrative cost (upstream versus downstream). The achievable potential analysis will be addressed and reported at the sector level (residential and BNI) by end use and building type.

The analysis will address the following aspects:

- Baseline market conditions (informed by the results of the Baseline Study currently being conducted by Navigant on behalf of EfficiencyOne)
- The full array of commercially-available technologies, including measures that aren't currently readily commercially-available but could be expected to be during the study period. At minimum, this will include EfficiencyOne's full current portfolio of measures. Measures will be developed in conjunction with E1 and stakeholder feedback will be further considered. Draft final measure assumptions will be communicated to stakeholders for review on 05/24/2019, as part of the scenarios/sensitivities and detailed assumptions package. Due to budget and timeline constraints, a maximum of five scenarios will be considered.
- Anticipated customer behaviour modelling, given specific incentive levels and the most relevant determinants of customer response, such as return or years to payback.
- The current and forecast detailed state of the Nova Scotia electricity system and its customers, such as:
    - Net system requirement
    - Firm peak demand
    - Expected timing of system peak demand
    - Number and type of customers
    - Sector-level energy and demand requirements
    - Net energy and system-peak demand savings, at the generator, of energy efficiency measures (after free-ridership, spillover, and interactive effects)
    - Demand reduction measures

2.1.3.1 Develop Technical Potential

Technical potential is defined as the energy savings that can be achieved assuming that all installed measures can immediately be replaced with the efficient measure/technology, wherever technically feasible, regardless of the cost, market acceptance, or whether a measure has failed and must be replaced.

As noted above, Navigant's modelling approach considers an energy-efficient measure to be any change made to a building, piece of equipment, process, or behaviour that could save energy. The savings can be defined in numerous ways, depending on which method is most appropriate for a given measure. Measures such as condensing water heaters are best characterised as some fixed amount of savings per water heater; savings for measures such as BNI automated building controls are typically characterised as a percentage of customer segment consumption or per square foot; and, lastly, measures such as industrial ventilation heat recovery are well-suited for estimating energy savings as a percentage of end use consumption. The DSMSim™ model can appropriately handle savings characterizations for all three methods.

The calculation of technical potential in this study will differ depending on the assumed measure replacement type, since technical potential is calculated on a per-measure basis and includes estimates of savings per unit, measure density (e.g., quantity of measures per home), and total Nova Scotia building stock.

The potential study will estimate the incremental annual and cumulative technical potential of

energy and peak demand savings capable through EE, without consideration of any non-engineering constraints, and include all possible efficient measures, disregarding economic feasibility and market acceptance. Technical potential will also consider how any anticipated future codes and standards will affect the baseline. Savings resulting from codes and standards ("natural adoption") will be quantified separately from technical potential.

The model accounts for three replacement types, where technical potential from retrofit and replace-on-burnout measures are calculated differently from technical potential for new measures. The formulae used to calculate technical potential by replacement type are demonstrated below.

New Construction (NEW) Measures

Similar to replace-on-burnout measures, the cost of implementing new measures is incremental to the cost of a baseline (and less efficient) measure. However, new construction technical potential is driven by equipment installations in new building stock rather than by equipment in existing building stock.[5] New building stock is added to keep up with forecasted growth in total building stock and to replace existing stock that is demolished each year. Demolished (sometimes called replacement) stock is calculated as a percentage of existing stock in each year and can be specified to Nova Scotia market conditions. New building stock (the sum of growth in building stock and replacement of demolished stock) determines the incremental annual addition to technical potential, which is then added to totals from previous years to calculate the total potential in any given year. In cases where data is not available, Navigant will use similar data that we have already gathered from comparable studies.

The equations used to calculate technical potential for new construction measures are provided below.

Annual Incremental Technical Potential (AITP): $AITP_{YEAR}$ = New $Buildings_{YEAR}$ (e.g., buildings/year[6]) X Measure Density (e.g., widgets/building) X $Savings_{YEAR}$ (e.g., sq.mt./widget)

---

[5] In some cases, customer segment-level and end use-level consumption/sales are used as proxies for building stock. These consumption/sales figures are treated like building stock in that they are subject to demolition rates and stock-tracking dynamics.

[6] Units for new building stock and measure densities may vary by measure and customer segment (e.g., 1,000 square meters of building space, number of residential homes, customer-segment consumption/sales, etc.).

NAVIGANT

X Technical Suitability (dimensionless)

Total Technical Potential (TTP): $TTP_Y = TTP_Y = \sum_{YEAR=2029}^{YEAR=2020} AITP_{YEAR}$

Retrofit (RET) and Replace-On-Burnout (ROB) Measures

RET measures, commonly referred to as advancement or early-retirement measures, are replacements of existing equipment before the equipment fails. RET measures can also be efficient processes that are not currently in place and that are not required for operational purposes. RET measures incur the full cost of implementation rather than incremental costs to some other baseline technology or process because the customer could choose not to replace the measure and would, therefore, incur no costs. In contrast, replace-on-burnout measures, sometimes referred to as lost-opportunity measures, are replacements of existing equipment that have failed and must be replaced, or existing processes that must be renewed. Because the failure of the existing measure requires a capital investment by the customer, the cost of implementing ROB measures is always incremental to the cost of a baseline (and less efficient) measure.

RET and ROB measures have a different meaning for technical potential compared with NEW measures. In any given year, the entire building stock is used for the calculation of technical potential.[7] This method does not limit the calculated technical potential to any pre-assumed rate of adoption of retrofit measures. Existing building stock is reduced each year by the quantity of demolished building stock in that year and does not include new building stock that is added throughout the simulation. In cases where data is not available, Navigant will use similar data that we have already gathered from comparable studies.

For RET and ROB measures, annual potential is equal to total potential, thus offering an instantaneous view of technical potential. The equation used to calculate technical potential for retrofit measures is provided below.

Annual/Total Savings Potential *= Existing Building Stock $_{YEAR}$ (e.g., buildings[8]) X Measure Density (e.g., widgets/building) X Savings $_{YEAR}$ (e.g., sq.ft.[3]/widget) X Technical Suitability (dimensionless)*

Competition Groups

Navigant's modelling approach recognizes that some efficient technologies will compete against each other in the calculation of potential. The study defines competition as efficient measures competing for the same installation as opposed to competing for the same savings (e.g., window A/C vs. split-system A/C) or for the same budget (e.g., lighting vs. water heating). For instance, a consumer may install a condensing water heater or a tankless water heater; both of which belong to the same competition group, as only one of these would be installed. General characteristics of competing technologies used to define the competition groups proposed for

[7] In some cases, customer segment-level and end use-level consumption/sales are used as proxies for building stock. These consumption/sales figures are treated like building stock in that they are subject to demolition rates and stock-tracking dynamics.

[8] Units for building stock and measure densities may vary by measure and customer segment (e.g., 1,000 square meters of building space, number of residential homes, customer-segment consumption/sales, etc.).

this study include:

- Competing efficient technologies share the same baseline technology characteristics, including baseline technology densities, costs, and consumption
- The total (baseline plus efficient) maximum densities of competing efficient technologies are the same
- Installation of competing technologies is mutually exclusive (i.e., installing one precludes installation of the others for that application)
- Competing technologies share the same replacement type (RET, ROB, or NEW)

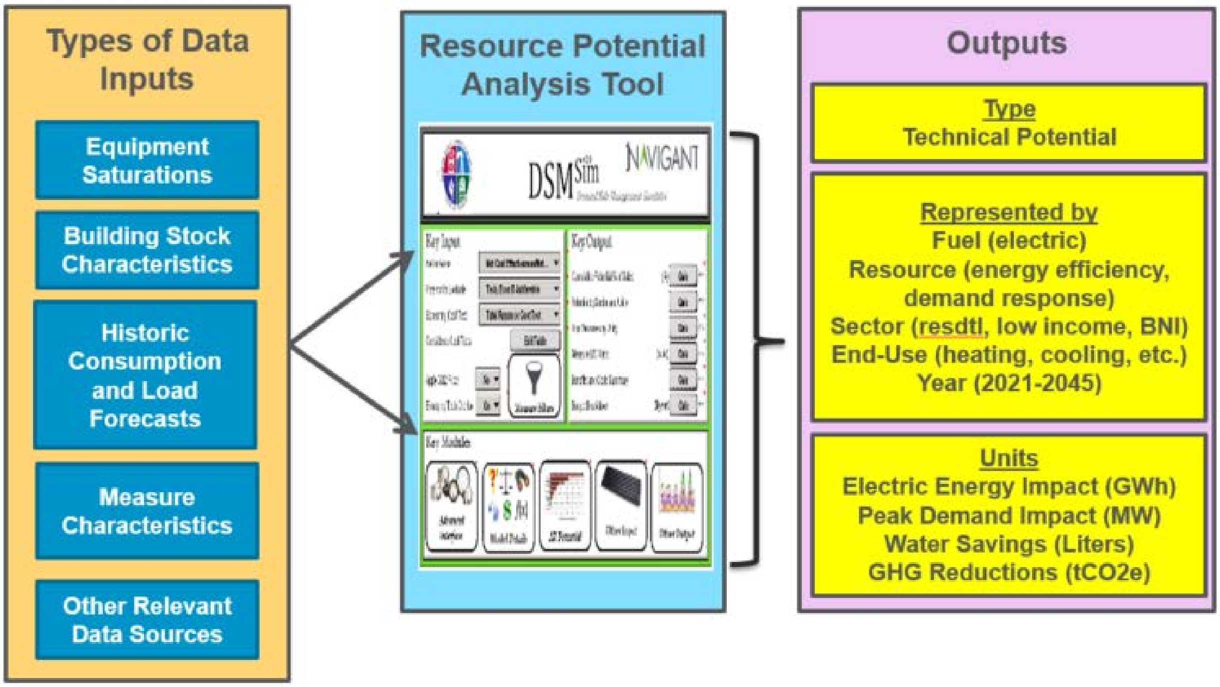
To address the overlapping nature of measures within a competition group, Navigant's analysis only selects one measure per competition group to include in the summation of technical potential across measures (i.e., at the end use, customer segment, sector, service territory, or total level). The measure with the largest savings potential in a given competition group is used for calculating total technical potential of the competition group. This approach ensures that double-counting is not present in the reported technical potential, though the technical potential for each individual measure is still calculated and reported.

Develop and Run the EE Technical Potential Model

The overall EE technical potential modelling framework is illustrated in Figure 10. The chart identifies the some of the key data inputs, the resource potential module, and the specific output types provided from the various modules. Figure 10 also summarizes the various dimensions of outputs produced from the potential model: type of potential (technical) reported at various levels (sector, end use, etc.) and in certain units (GWh, MW, etc.).

NAVIGANT

Figure 10. Navigant's Technical Potential Model Data Flow



2.1.3.2 Develop Economic Potential

Economic potential is a subset of technical potential and uses the same assumptions regarding immediate replacement as in technical potential, however, only includes those measures that have passed the cost-benefit (B/C) tests chosen for measure screening. For Nova Scotia, a measure with a total resource cost test (TRC) B/C ratio greater than or equal to 1.0 is a measure that provides monetary benefits greater than or equal to its costs. If a measure's B/C meets or exceeds the threshold, it is included in the economic potential. DSMSim™ can calculate the five standard cost tests for the cost-benefit analysis: Participant Cost Test, Program Administrator Cost Test, Ratepayer Impact Measure Test, Total Resource Cost Test, and Societal Cost Test. and use any of the tests for economic screening.

When the TRC test is used for measure screening, administrative costs are not included in the economic screening process at the *measure level* because, typically, the measure's cost-effectiveness *on the margin* is the objective of the test. Rather, administrative costs are typically included in economic potential calculations when aggregating multiple measures into an archetype program or portfolio. However, our team, and the DSMSim™ model, are flexible on this front. Specifically, DSMSim™ has the capability of including administrative costs in screening at the measure level, if desired.

Similar to technical potential, only one economic measure (meaning that its B/C ratio meets the threshold) from each competition group is included in the summation of economic potential across measures (e.g., at the end use, customer segment, sector, service territory or total level). If a competition group is composed of more than one measure that passes the TRC test, then the economic measure that provides the greatest savings potential is included in the summation of economic potential. This approach ensures that double-counting is not present in the reported economic potential, though economic potential for each individual measure is still calculated and reported.

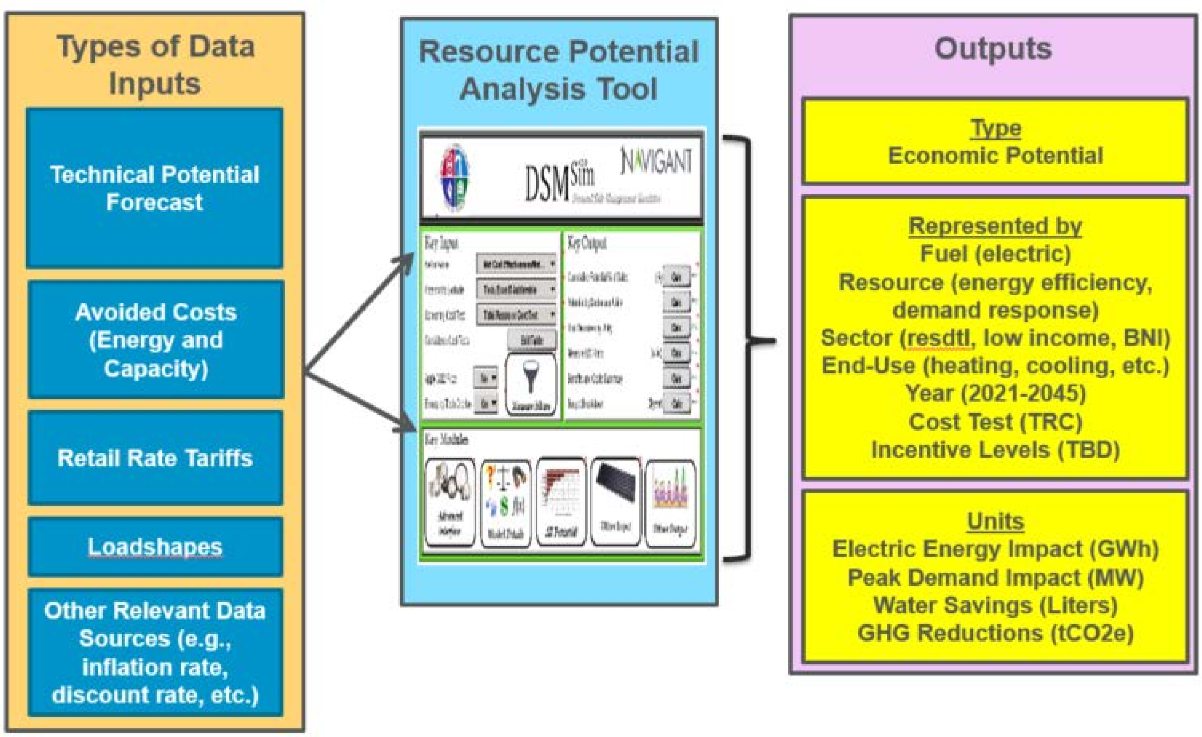
DSMSim™ has the flexibility to provide potential outputs by “binned” levelized cost groups as desired by E1. If required and based upon the cost of conserved energy for the various measures included in the economic potential, Navigant will work with E1 to identify the most appropriate bins for this grouping and the most appropriate application (e.g., for economic potential, achievable potential or both).

Develop and Run the Economic Potential Model

We will deploy our DSMSim™ model which provides estimates of economic potential for a defined service area. We will screen specific DSM measures using a TRC threshold level of 1.0. The overall economic potential modelling framework is illustrated in Figure 11.

We will primarily draw on the results of the technical potential to feed the economic potential analysis. Using our model, we will run cost-benefit screens for all measures considered in the technical potential analysis. To that end, we will draw upon the avoided costs for electricity. We will then develop the economic potential outputs in the manner outlined on the right-hand bar of Figure 11.

Figure 11. Navigant’s Economic Potential Model Data Flow



18

2.1.3.3 Develop Achievable Potential

This section presents the approach to calculating achievable potential, which is fundamentally more complex than the calculation of technical or economic potential. The potential study will estimate the annual and cumulative achievable potential of energy and peak demand savings through EE by analyzing up to five scenarios with varying levels of incentives. Scenarios will be developed in conjunction with E1 and stakeholder feedback will be considered. Draft final scenarios will be communicated to stakeholders on 05/24/2019, as part of the scenarios/sensitivities and detailed assumptions package. Due to budget and timeline constraints, a maximum of five scenarios will be considered, one of which will be maximum achievable. To conduct the analysis at a sector level, Navigant will determine the achievable potential at the building type and end use level.

The critical first step in the process of accurately estimating achievable potential is to simulate market adoption of energy-efficient measures. Our approach to simulating the adoption of energy-efficient technologies for purposes of calculating achievable potential can be broken down into the following two strata:

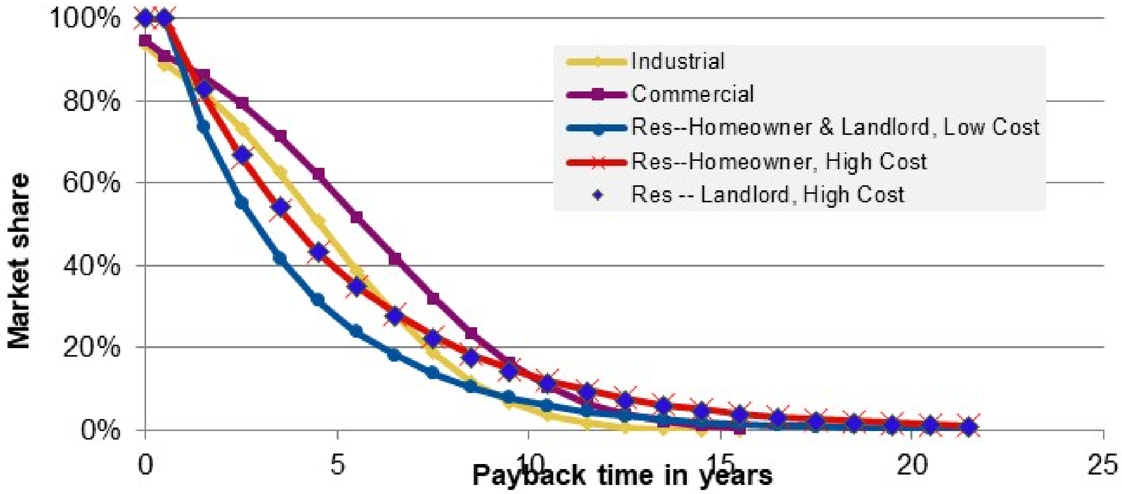
- Calculation of the *equilibrium market share*
- Calculation of the *dynamic approach to equilibrium* market share

Calculation of Dynamic Equilibrium Market Share

The equilibrium market share can be thought of as the percentage of individuals choosing to purchase a technology provided those individuals are fully aware of the technology and its relative merits (e.g., the energy- and cost-saving features of the technology). For energy-efficient technologies, a key differentiating factor between the base technology and the efficient technology is the energy and cost savings associated with the efficient technology. Of course, that additional efficiency often comes at a premium in initial cost. In efficiency potential studies, equilibrium market share is thus often calculated as a function of the payback time of the efficient technology relative to the inefficient technology. While such approaches certainly have limitations, they are nonetheless directionally reasonable and simple enough to permit estimation of market share for the dozens or even hundreds of technologies that are often considered in potential studies.

Navigant will develop equilibrium payback acceptance curves based on the results of the baseline study being conducted, which will query Nova Scotians about their awareness of and willingness to install efficiency measures. Based on the survey respondents, Navigant will develop payback acceptance curves, as illustrated in Figure 12. These surveys presented decision makers with numerous choices between technologies with low upfront costs but high annual energy costs, and measures with higher upfront costs but lower annual energy costs.

Figure 12. Example – Payback Acceptance Curves



Source: Navigant, 2015

Since the payback time of a technology can change over time; as technology costs and/or energy costs change over time, the equilibrium market share can also change over time. The equilibrium market share is, therefore, recalculated for every time-step within the market simulation to ensure the dynamics of technology adoption considers this effect. As such, the term "equilibrium market share" is a bit of an oversimplification and a misnomer, as it can itself change over time and is, therefore, never truly in equilibrium; it is used nonetheless to facilitate understanding of the approach.

Calculation of the Approach to Equilibrium Market Share

Two approaches are used for calculating the approach to equilibrium market share (i.e., how quickly a technology reaches final market saturation): one for new technologies or those being modeled as a retrofit (a.k.a. discretionary) measures, and one for technologies simulated as ROB (a.k.a. lost-opportunity) measures[9]. A high-level overview of each approach is provided in the following sections.

Retrofit and new technologies adoption approach uses an enhanced version of the classic Bass diffusion model[10,11] to simulate the S-shaped approach to equilibrium that is commonly observed for technology adoption. Figure 13 provides a stock/flow diagram illustrating the

[9] Each of these approaches can be better understood by visiting Navigant's technology diffusion simulator, available at: http://forio.com/simulate/navigantsimulations/technology-diffusion-simulation.

[10] Bass, Frank (1969). "A new product growth model for consumer durables". Management Science 15 (5): p215–227.

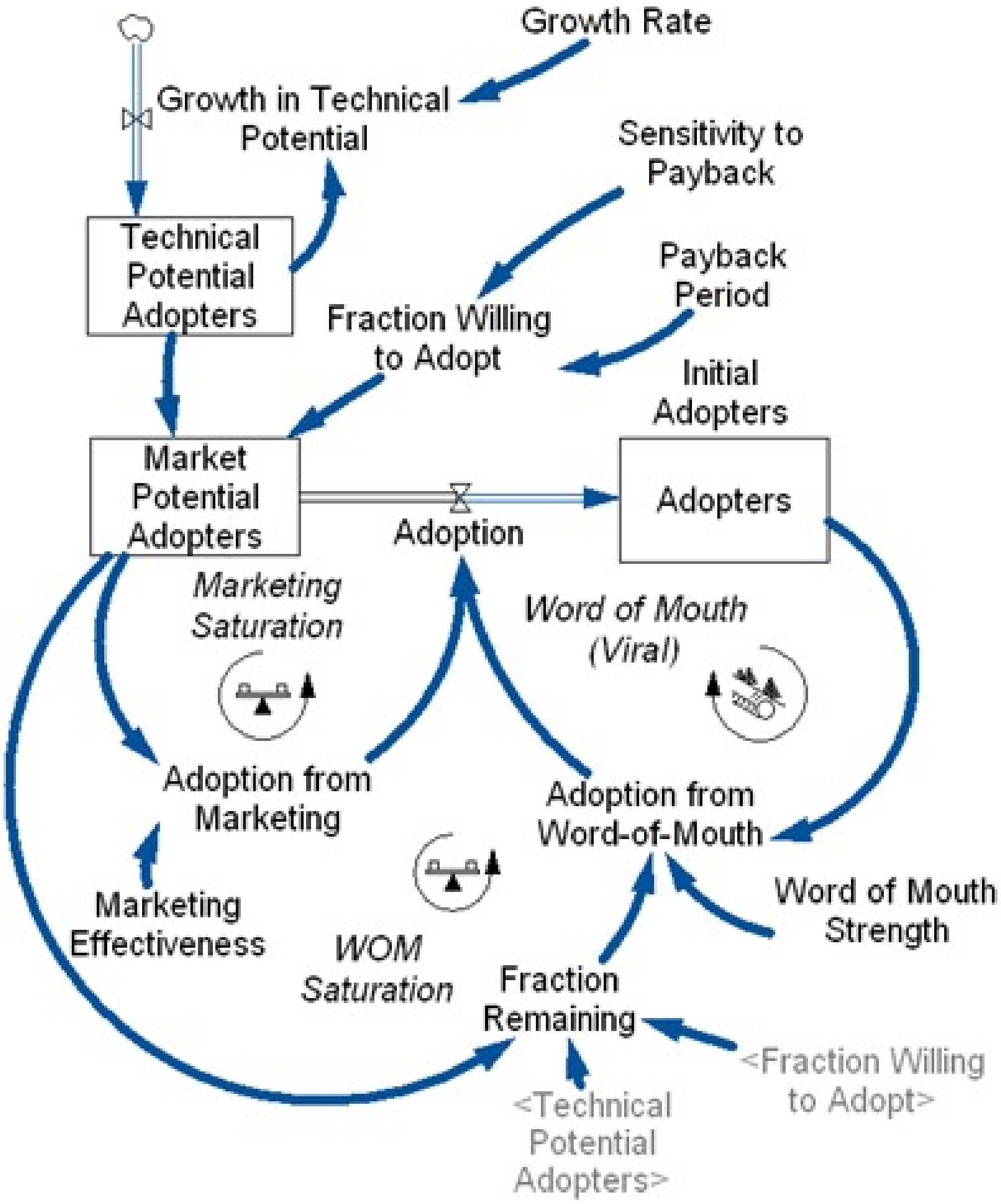
[11] See Sterman, John D. Business Dynamics: Systems Thinking and Modeling for a Complex World. Irwin McGraw-Hill. 2000. p. 332.

causal influences underlying the Bass model. In this model, market potential adopters flow to adopters by two primary mechanisms: adoption from external influences, such as program marketing/advertising, and adoption from internal influences, including word-of-mouth. The fraction of the population willing to adopt is estimated using the payback acceptance curves illustrated in Figure 13.

The marketing effectiveness and external influence parameters for this diffusion model are typically estimated upon the results of case studies where these parameters were estimated for dozens of technologies.[12] Recognition of the positive, or self-reinforcing, feedback generated by the word-of-mouth mechanism is evidenced by increasing discussion of the concepts such as social marketing as well as the term viral, which has been popularized and strengthened most recently by social networking sites such as Facebook and YouTube. However, the underlying positive feedback associated with this mechanism has been ever present and a part of the Bass diffusion model of product adoption since its inception in 1969.

[12] See Mahajan, V., Muller, E., and Wind, Y. (2000). New Product Diffusion Models. Springer. Chapter 12 for estimation of the Bass diffusion parameters for dozens of technologies. This model uses the median value of 0.365 for the word-of-mouth strength in the base case scenario. The Marketing Effectiveness parameter was assumed to be 0.04, representing a somewhat aggressive value that exceeds the most likely value of 0.021 (75th percentile value is 0.055) per Mahajan 2000.

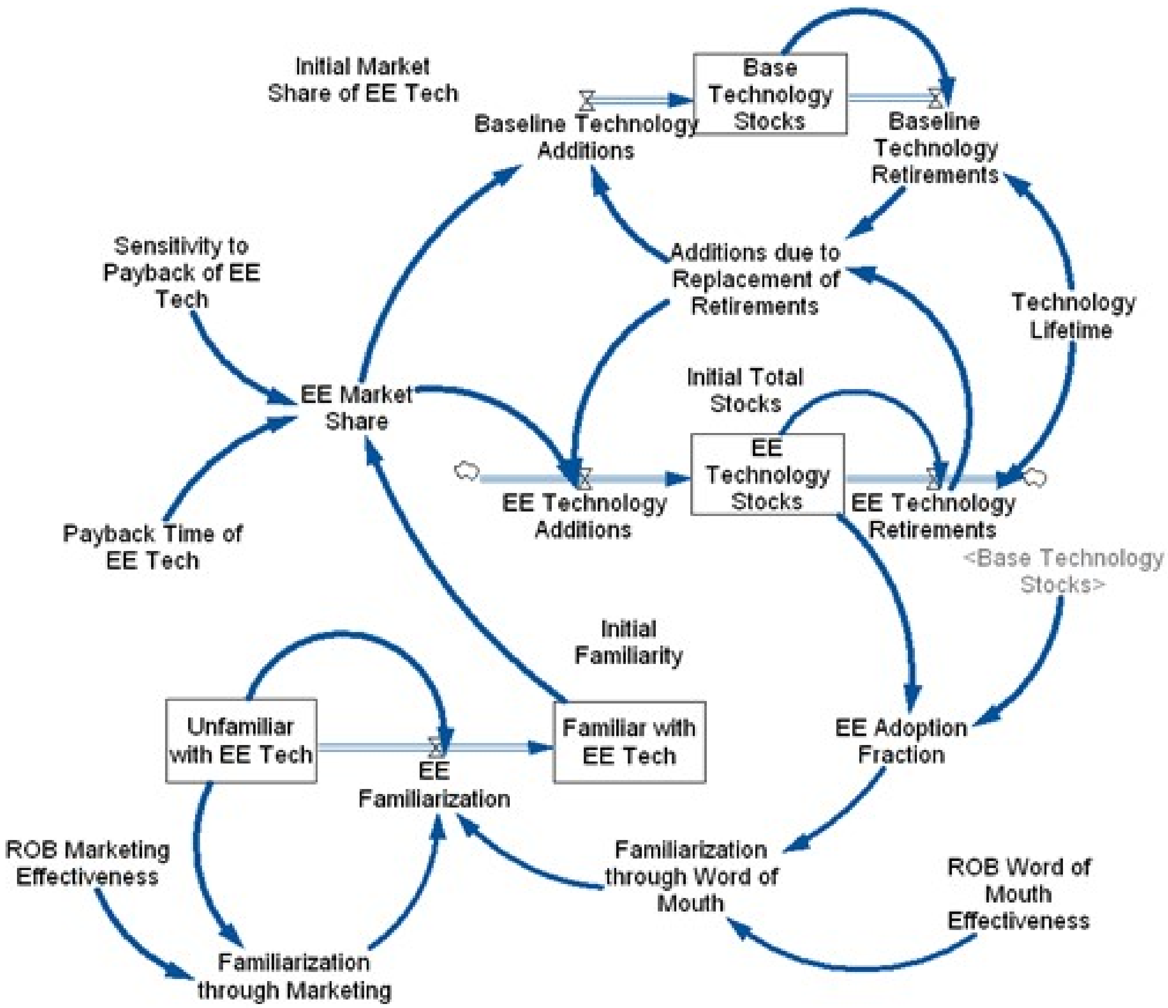
Figure 13. Stock/Flow Diagram of Diffusion Model for New Products and Retrofits



Source: Navigant, 2015

The dynamics of adoption for ROB technologies technology adoption approach is somewhat more complicated than for new/retrofit technologies since it requires simulating the turnover of long-lived technology stocks. In order to account for this, the DSMSim^{TM} model tracks the stock of all technologies, both base and efficient, and explicitly calculates technology retirements and additions consistent with the lifetime of the technologies. Such an approach ensures that technology churn is considered in the estimation of market potential, since only a fraction of the total stock of technologies are replaced each year, which affects how quickly technologies can be replaced. A model that endogenously generates growth in the familiarity of a technology, analogous to the Bass approach described above, is overlaid on the stock-tracking model to capture the dynamics associated with the diffusion of technology familiarity. A simplified version of the model employed in DSMSim™ is illustrated graphically in Figure 14.

Figure 14. Stock/Flow Diagram of Diffusion Model for Replace-on-Burnout Measures



Source: Navigant, 2015

Model Calibration

Calibration of a predictive model imposes unique challenges, as future data is not available to compare against model predictions. While engineering models, for example, can often be calibrated to a high degree of accuracy since simulated performance can be compared directly with performance of actual hardware, predictive models do not have this luxury. Demand-side management models, therefore, must rely on other techniques to provide both the developer and the recipient of model results with a level of comfort that simulated results are reasonable.

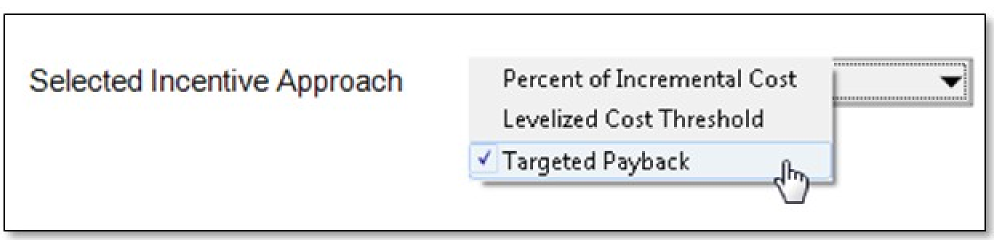
For this project, Navigant proposes to take a number of steps to ensure that the initial, base year used (2018 or 2017) forecast model results are reasonable and consider historic adoption, including:

1. Comparing forecast values, by sector and end use, against historic achieved savings (e.g., from program savings for 2018 or 2017). Although some studies indicate that demand-side management potential models are calibrated to ensure first-year simulated savings precisely equal prior-year reported savings, we have found that forcing such precise agreement has the potential to introduce errors into the modelling process by effectively masking the explanation for differences—particularly when the measures included may vary significantly. Additionally, there may be sound reasons for first-year simulated savings to differ from prior-year reported savings (e.g., savings estimates have changed). Thus, while Navigant endeavors to achieve agreement to a degree believed to be reasonable between past results and forecast first-year results, our approach does not force the model to do so—providing, the team believes, a degree of confidence that the model is internally consistent.
2. Identifying and ensuring an explanation existed for significant discrepancies between forecast savings and prior-year savings, recognizing that some ramp-up is expected, especially for new measures or archetype programs.
3. Calculating $/first-year kWh costs by sector and comparing these with past results.
4. Calculating the split (percentage) in spending between incentives and variable administrative costs predicted by the model to historic values.
5. Calculating total spending by sector and end use and comparing the resulting values to historical spending.
6. Calculating portfolio-level $/first-year kWh costs and comparing these with values Navigant researched through benchmarking of other jurisdictions.

Achievable Potential Scenarios and Incentive Levels

A key component of any potential study is determining the appropriate level at which to set measure incentives for a scenario. Navigant's DSMSim™ model offers several different strategies for setting incentive levels, each of which are accessible via DSMSim™ 's graphical user interface, as illustrated in Figure 15.

Figure 15. Model Incentive Options



Navigant will work with E1 to determine the incentive method desired for this study, as each has its advantages and disadvantages. Based on E1's guidance, as a starting point, we will employ one of the following incentive strategies for the achievable potential scenario. Scenarios will be developed in conjunction with E1 and stakeholder feedback will be considered. Draft final scenarios will be communicated to stakeholders on 05/24/2019, as part of the scenarios/sensitivities and detailed assumptions package. Due to budget and timeline constraints, a maximum of five scenarios will be considered, one of which will be maximum achievable. These strategies can be characterized as follows:

- ***Levelized Cost Threshold Approach:*** In this approach, incentive levels are set to achieve a specified threshold spending level (on a $/levelized kWh saving basis). This threshold incentive level would be adjusted iteratively to a point where overall spending results in the achieving the savings targets.
- ***Targeted Payback Approach:*** This approach instead sets incentive levels at a level that targets a specified payback period for each measure (e.g., 1.5 or 2 years). This approach will tend to result in a higher savings acquisition costs (resulting in lower savings for a given budget) than a levelized cost threshold approach. However, it does tend to result in what some may consider to be a more comprehensive portfolio (i.e., one that more proportionally allocates spending and savings across various end uses). The reason is that the lower cost measures (such as lighting), which already tend to have short payback times, receive lower incentives relative to incremental cost than in the levelized cost threshold approach, thereby permitting greater spending on non-lighting measures (e.g., HVAC and shell measures). For this reason, this approach is at times preferred by stakeholders.
- ***Percent of Incremental Cost Approach:*** This approach simply calculates the incremental cost of each measure and then provides an incentive that is a specified percentage of that incremental cost. This method, while common in the industry, tends to result in a somewhat less comprehensive portfolio than the targeted payback approach, while also providing lower total savings for a given budget than the levelized cost threshold approach. Thus, it does not tend to be Navigant's proposed option. However, since the results tend to be fairly similar to the targeted payback approach, and since the approach is simple and easy to communicate, it is sometime preferred by stakeholders.

The achievable potential analysis results will reflect the portfolio of passing measures under the desired cost-benefit test. For the passing measures, we will determine the reasonably achievable winter peak demand (kW) and annual energy savings (kWh), and corresponding for 25 years, 2021 through 2045. Each achievable potential set of results will consider the market availability of each measure, customer awareness, the anticipated adoption rate at the specified incentive level, and any relevant market barriers.

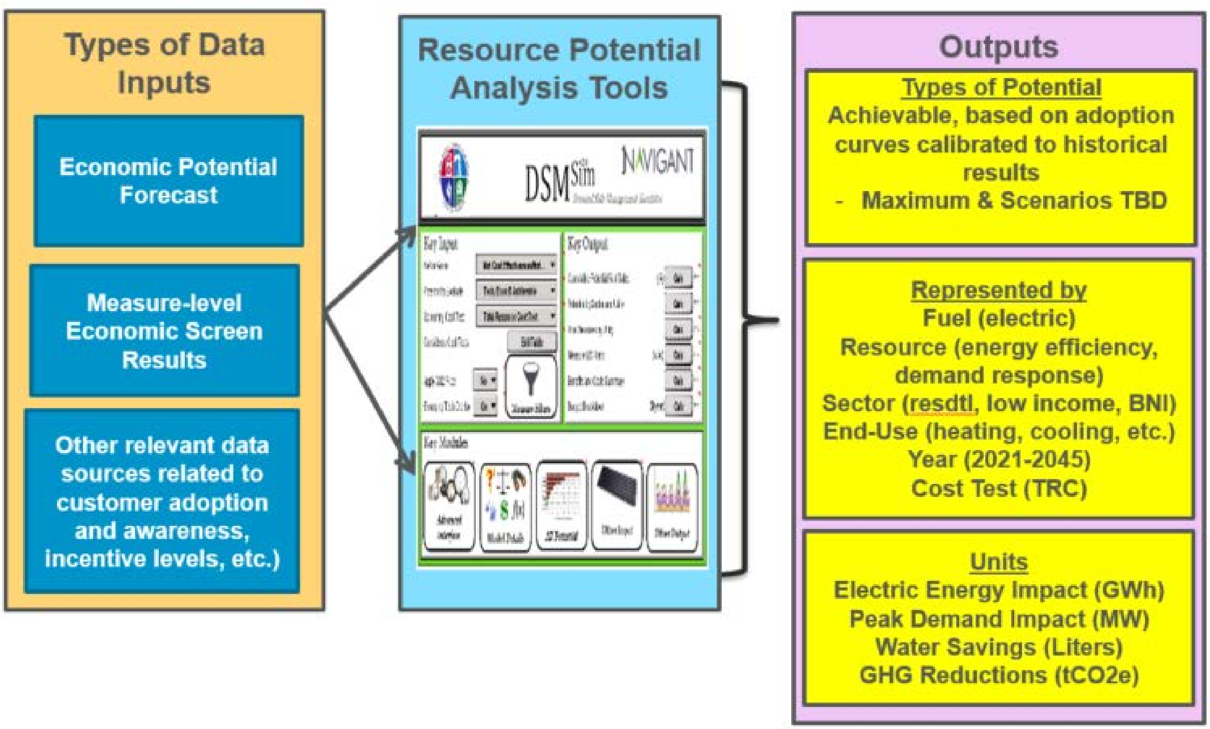
Develop and Run the Achievable Potential Model

The overall achievable potential modelling framework is illustrated in Figure 16. We will draw on the results of the economic potential analysis to feed the achievable potential analysis. Using

NAVIGANT

our model, we develop estimates of achievable potential of all measures passing the economic screen. To that end, we draw upon the specified avoided costs. We will then develop the achievable potential outputs in the manner outlined on the right-hand bar of Figure 16.

Figure 16. Navigant's Achievable Potential Model Data Flow



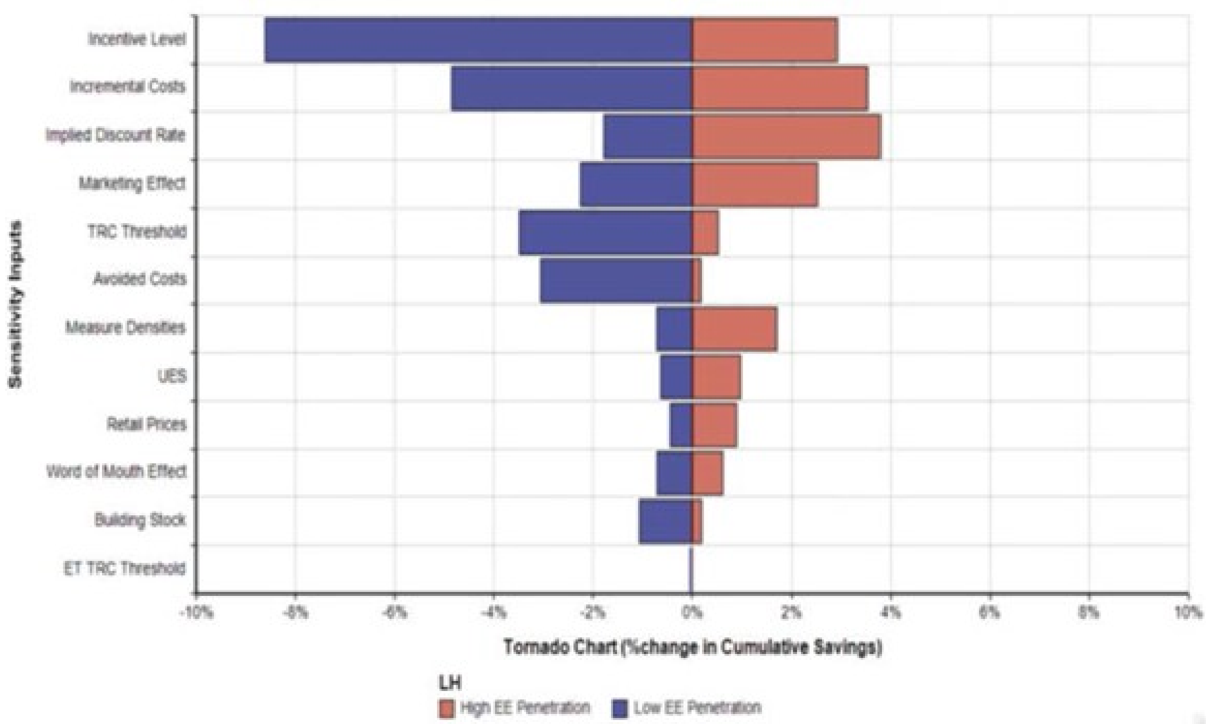
NAVIGANT

Sensitivity Analysis

Sensitivity analysis will allow E1 and stakeholders to gauge the level of influence a variety of factors can have on energy savings potential. Such understandings are critical to informing related policy decisions (as well as informing effective program design). Navigant may run sensitivity analysis on a variety of model variables, including discount rates. Draft final sensitivities will be communicated to stakeholders for review on 05/24/2019, as part of the scenarios/sensitivities and detailed assumptions package. Due to budget and timeline constraints, a maximum of five scenarios will be considered.

DSMSim™ has the ability the perform sensitivity analyses against twelve of the most influential factors impacting potential concurrently. Figure 17 demonstrates an example of this capability. Such analyses will be completed to provide E1 with an increased understanding of the relationships between key variables and potential. DSMSim™ can easily and quickly run different levels of sensitivity analyses to compare results with each case of results developed.

Figure 17. Tornado Chart Showing Model Sensitivities to Changes in Key Variables

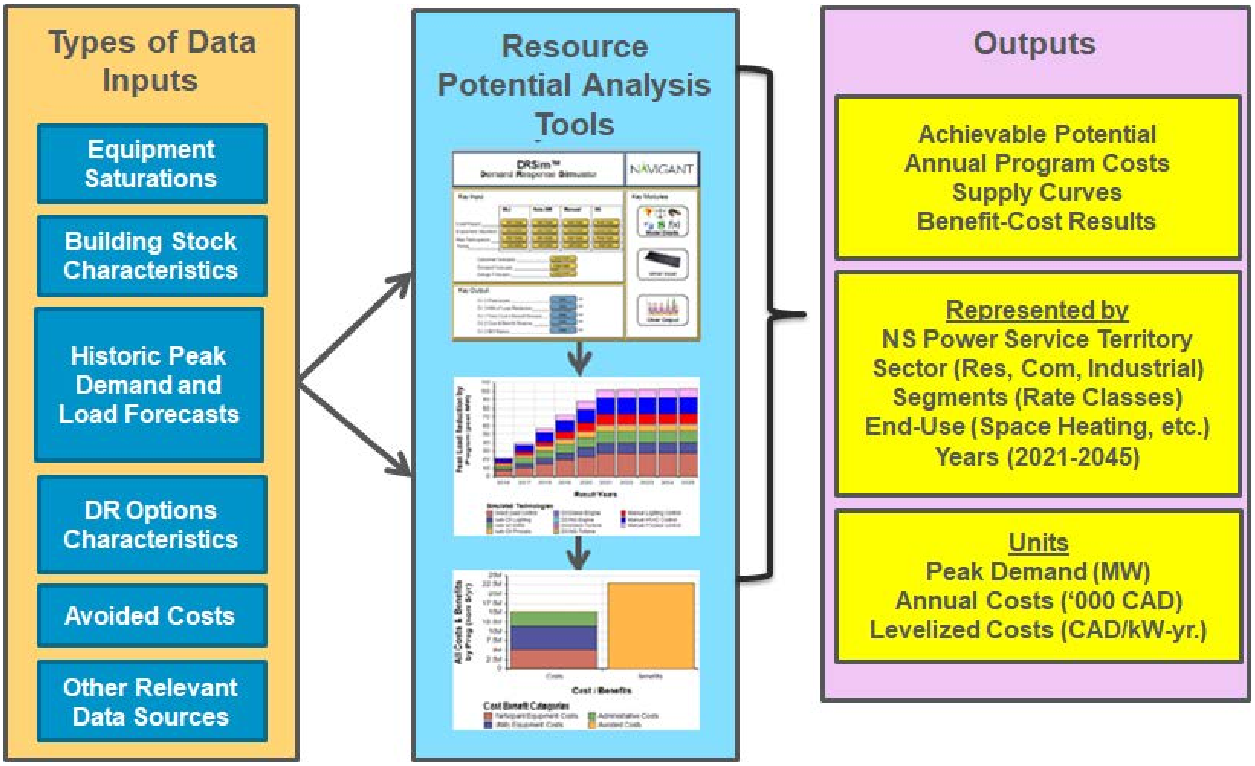


2.2 Approach to Demand Response Potential

This section describes Navigant's approach to developing estimates of the DR potential. Over the course of conducting similar studies, Navigant has developed a series of steps that encompass our general approach for conducting the DR potential analysis. The overall data flow of the DR study is as shown in Figure 18.

NAVIGANT

Figure 18. Demand Response Potential Study Data Flow



Navigant will develop DR potential and cost estimates using a bottom-up analysis. For the analysis, Navigant will utilize primary data from E1 and from the baseline study being conducted concurrent with this study, and supplement with secondary data where there are gaps. Navigant will customize its DRSim™ model, which uses this data as inputs, for this study. The following subsections detail Navigant's DR potential and cost estimation methodology, as summarized in Figure 19. Developing the potential and cost estimates included the following steps:

- Characterize market for DR potential by quantifying the number of eligible customers and estimating coincident winter peak load by customer class over the 25-year study period (2021 – 2045).
- Define and characterize DR options and map applicable options to relevant customer classes and/or building types.
- Develop participation levels, unit load reductions and cost assumptions for each DR option, by customer class and building type combination.
- Present potential estimates by DR option, customer class and building type; annual and levelized costs; and cost-effectiveness results.
- Conduct scenario analysis and present the range of DR potential, cost and cost-effectiveness results for each of the scenarios.

Figure 19. DR Potential Assessment Steps

Step 1: Market Characterization	Segment customers by size (max. demand following rate schedules) and characterize peak demand (define peak period)
Step 2: Develop Baseline Projections	Develop baseline projections for customer count and peak demand over the study timeframe (2021-2045)
Step 3: Define DR Options and Characterize	Define and characterize DR options and map applicable options to relevant customer classes.
Step 4: Develop Key Assumptions for Potential & Costs	Develop participation and unit load reduction assumptions under each DR option; develop itemized cost assumptions.
Step 5: Estimate Potential and Costs; Assess Cost-effectiveness of Programs	Present potential estimates by DR option and customer segments, annual and levelized costs, and cost-effectiveness results.

The following sub-sections discuss each step in more detail.

2.2.1 Step 1: Develop Market Characterization

Market characterization is the first step in the DR potential assessment process. Figure 20 presents the different levels of market segmentation for DR potential assessment. The Level 2 segmentation follows Nova Scotia Power's rate schedules. The segmentation approach presented in Figure 20 is based on recent discussions between E1 and Navigant and represent mutually agreed upon segmentation approach. This segmentation approach is different from that followed in the energy efficiency potential assessment, where customers are not differentiated by rate class.

Figure 20. Market Segmentation Approach for DR Potential Assessment

Level	Description
Level 1 **By Sector**	1. Residential 2. Business, Non-profit and Institutional (BNI)
Level 2 **By Segment** **(following rate schedules)**[13]	3. Residential o Single and Multi-Family o Low Income 4. Commercial o Small General Demand o General Demand o Large General 5. Industrial o Small Industrial o Medium Industrial o Large Industrial
Level 3 **By End Use** **(for each segment)**	6. Residential: space heating, electric water heating, electric vehicles, batteries 7. BNI: HVAC, electric water heating, lighting, industrial processes, electric vehicles, batteries

Level 1: Sector

Navigant will segment customers between the residential and business, non-profit and institutional (BNI) sectors.

Level 2: Customer Segment

Single-family and multi-family dwelling customers are grouped into one category for the DR analysis since the applicable DR option does not vary by dwelling type. Low income customers are separated out as a different segment. First Nation customers are included in the single-family category based on recent discussions between E1 and Navigant. BNI customers are segmented by Nova Scotia Power's rate schedules, as represented in Figure 21. Small General and General Demand customers map to the Small Commercial segment in the EE analysis. Large General segment under Commercial maps to the Large Commercial in EE, and the three industrial rate classes are all grouped under industrial segment in the EE analysis.

Level 3: End Use

Navigant will develop a breakdown of the winter peak demand by end use for each segment as indicated in Figure 21.

[13] Customers under the Municipal rate will be blended across the residential and BNI customers and will not be considered separately. This is consistent with how these customers are treated in the EE analysis.

2.2.2 Step 2: Develop Baseline Projections

Once the market segments are defined, the next step is to select the base year, which is the latest year for which full customer count and load data is available, 2018 or 2017. The selection of the base year will be consistent with that used in the EE potential.

The baseline projection for DR potential assessment entails the following:

Customer count projections by segment for Nova Scotia (Levels 1 and 2 in Figure 20).

- **Winter peak demand projections** by segment for Nova Scotia (Levels 1, 2, and 3 in Figure 20).

Navigant will use a bottom-up approach for developing the winter peak demand projections by customer segment and end use and calibrate this to the winter peak demand projections available from Nova Scotia Power. Navigant's approach for disaggregating peak demand till the end use level enables a granular assessment of peak demand reduction potential by end use.

The disaggregated winter peak demand projections by revenue class, building type and end use will utilize the following data sources:

- **Retail sales data by revenue class** (which is in turn mapped to customer segments).
- **Baseline sales projections by segment and end use** (described in Steps 1 and 2 for the EE potential).
- **End Use load shapes**. Navigant will use available load research data by rate class, available from Nova Scotia Power, and end use shapes developed by Navigant in a prior 2013 DSM Potential study for Nova Scotia, and fill in gaps, if any, with publicly available information sources.[14]

Navigant will compare the bottom-up disaggregated winter peak demand projections with system peak demand projections from Nova Scotia Power and calibrate the bottom-up derived estimates to match the utility's demand projections.

2.2.3 Step 3: Define Demand Response Options and Characterize

Figure 21 presents Navigant's proposed list of DR options by market segment. This list is based on a universal set of DR options that is typically considered in a DR potential study and standard industry practice. Navigant has had initial discussions with E1 on the proposed list and received their approval. The list will be finalized based on feedback from stakeholders and further discussions with E1.

---

[14] For example, Open EI provides a publicly available database of end use load profiles for DOE reference building types. This dataset contains hourly load profile data for 16 BNI building types (based off the DOE BNI reference building models) and residential buildings (based off the Building America House Simulation Protocols). This dataset also uses the Residential Energy Consumption Survey (RECS) for statistical references of building types by location. Hourly load profiles are available for all TMY3 locations in the United States.

http://en.openei.org/doe-opendata/dataset/commercial-and-residential-hourly-load-profiles-for-all-tmy3-locations-in-the-united-states

Figure 21. Proposed List of DR Options by Customer Segment[15]

Direct Load Control (DLC) • Thermostat • Load Control Switch	Control of electric loads by a thermostat and/or load control switch.	Residential, Small General Demand	space heating, electric water heating.
C&I Curtailment • Manual • Auto-DR enabled	Firm capacity reduction commitment. $/kW payment based on contracted capacity, plus $/kWh payment based on energy reduction during an event.	General Demand, Large General, Industrial	Various load types including- heating, ventilation, lighting, water heating, refrigeration, industrial process loads.
Electric Vehicle Charging Control • Auto-DR enabled	Managed charging of electric vehicles for peak demand reduction.	All	Electric vehicles.
Behind the Meter (BTM) Battery Storage	Use of BTM batteries for load shifting and/or curtailment during peak demand periods.	All	BTM batteries.

[15] This is provided as an example of how Navigant proposes to position DR options by the different segments. It will be finalized based on feedback and discussions with E1.

Dynamic Pricing*	Offer time varying rates (e.g., critical peak pricing), or discounts on electricity use reduction during critical peak periods (Peak Time Rebate). Consider an opt-in type of offer.	All	All

2.2.4 Step 4: Develop Programmatic Assumptions

The purpose of this task is to develop a set of assumptions that will ultimately drive the activity of modelling DR potential. We refer to this process as developing the DR program design parameters.

The two key parameters that are needed for potential estimation are participation rates and unit impact assumptions[16] by DR option for applicable customer segments. Additional parameters for potential estimation include DR event participation rates, percentage of customers with enabling technology, and attrition rates of enrolled customers. In addition, we develop detailed bottom-up program cost assumptions that include items such as program development costs, equipment costs, marketing and program administration costs, product lifetimes, discount rate, etc.

Several important information sources are evaluated during the process of formulating the representative DR portfolio, including:

- First, the effort relies extensively assessing the market characteristics for each of the market segments that we are interested in pursuing. For each market segment, end use market and technology, we typically conduct a detailed review of the amount of baseline load with by customer segment and end use with an eye toward how much of that load might be affected by DR programs.
- Second, we expect to draw upon the experience and insights gleaned from previous DR potential studies conducted by Navigant.
- Third, the knowledge and experience from industry DR best practices plays a significant role in the program development process. We review information presented in well-established secondary sources, such as the FERC National DR Program Survey database[17], and publicly filed program evaluation reports and market assessment studies from other jurisdictions to assess participation, and impact assumptions in similar DR programs offered by utilities and ISOs/RTOs.

---

[16] Note that we use best available industry information on unit impacts which are provided at the end use level. This utilizes our peak demand projections by segment and end use and applies the unit impacts by end use across all customer segments to develop highly-granular potential estimates associated with each end use by customer segment.

[17] http://www.ferc.gov/industries/electric/indus-act/demand-response/dem-res-adv-metering.asp

- Fourth, we draw on the internal stakeholders to provide valuable insights and perspectives on the results. In the program development process, we will solicit input to help guide and shape the set of programs to be considered in the DR potential assessment.

Program Costs: we develop program costs for each DR program from two main perspectives:

- First are the costs associated with administering the DR programs. This includes staff/labor, marketing, program development, regulatory-related, and measurement/evaluation. Also considered are the costs for developing the DR program infrastructure, including any costs for Demand Response Management Systems (DRMS) and other associated DR program operational functions. Oftentimes, these administrative costs represent shared costs across different DR programs.
- Second are the costs associated with the incentives that will be offered to the customers. This includes any one-time incentives for DR enablement equipment as well as ongoing incentives (such as monthly payments) in exchange for customers offering their loads.

In some cases, customers may be able to use the same enabling equipment to participate in multiple DR programs. These economies of scale will be factored into the cost analysis. We will work closely with E1 as we develop the program costs to ensure agreement with our assumptions at every stage of the process. Navigant has extensive experience in developing costs, and therefore we will rely on expert judgment among our team members for vetting these assumptions. Along with program costs and annual budgets, we also calculate levelized costs for DR programs. We routinely use levelized costs and potential savings results to develop supply curves, in which savings are stacked up in ascending order of costs.

2.2.5 Step 5: Develop Demand Response Potential Estimates

The “Develop Model” task will be more of a “customize model” effort, as Navigant has already developed a suitable model that can serve as a starting point. DRSim™ simulates the roll-out of DR technologies, costs, and their interactions given user-defined deployment trajectories. The established model structure and user-friendly input/output capabilities will provide the starting point for modeling Nova Scotia’s DR potential.

NAVIGANT

Figure 22 lists key model inputs and outputs for the DR potential study.

Figure 22. Key Inputs and Outputs for DR Potential

• System load • Customer count by market segment • Load profiles by market segment • Retail sales by rate schedule and by business type (if available) • Participation forecasts by customer segment in different DR programs • Per customer load impacts (either specified in terms of kW reduction per participant or in terms of percentage of enrolled load) • Customer attrition, event participation assumptions • Cost and benefit items o Technology costs, per-unit energy & load reductions, initial & maximum saturation levels o Various other cost components including program development costs, annual program administration costs, marketing and recruitment costs, O&M costs, and incentive levels. o Avoided energy and demand costs.	• Number of participants in DR programs by market segment • Winter demand reductions and energy savings by DR program and by market segment for Nova Scotia. • Annual program costs and levelized costs by program (by winter for Nova Scotia). • Supply curve for DR options (by winter for Nova Scotia).

From our experience, technical and economic potentials for DR are somewhat perfunctory exercises that don't generally shed much light on what we are ultimately after, which is how much DR potential can be achieved. Accordingly, the DR analysis will develop two types of achievable potential estimates – maximum and realistic.

Maximum achievable potential represents an upper-boundary of achievable potential where maximum incentives are offered to customers and marketing and outreach efforts are taken to the highest level to ensure high levels of participation.

Realistic achievable potential represents likely customer adoption when taking into account real-world constraints (e.g., limited budgets, regulatory policies, and customer preferences). Estimates are typically tied to recent program experience and reported savings from past programs and customers are offered incentives that are in line with existing industry practices.

We will use the potential savings and levelized cost data to construct supply curves which stack up savings in ascending order of costs.

3. Modelling Assumptions

Figure 23 lists many of the key input assumptions necessary for modelling the technical and economic potentials for the EE potential study.

Figure 23. Key Inputs for Energy Efficiency Technical and Economic Potential

Input	Options	Notes	Decision
General Setting and Global Input Options			
Technical Potential Type	Unconstrained/Constrained	Constrained potential, which is only applicable to ROB measures, would be limited by the rate at which measures turn over due to burnout.	Constrained
Competition Group Max for Technical	Max for each fuel/Max for Primary Fuel		Max for Primary Fuel
C&I Stock Basis	EUI, Sales, 1 ksqft	Node Calculate Sales From EUI	thousands of square meters
Apply Demolition Rates to Consumption	Yes/No	Affects sales-based stocks	Yes
Freeze New Stock	Yes/No	Holds new stock constant at first forecast year values	No
Measure and CE Options			
Screening Cost Test	TRC/PAC/SCT/RIM/PCT		TRC
Cost Benefit threshold	0-INF		1.0 at Program Level
CE Override by Measure	All Measures		YES
Reparticipation	0-100%	0.85 in 2018 ELRAM Model	Defer to best practices / previous study
Apply ET Risk Factors to CE?	Yes/No	Risk is modeled as a year over year vector derating savings/cost %	No
Allow Emerging Technologies	Yes/No		Yes
Apply ET Risk Factors to Consumption?	Yes/No		No
Net to Gross Methods	Gross screening--Gross aggregate C/E--Gross potential Gross screening--Gross aggregate C/E--Net potential Gross screening--Net aggregate C/E--Gross potential Gross screening--Net aggregate C/E--Net potential Net screening--Net aggregate C/E--Net potential		Net/Net/Net
Apply Dual Baseline	Yes/No	Impacts RET Measures Unit Energy Savings	Yes
Cost Test Method	2001/2007 CA SPM		2001 CA SPM
Allow Deferred Replacement	Yes/No		Yes
Cost Levelization Method	Levelize over measure life/Levelize over planning horizon		Measure Life
Apply Program Fixed Admin	Yes/No	If yes, need to provide fixed costs that do not scale with savings *for each program*	No - Variable Admin
Apply Admin Inflation	Yes/No		Yes
Apply Portfolio Admin	Yes/No	If yes, need to provide fixed costs that do not scale with savings for the portfolio as a whole, not applicable to individual programs.	No
Include Lost Revenue	By Cost Test/Impact Type	Does not override inclusion in cost-effectiveness testing; only for reporting	No
Apply O&M Inflation	Yes/No		Yes

Figure 24 lists many of the key input assumptions necessary for modelling the achievable potential scenarios for the EE potential study.

Figure 24. Key Inputs for Energy Efficiency Achievable Potential

Calibration and Achievable Potential Options			
Minimum Incentive Fraction	0-100%	% incremental costs. Overrides other incentive choices	10%
Selected Incentive Approach	Percent of Incremental Cost Max Utility Incentive Targeted Payback Targeted Participant Cost Percent of RIM NPV		Targeted Payback
Behavior Measure Incentive Fraction	0-100%	% incremental costs. Overrides other incentive choices. Only applicable for some measure characterization approaches, does not apply for planned rollout of behavior measures.	100%
Maximum Incentive Fraction	0-100%		100%
Apply Incentives to C&S measures	Yes/No		No
Initial Saturation Multiplier	0-INF	Calculates EE awareness from saturation	0.05
Logit Alpha	~2	Affects customer price response within a competition group	2
Incentive-Based Market Share sensitivity	0-100%	Applies to non-competition group recycling measures, where payback does not make sense	0.01
Cost Benefit threshold	0-INF		0.7 at Measure Level

NAVIGANT

in collaboration with:

NARRATIVE RESEARCH

Nova Scotia Residential Sector and BNI Sector Baseline Study

Prepared for:

Efficiency One
230 Brownlow Avenue, Suite 300
Dartmouth, NS B3B 0G5

Submitted by:

Navigant Consulting, Ltd.
First Canadian Place
100 King Street West | Suite 4950
P.O. Box 64
Toronto, ON M5X 1B1 | Canada

416.777.2440
navigant.com

June 19, 2019

TABLE OF CONTENTS

List of Figures

1. PURPOSE AND METHODOLOGY

1.1 Background

EfficiencyOne has indicated that Nova Scotia Power Inc. (NSPI) will be updating its Integrated Resource Plan (IRP) in 2019. Navigant understands that EfficiencyOne requires estimates of demand-side management (DSM) potential energy and winter peak demand savings for a 25-year period (2021 through 2045) to inform the development of this IRP.

Navigant is developing a 25-year DSM potential analysis to inform the IRP process. To inform and support the potential analysis, and to ensure that the assumptions for the current baseline of energy efficiency in Nova Scotia are current, Navigant, in collaboration with Narrative Research, conducted a market assessment of the current baseline of energy-consuming equipment and building stock within Nova Scotia.

1.2 Purpose

The purpose of conducting this study for EfficiencyOne is:

- to develop **Nova Scotia baseline information**, with saturations of various electricity-consuming equipment in Nova Scotia for residential and business, nonprofit and institutional buildings. This information will ensure that the starting point for the DSM potential estimation process is accurate and current.
- To develop Nova Scotia specific payback acceptance curves, based on responses to questions about willingness to purchase and install energy efficiency equipment, with varying incentive levels.

The primary objectives of this study were to:

Develop customer data by sector and end use that is specific to Nova Scotia.

Develop useful data to inform the Nova Scotia energy efficiency potential study.

1.3 Methodology Overview

This study consisted of a multi-phased data collection methodology. Specifically, there were two parallel studies conducted: (1) a general population (residential) online panel survey, and (2) a commercial panel online survey. These studies were intended to gather information from a sampling of residents and businesses/institutions within Nova Scotia. Given that both of these panel surveys do not represent a probability sampling approach, a margin of error cannot be ascribed to the research findings. Online panels are referred to as ‘samples of convenience’ and therefore results cannot be extrapolated to the entire provincial population of residents and businesses with any degree of statistical certainty. That being said, Narrative Research employed data weighting to the residential survey findings to ensure that the data is as statistically reliable as possible. The detailed methodologies for the two parallel surveys follow.

1.4 Residential Sector Online Survey Methodology

The primary source of data used in determining the residential baseline was a 2019 online general population panel survey conducted by Narrative Research (formerly Corporate Research Associates) on behalf of Navigant, referred to as the Nova Scotia Energy Usage Baseline Study. On-site data also was collected by Sustainable Housing and was used to supplement and calibrate the self-reported data from the online study. To develop estimates for density (the number of equipment units, both efficient and baseline present in the home), and saturation (the percent of efficient equipment units in the home, relative to the total units), survey responses were calibrated to onsite field observations. The calibration process estimates adjustment coefficients based on the relative difference between the survey responses and the field observations for each sector and measure. These coefficients are applied to customer segment and measure level counts of baseline and efficient equipment. Relative precision is used as the statistical determinant of the appropriateness of this adjustment between the three different estimates of density and saturation for each measure: surveyed, onsite, and calibrated. A lower relative precision indicates a better estimate of the parameter of interest, given a sample size.

The online survey instrument was designed in close consultation with Narrative Research, Navigant Consulting, and EfficiencyOne. Data was collected using an online general population panel hosted by Dynata. The target for this study was 1,000 completed surveys (with 1,002 completes being obtained). The online panel consisted of Nova Scotian residents across a variety of housing types including single family attached and detached homes, condominiums, apartments and other multifamily dwellings of two, three or more units, mobile homes and trailers. The online panel consisted of Nova Scotian residents aged 18 and older and quotas were established regionally, as well as by age and gender. As mentioned, as this was completed using a general population panel that does not comprise all Nova Scotian adults, a margin of error cannot be attributed. The results of this survey were statistically weighted to represent the true distribution of key demographic characteristics of the population. Data collection took place from April 16 to April 24, 2019, with an average survey length of thirteen minutes.

1.5 Business, Nonprofit and Institutional Sector Online Survey Methodology

The online survey instrument was designed in close consultation with Narrative Research, Navigant Consulting, and EfficiencyOne. Data was collected using an online panel of businesses and institutions within Nova Scotia, hosted by Dynata. The target for this study was 200 completed surveys (with 200 completes being obtained). The online panel consisted of Nova Scotian businesses and institutions with one or more employees. To ensure that respondents were capable of answering the survey questions, Narrative Research worked with Dynata to identify decision makers/people familiar with their building systems and their power bill to complete the BNI survey. As mentioned, this was completed using an online panel that does not comprise all Nova Scotia businesses/institutions, and therefore a margin of error cannot be attributed. Data collection took place from April 30 to May 9, 2019, with an average survey length of nine minutes.

1.6 Organization of the Report

The remainder of the report includes the following sections:

Section 2 – Summary of Findings – Residential Sector

Section 3 – Summary of Findings – BNI Sector

Section 4 – Online Survey Findings

Appendix B-1 – Residential Sector Online Survey Instrument

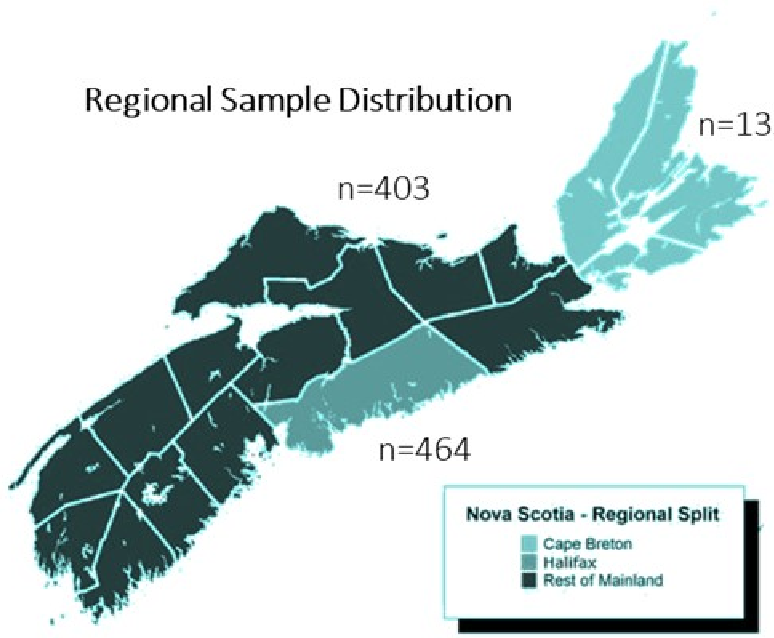
2. SUMMARY OF FINDINGS – RESIDENTIAL SECTOR

This section presents detailed findings from the residential sector online survey and onsite visits to assess baseline conditions in Nova Scotia dwelling units. **It is important to note that when applicable, this section presents the calibrated data as described in section 1.4 above.**

2.1 Residential Survey Responses by Region

Figure 1 shows the distribution of survey responses across the province, with 46.3% from the Halifax region, 40.2% from the rest of the mainland, and 13.5% from Cape Breton Island.

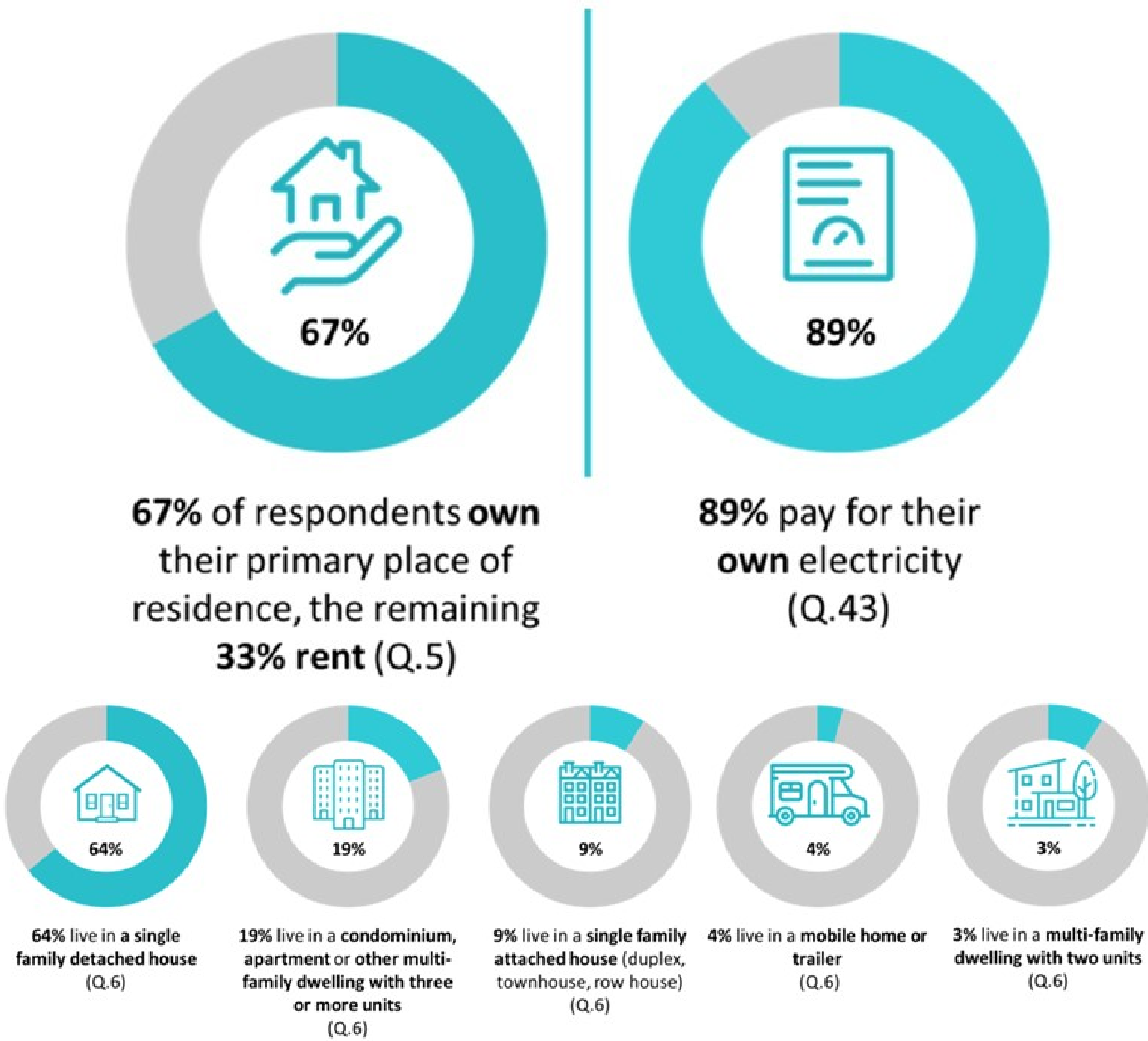
Figure 1. Residential Sector – Survey Responses by Region



2.2 Residential – Primary Place of Residence

As shown in Figure 2, the majority of respondents own their home, and most commonly live in a single family detached dwelling. The vast majority of residents pay for their own electricity, as opposed to having a landlord pay, or having some other arrangement. Of note, 2% of respondents live in a First Nations community.

Figure 2. Residential Sector – Primary Place of Residence



Results do not sum to 100% as some respondents did not provide a response or provided 'other' response.

2.3 Residential – Heating Source Types

Electricity and oil are the most common forms of home heating in the province. Meanwhile, 26% use a heat pump as a main heat source. Survey respondents reported that 33% of all primary heating systems are electric and 62% of households have a secondary heating system installed. Of these, 26% use some form of electric heating as a backup source. Respondents reported 31% of primary heating systems are fuel oil. Figure 3 illustrates all sources (both primary, secondary and tertiary) of energy sources used to heat homes in Nova Scotia.

Figure 3. Residential Sector – Heating Source Fuel Types – All Sources

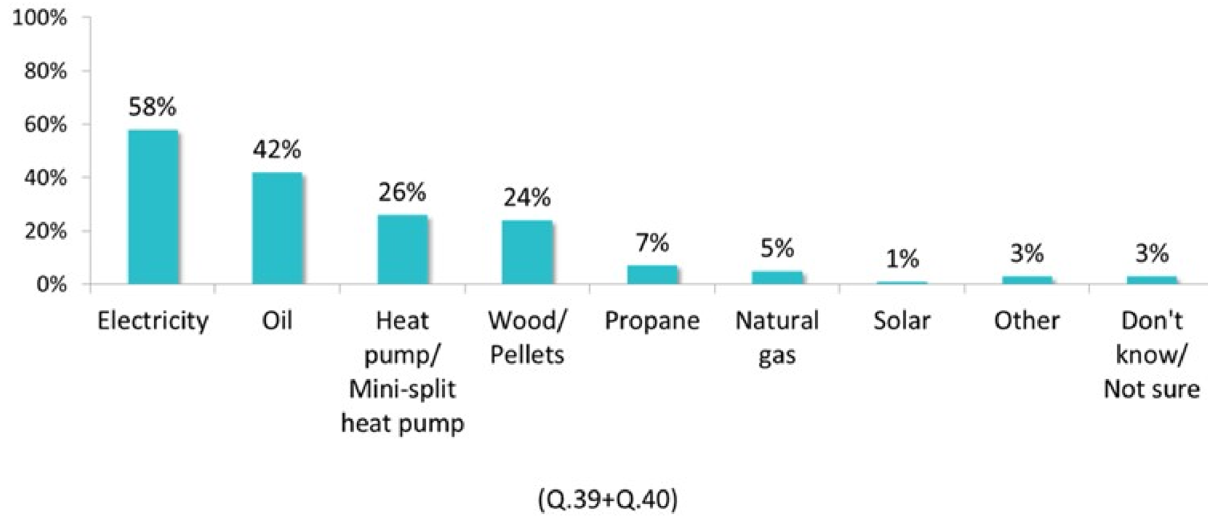
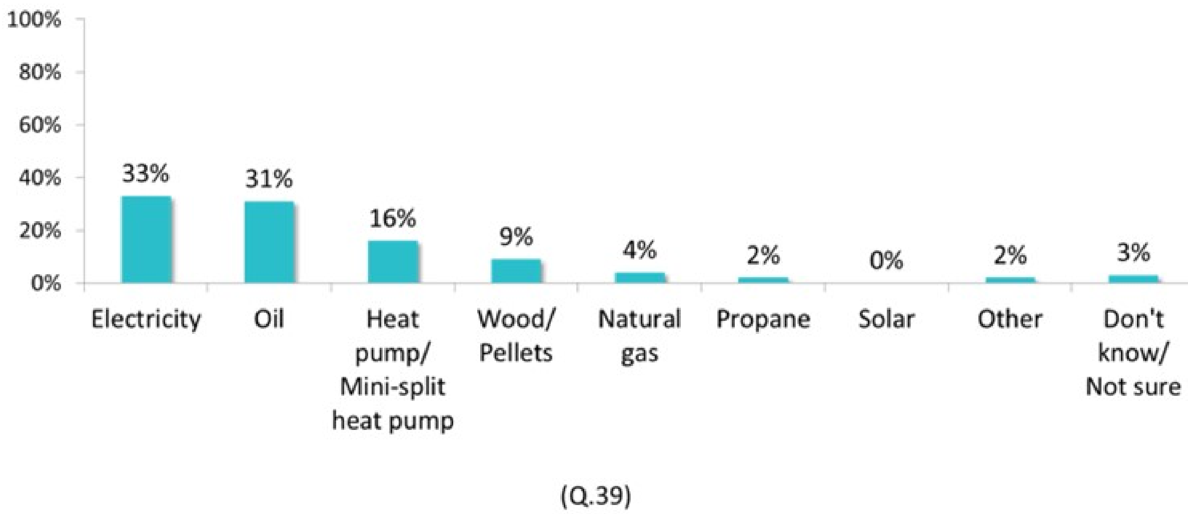


Figure 4 presents primary heating source types. Nova Scotia residences use electricity for heat (33%), followed by oil (31%), and then heat pump (16%), wood/pellets/chips (9%), natural gas (4%), propane (2%).

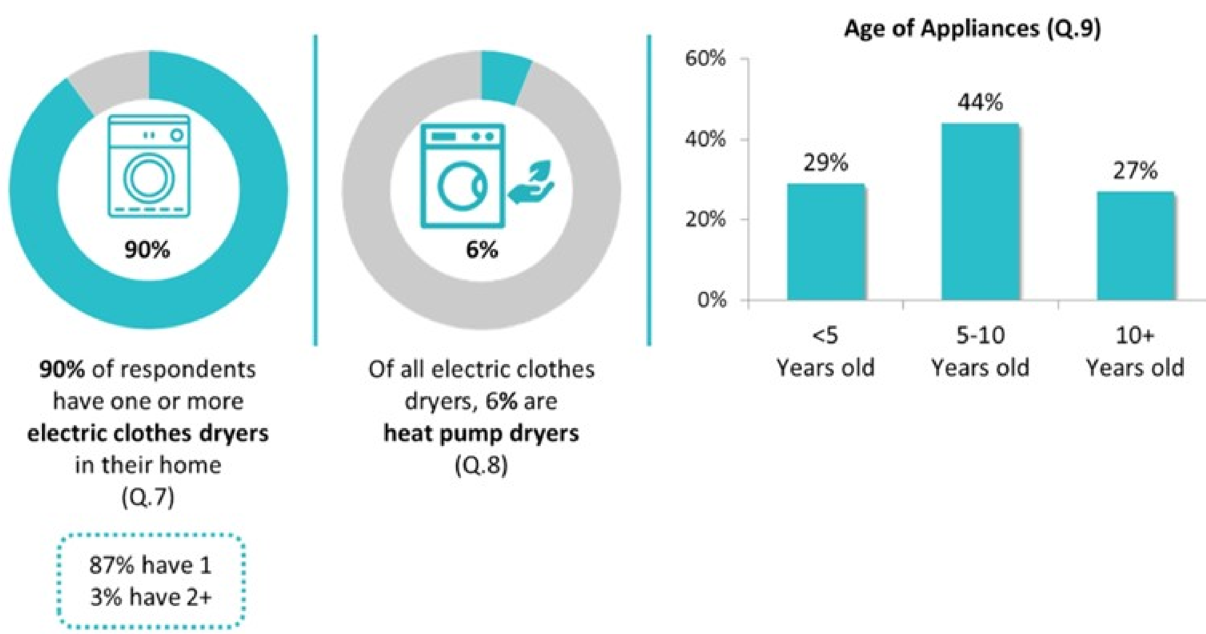
Figure 4. Residential Sector – Primary Heating Source Fuel Type



2.4 Residential – Clothes Dryers

The vast majority of respondents have a clothes dryer in their home. The survey found the 71% of clothes dryers were five years old or older and thus very few homes reported having a heat pump clothes dryer. Figure 5 illustrates the number and age of electric clothes dryers of survey respondents.

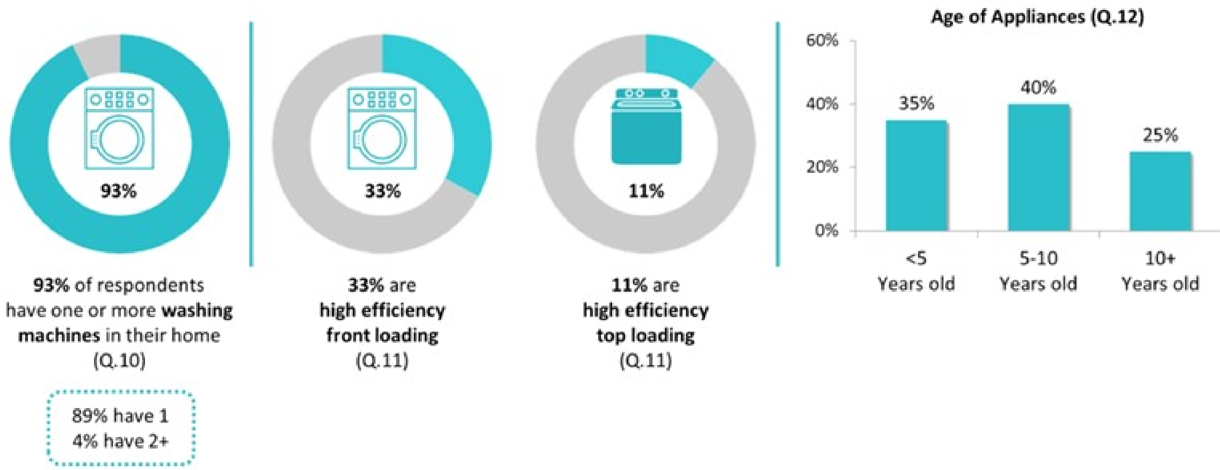
Figure 5. Residential Sector – Clothes Dryers



2.5 Residential – Washing Machines

Figure 6 shows that like dryers, most respondents have a washing machine in their home, and one-third of washing machines are high-efficiency front loading. High efficiency top loading washing machines were found to be present 11% of the time. The survey found the 65% of clothes washers were five years old or older.

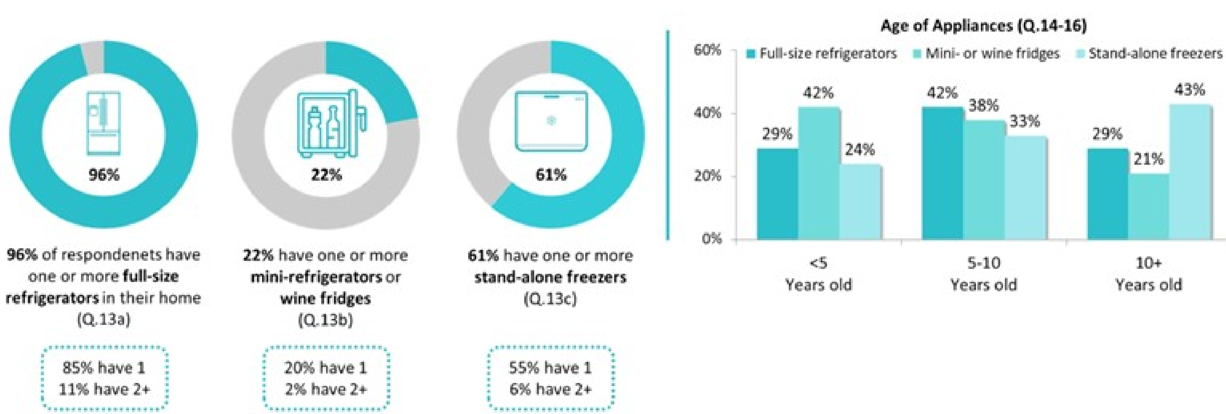
Figure 6. Residential Sector – Washing Machines



2.6 Residential – Refrigerators and Freezers

Virtually all respondents have a fridge in their home with 11% of respondents reporting owning a second full size refrigerator. A majority of respondents also have a stand-alone freezer and reported that stand-alone freezers tend to skew older in age. See Figure 7.

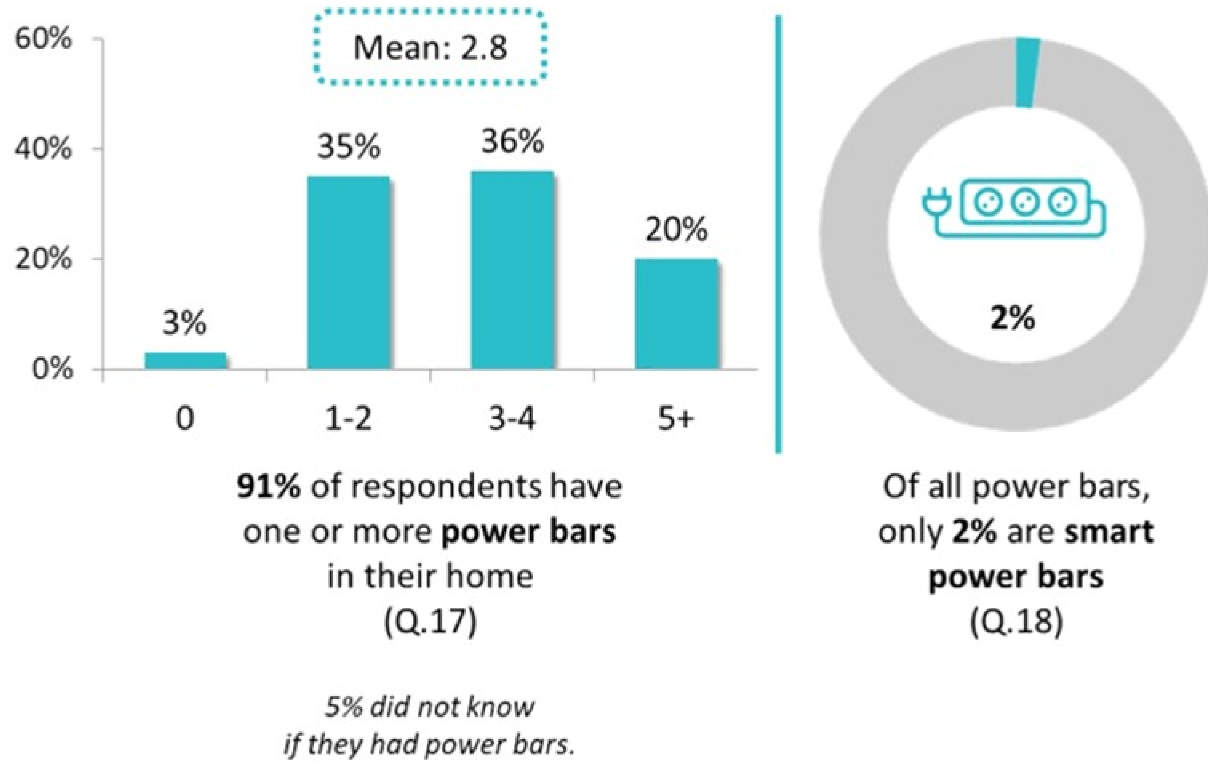
Figure 7. Residential Sector – Refrigerators and Freezers



2.7 Residential – Power Bars

As indicated in Figure 8, on average, respondents have three power bars in their homes, and almost none of them are smart power bars; and 20% of residents have five or more power bars in their home. A smart power strip (also called a smart power bar) looks similar to a traditional power bar, however circuitry is designed to monitor and control power to each electrical outlet in the strip to improve energy efficiency and prevent household electronics from wasting power.

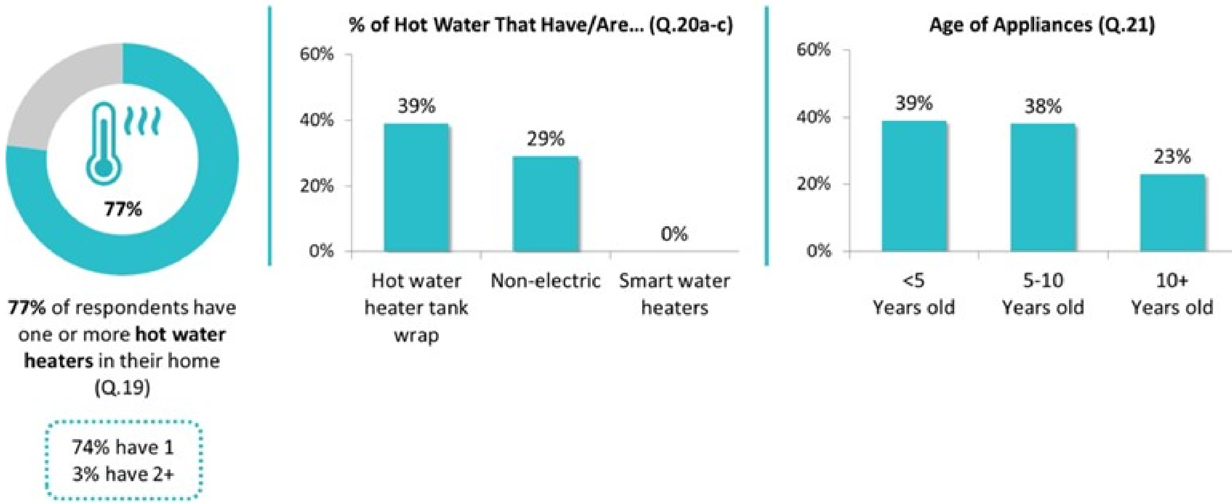
Figure 8. Residential Sector – Power Bars



2.8 Residential – Water Heaters

Figure 9 details the majority of respondents (77%) have a water heater in their home, with 29% being non-electric water heaters, and four in ten have a tank wrap. It is likely that the 23% of respondents who indicated not having a hot water heater have this supplied by a central hot water system in a multi-tenant building (for example, a multifamily building with a central boiler that provides hot water to individual tenant units). While the majority of water heaters in the province are less than 10 years old the survey found that no homes had a heat pump water heater or smart water heater connected to the internet.

Figure 9. Residential Sector – Water Heaters



2.9 Residential – Shower Heads and Faucets

On average, respondents have two shower heads in their home (Figure 10) and report three faucets in their home, while a majority of faucets have a low flow aerator (Figure 11), just under one-half of shower heads are low-flow.

Figure 10. Residential Sector – Shower Heads

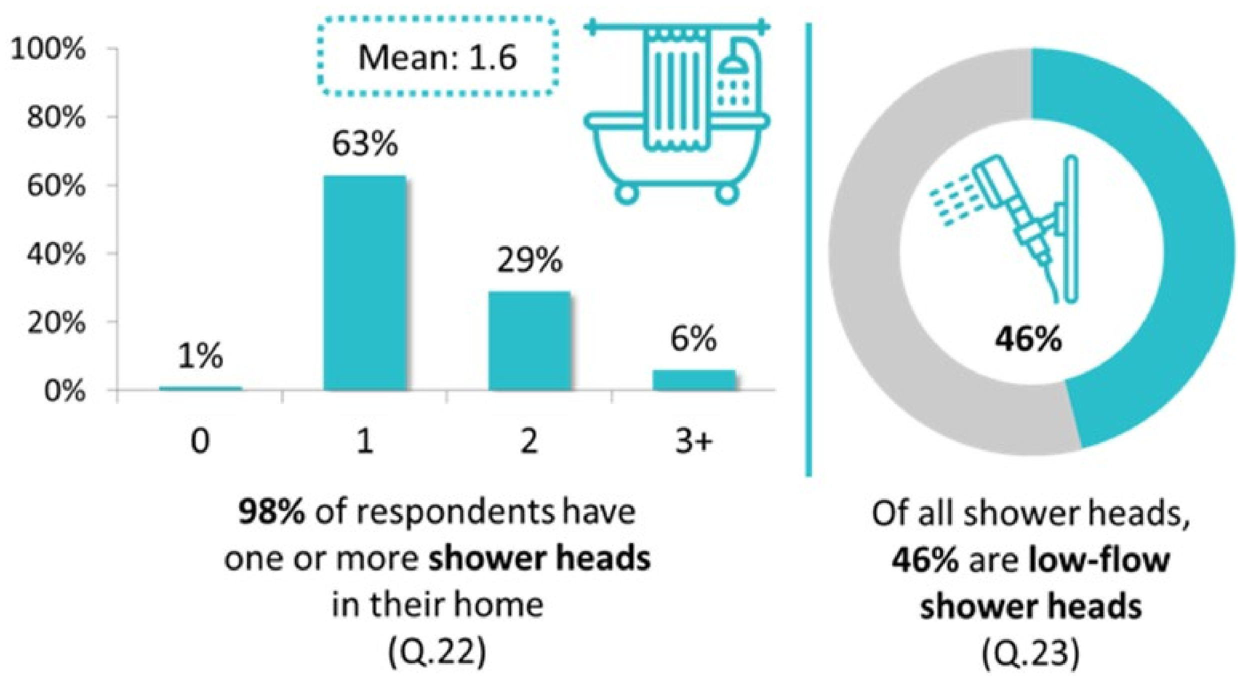
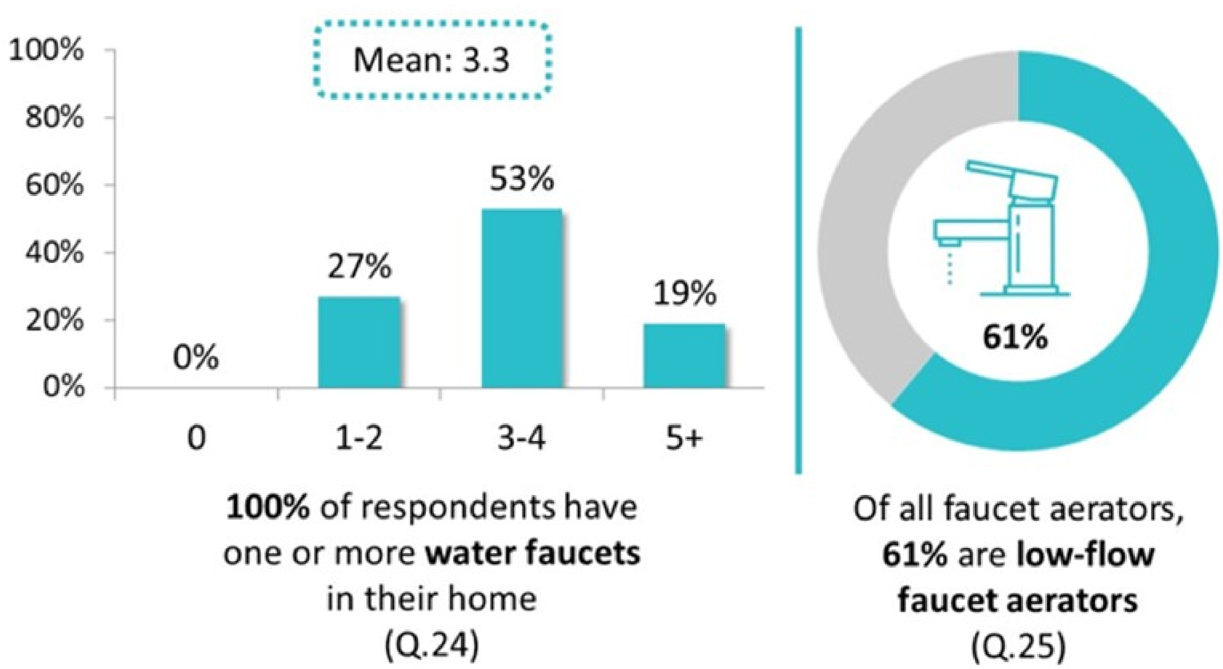


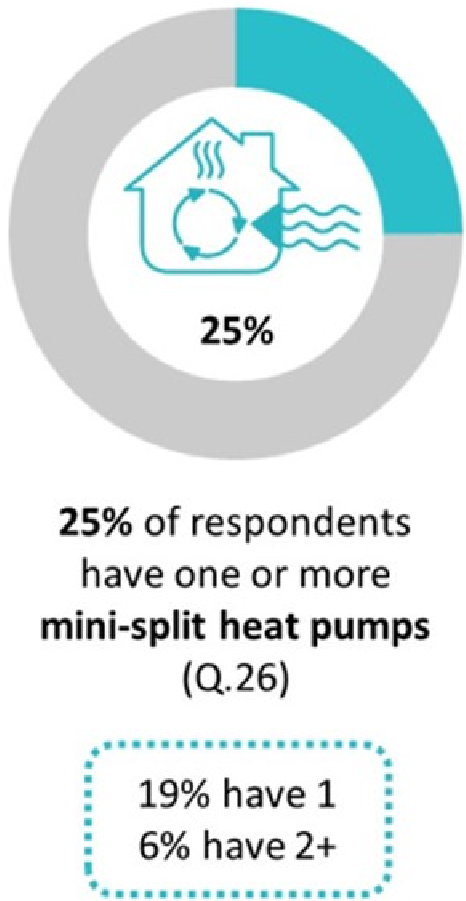
Figure 11. Residential Sector – Faucets



2.10 Residential – Mini-Split Heat Pumps

As reported in Figure 12, one-quarter of respondents have at least one mini-split heat pump.

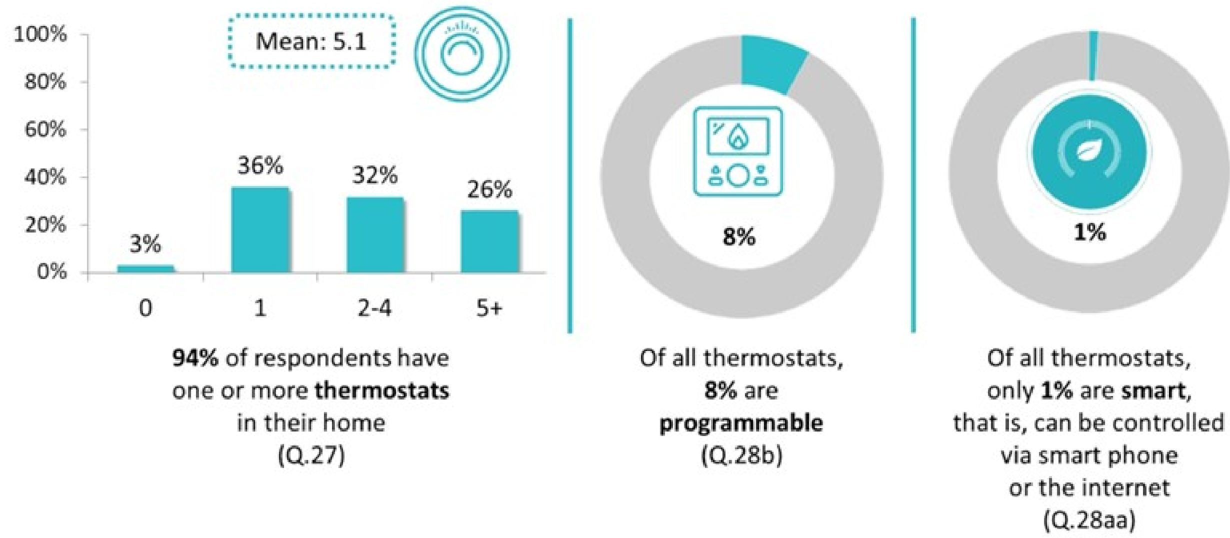
Figure 12. Residential Sector – Mini-Split Heat Pumps



2.11 Residential – Thermostats

Figure 13 shows that on average, respondents have five thermostats in their home (calibrated results), and virtually none of these thermostats are smart or programmable. It is likely that respondents considered each thermostat for each unit controlled (for example, each strip of electric resistance heat has its own on/off control).

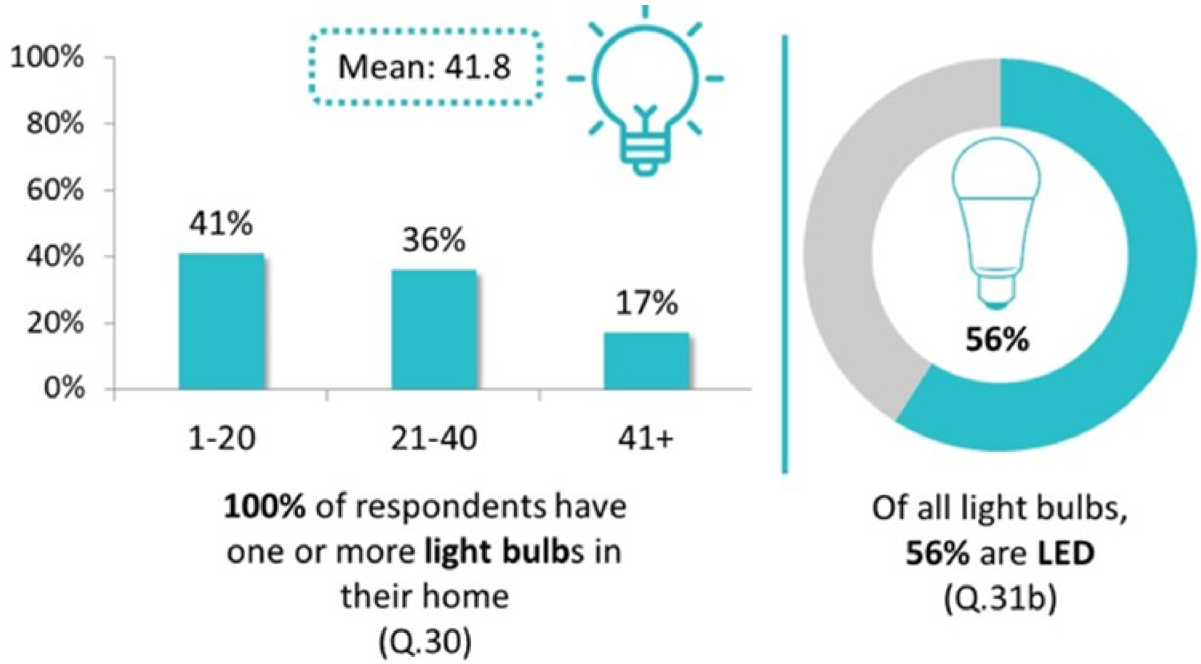
Figure 13. Residential Sector – Thermostats



2.12 Residential – Lighting

Figure 14 illustrates that survey respondents have 42 lightbulbs in their home on average (calibrated results), while more than one-half of lightbulbs in the province are LED. However, no bulbs were smart bulbs connected to the internet..

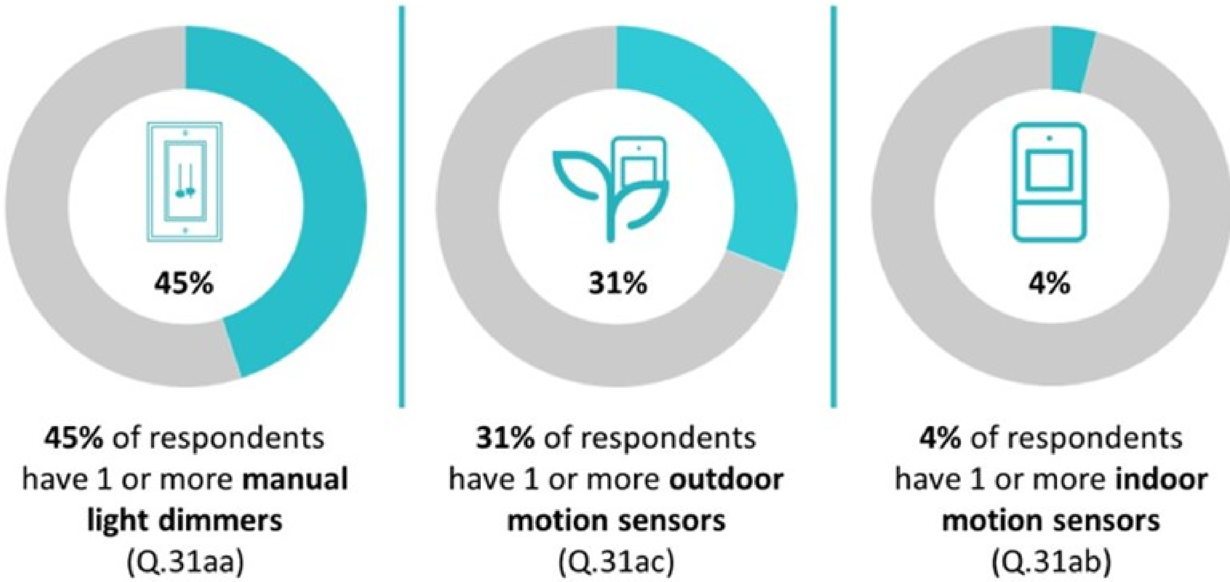
Figure 14. Residential Sector – Lighting



2.13 Residential – Dimmers and Sensors

As seen in Figure 15, nearly one-half of respondents have at least one manual light dimmer in their home, while a slightly smaller number have at least one outdoor motion sensor. Very few respondents have indoor motion sensors in their home.

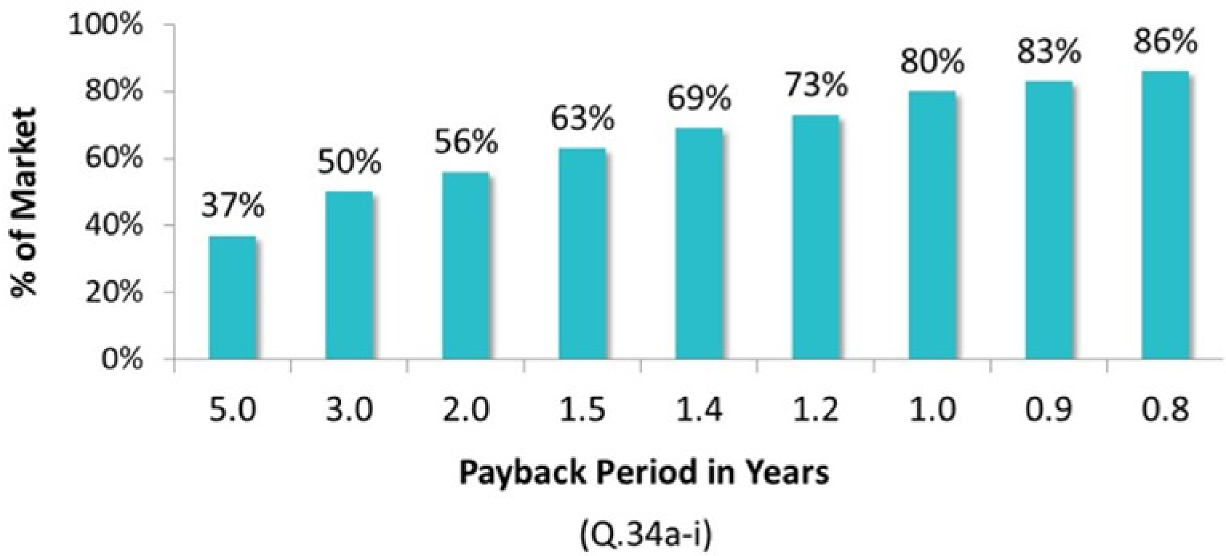
Figure 15. Residential Sector – Dimmers and Sensors



2.14 Residential – Cost Savings (Lower Cost Project)

Figure 16 shows responses when residential respondents were asked – if a project were to cost $75 after rebates, a majority of respondents would likely pursue it if it saved them $35 or more annually, or if it had a 2 year payback period.

Figure 16. Residential Sector – Cost Savings (Lower Cost Project)

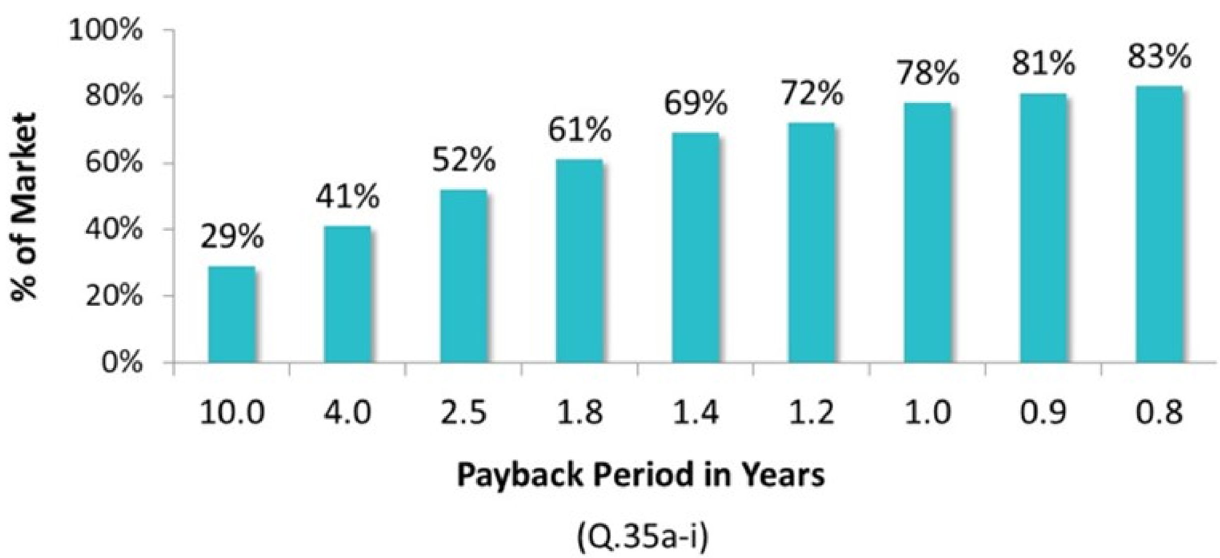


The payback period in years has been converted from annual savings in dollars.

2.15 Residential – Cost Savings (Higher Cost Project)

Figure 17 shows responses when residential respondents were asked – if a project were to cost $1,000 after rebates, a majority of respondents would likely pursue it if it saved them $550 or more annually, or if it had an approximate 2 year payback period.

Figure 17. Residential Sector – Cost Savings (Higher Cost Project)



The payback period in years has been converted from annual savings in dollars.

2.16 Residential Sector Demographics

Residential survey participants participated from all three regional municipalities as shown in Figure 18.

Figure 18. Residential Sector – Home Ownership and Municipality of Residence

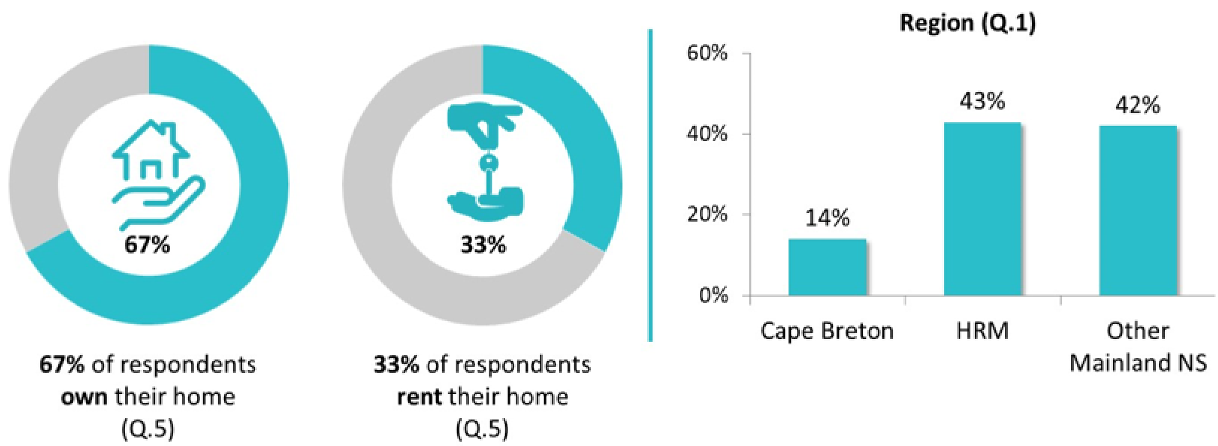


Figure 19 shows an even distribution of male and female participants across all age groups with more respondents 55 years or older, followed by those 35 to 54 years of age, and then 18 to 34 years old.

Figure 19. Residential Sector – Gender and Age of Participants

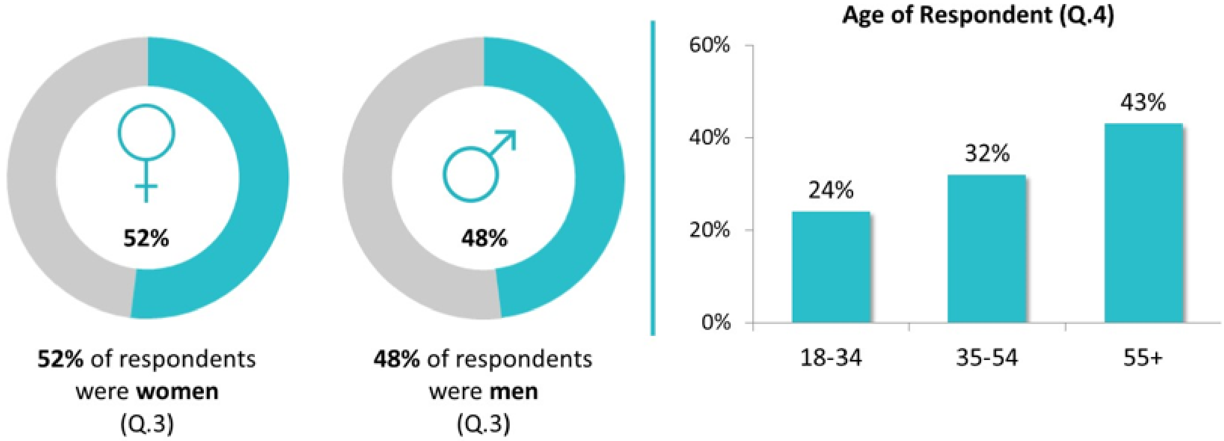
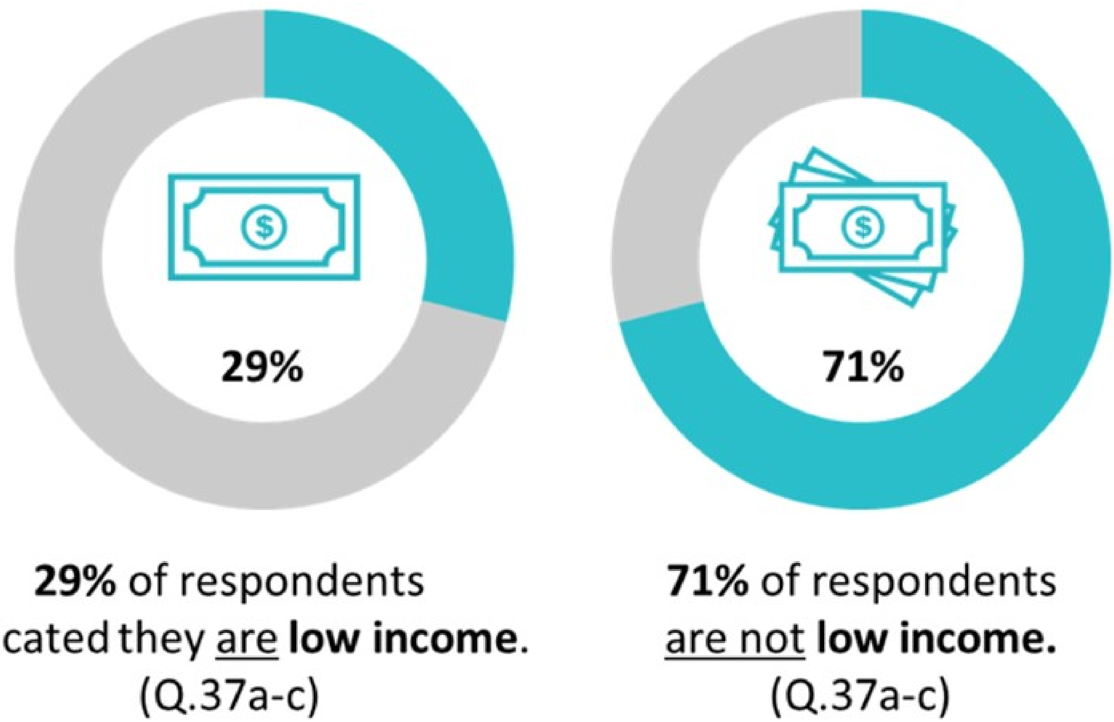


Figure 20 shows the distribution of households by income level, with 29 percent identified as low income based on Statistics Canada's low income cut-offs (LICO)measures.

Figure 20. Residential Sector – Household Income Type



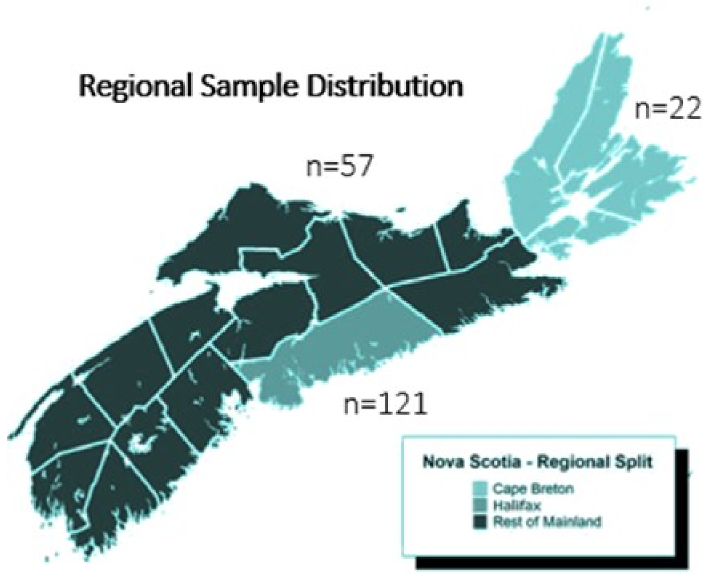
3. SUMMARY OF FINDINGS – BNI SECTOR

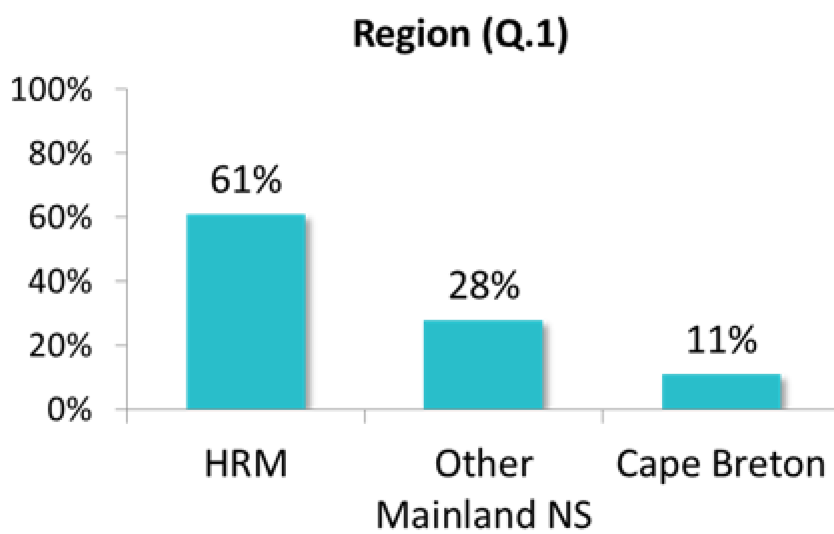
This section presents detailed findings from the business, nonprofit and institutional (BNI) sector online survey to assess baseline conditions in Nova Scotia facilities.

3.1 BNI Survey Responses by Region

Figure 21 shows the distribution of survey responses across the province, with 60.5% from the Halifax region, 28.5% from the rest of the mainland, and 11% from Cape Breton Island.

Figure 21. BNI Sector – Survey Responses by Region

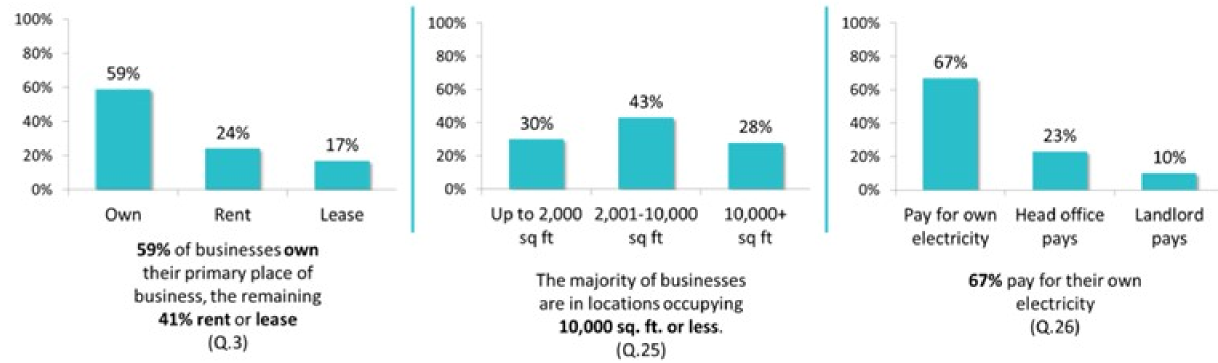




3.2 BNI – Primary Business Location and Type

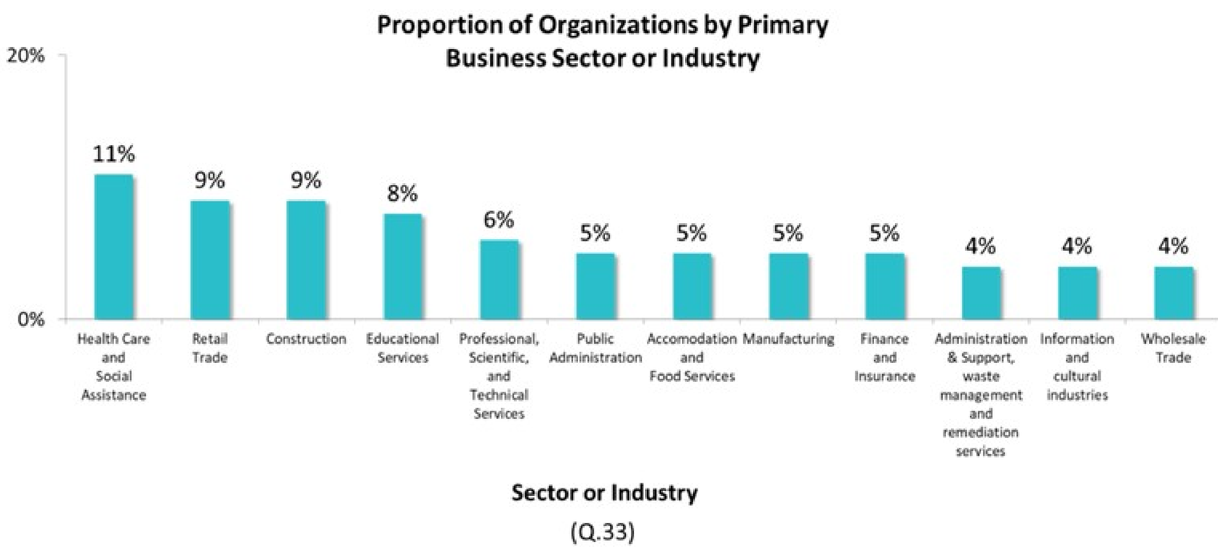
As shown in Figure 22, the majority of BNI respondents (59%) own their own primary place of business, occupy locations that are 10,000 square feet or less (73%), and pay for their own electricity (67%).

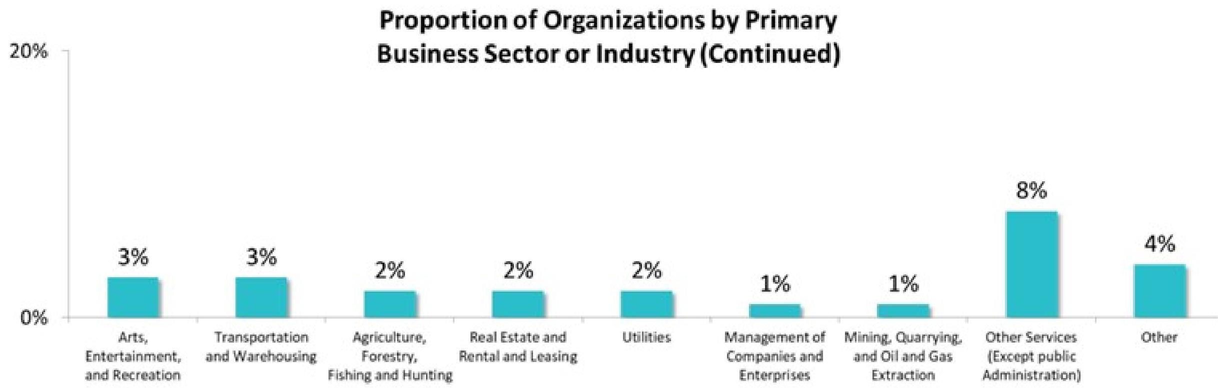
Figure 22. BNI Sector – Primary Place of Business



As shown in Figure 23, a variety of different primary sectors and industries are mentioned by respondents, with the most common being health care and social assistance, retail trade, construction, and educational services.

Figure 23. BNI Sector – Primary Business Sector or Industry



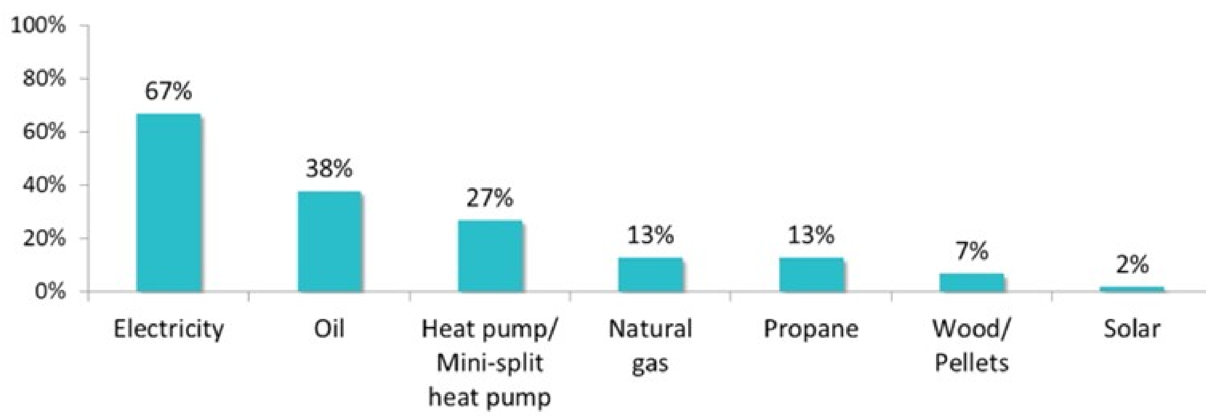


(Q.33)

3.3 BNI – Heating Source Types

Figure 24 presents a combination of both primary and secondary heating source types. The majority of Nova Scotian business respondents have electric heating systems (67%), followed by oil (38%), and then heat pump at 27%. Natural gas and propane both are at 13%, followed by wood/pellets (7%) and solar (2%).

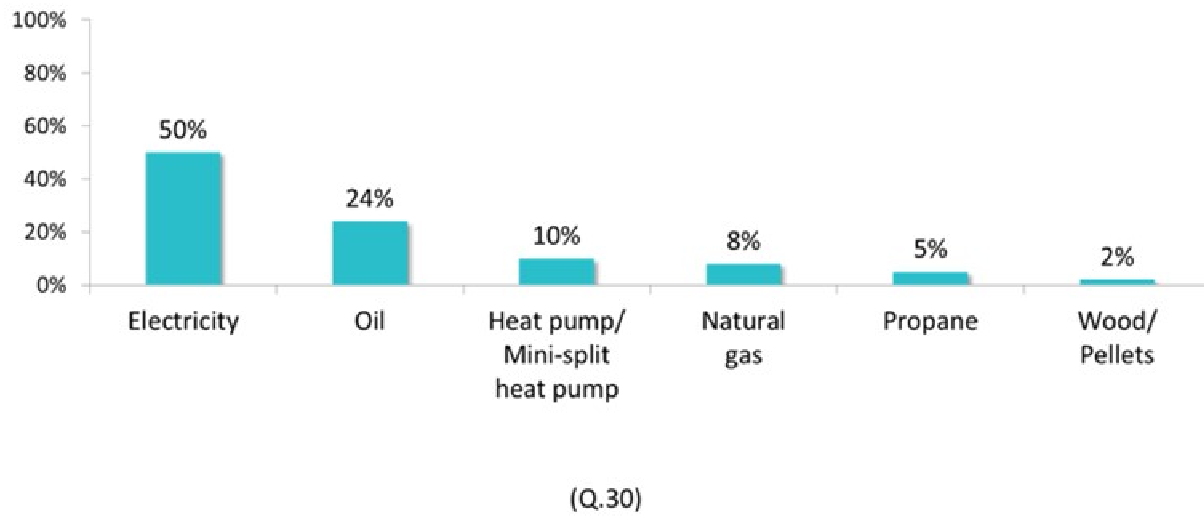
Figure 24. BNI Sector – Heating Source Fuel Types – All Sources



(Q.30+Q.31)

Figure 25 presents primary heating source types. The majority of Nova Scotian business respondents use electricity for heat (50%), followed by oil (24%), and then heat pump (10%), natural gas (8%), propane (5%), followed by wood/pellets/chips (2%).

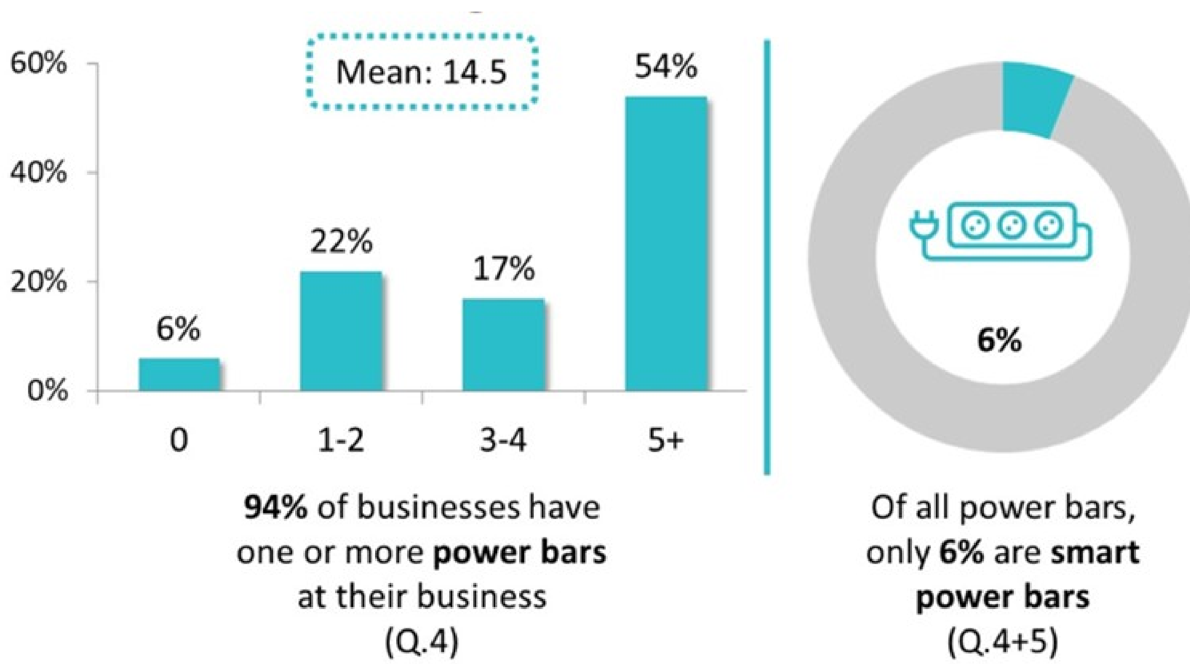
Figure 25. BNI Sector – Primary Heating Source Fuel Type



3.4 BNI – Power Bars

As shown in Figure 26, on average, business respondents have almost 15 power bars, and the vast majority are not smart power bars (6%).

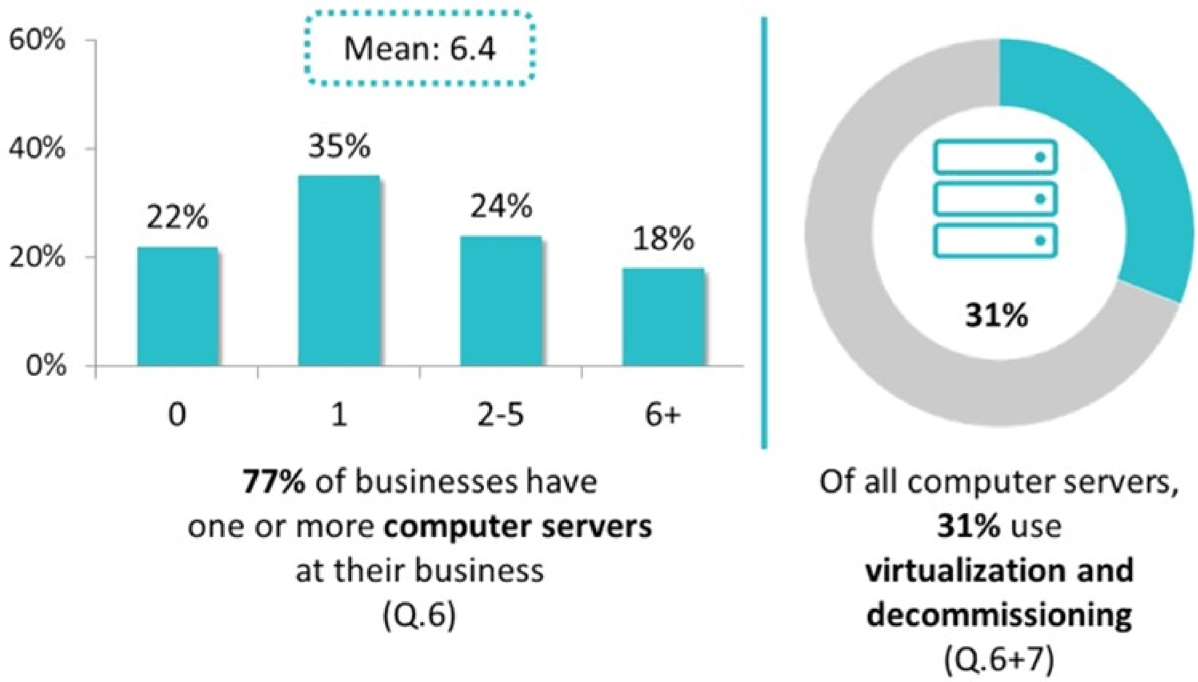
Figure 26. BNI Sector – Power Bars



3.5 BNI – Computer Servers

As shown in Figure 27, on average, business respondents have more than six servers onsite, and approximately one-third of servers use virtualization and decommissioning.

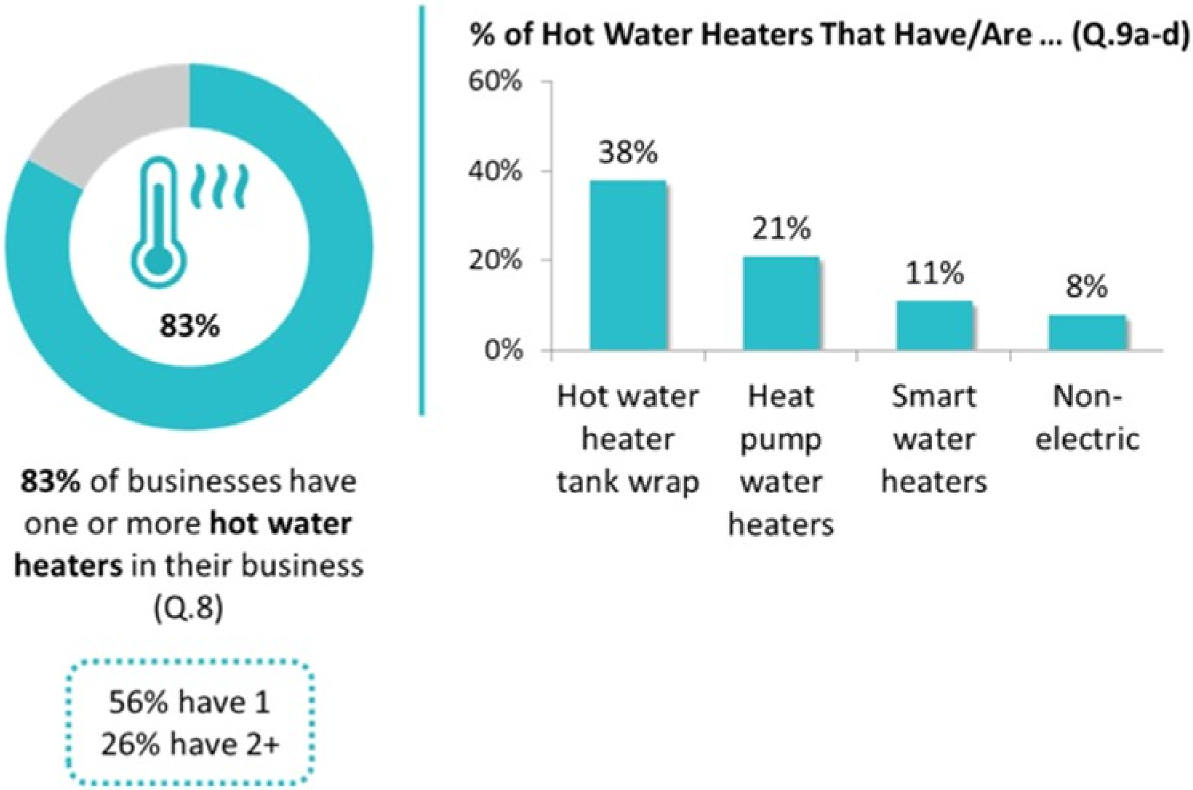
Figure 27. BNI Sector – Computer Servers



3.6 BNI – Hot Water Heaters

As shown in Figure 28, most businesses (83%) have one or more hot water heaters, with approximately 40% of water heaters having a tank wrap. 21% are heat pump water heaters, and 11% are smart water heaters. 8% use a fuel other than electricity to heat water.

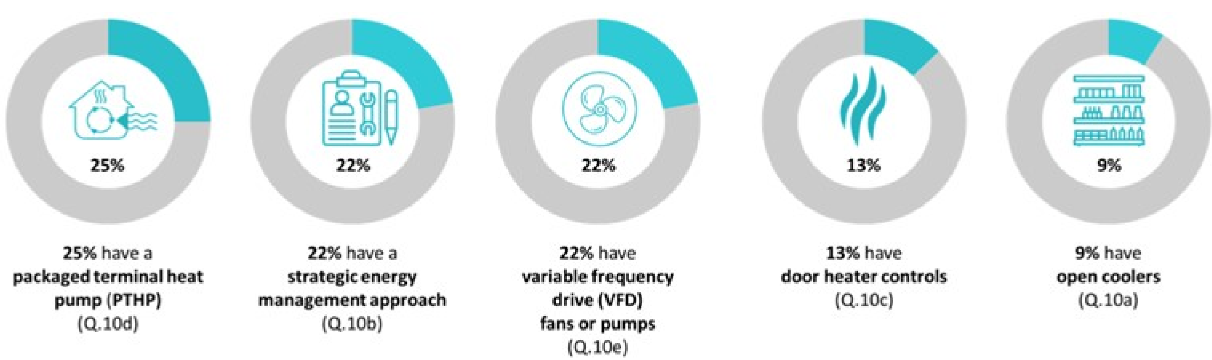
Figure 28. BNI Sector – Hot Water Heaters



3.7 BNI – Building Systems

Figure 29 presents the incidence of the application of different building systems. 25% of BNI respondents have one or more packaged terminal heat pumps, with a similar portion claiming having a strategic energy management approach. Variable frequency drive fans or pumps are present for 22% of respondents. Respondents indicated 13% of refrigeration units (e.g. coolers, freezers) have door heater controls and 9% are open coolers.

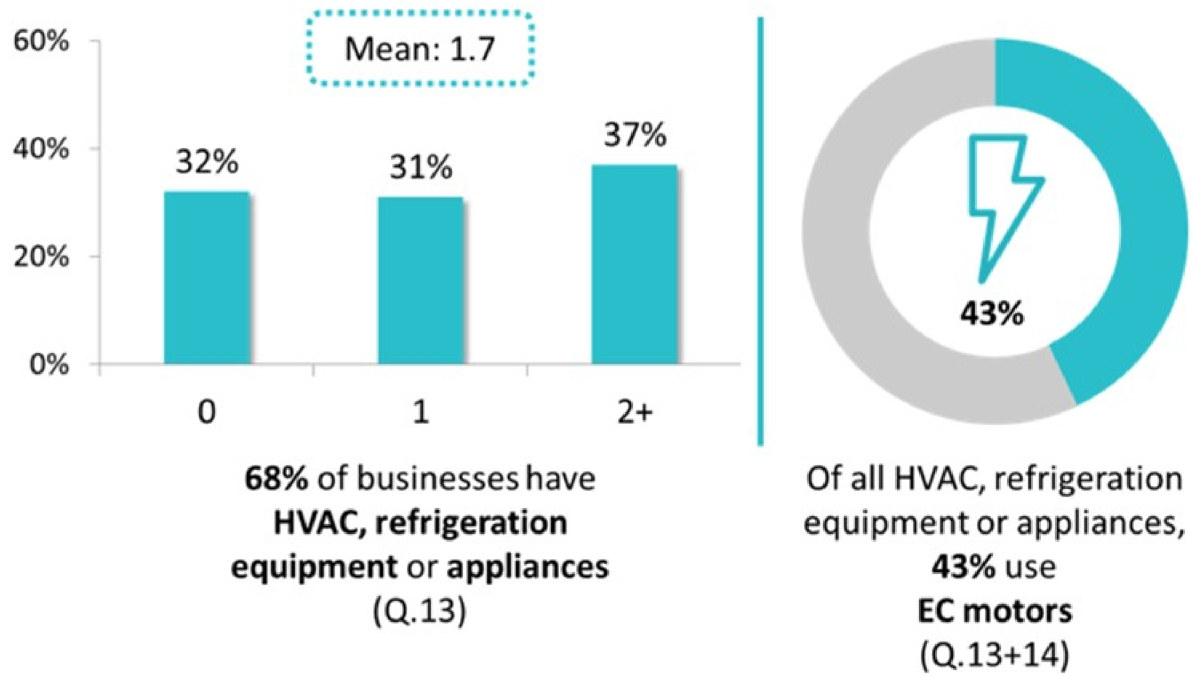
Figure 29. BNI Sector – Building Systems



3.8 BNI – HVAC

Figure 30 shows on average, BNI respondents have multiple types of HVAC units, refrigeration equipment or appliances, and 43% of these units use electrically commutated motors. It is likely that respondents who did not indicate having any units have these supplied by the facility at large for their floor area (for example, a central unit for a multi-tenant building which provides HVAC to terminal units in individual tenant spaces).

Figure 30. BNI Sector – HVAC



3.9 BNI – Lighting

Figure 31 presents data on the use of different types of LED lighting. Track/mono-point directional LED lighting (i.e. track lighting) is the most popular type of lighting among business respondents (88%), followed by downlight LED luminaires (77%), LED exterior floodlights (74%), pole mounted LED exterior area lights (71%), general service LED lights (70%), and linear lighting LEDs 60%).

Figure 31. BNI Sector – LED Lighting

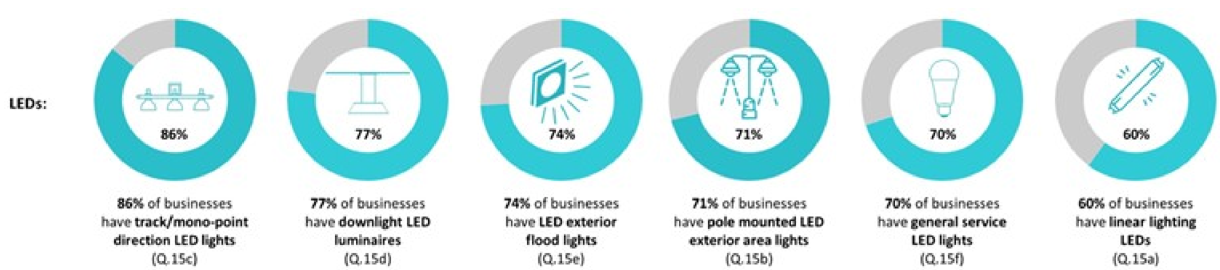
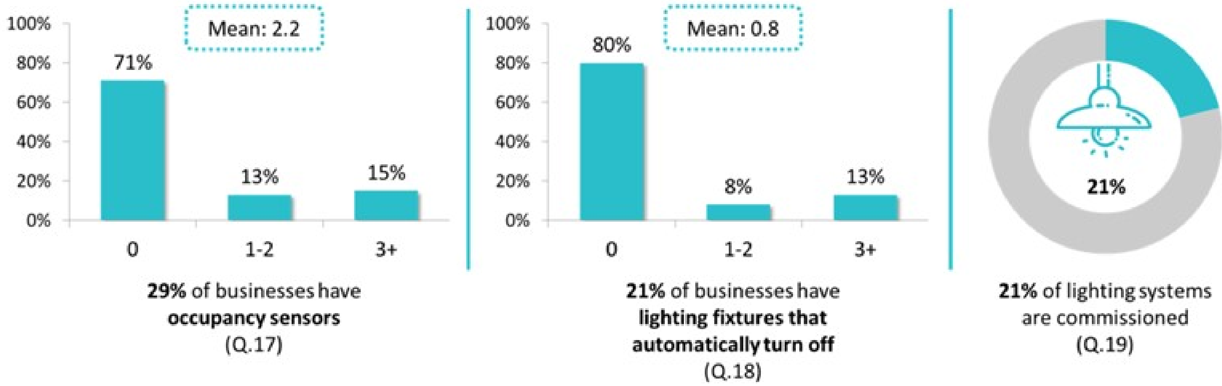


Figure 32 shows the average number of occupancy sensors that BNI respondents report having is about two, and the majority of business respondents do not have automatic light fixtures. 21% of BNI respondents have had lighting systems commissioned.

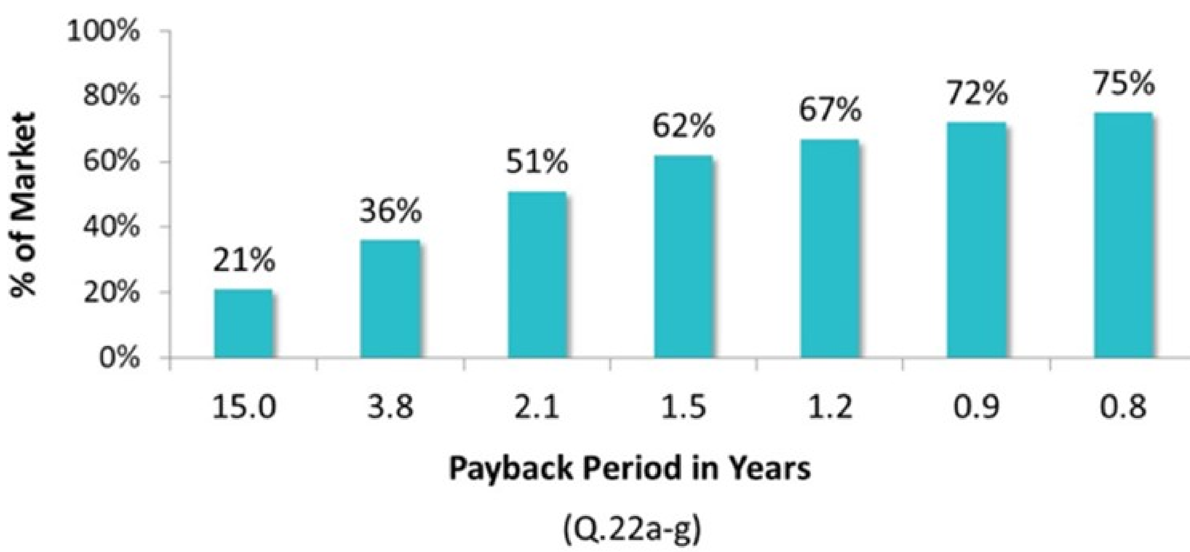
Figure 32. BNI Sector – Lighting Controls



3.10 BNI – Cost Savings (Lower Cost Project)

Figure 33 shows responses when businesses were asked – if a project were to cost $7,500 after rebates, that a majority of BNI respondents would likely pursue it if it saved them $5,000 or more annually, or had a 1.5 year payback period.

Figure 33. BNI Sector – Cost Savings (Lower Cost Project)

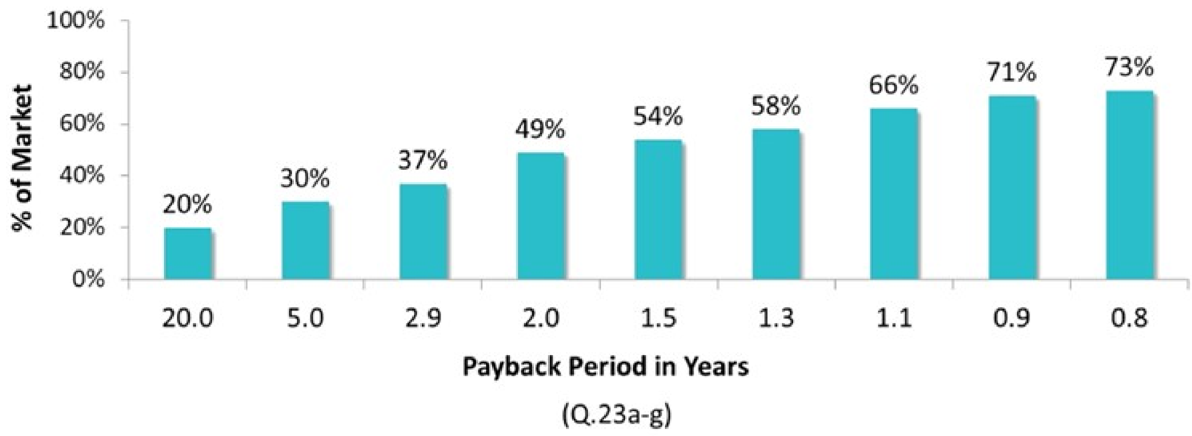


The payback period in years has been converted from annual savings in dollars.

3.11 BNI – Cost Savings (Higher Cost Project)

Figure 34 shows responses when businesses were asked – if a project were to cost $100,000 after rebates, a majority of BNI respondents would likely pursue it if it saved them $65,000 or more annually, or had a 1.5 year payback period.

Figure 34. BNI Sector – Cost Savings (Higher Cost Project)



The payback period in years has been converted from annual savings in dollars.

4. ONLINE SURVEY FINDINGS

This section presents online survey findings for the residential and BNI sector surveys.

4.1 Online Survey Residential Sector Findings

4.1.1 Basic Home Characteristics

This section summarizes the basic home characteristics of residential dwellings in Nova Scotia. **It is important to note that all data presented in this section is self-reported data gathered utilizing the residential sector online survey. No calibrated data is shown in the following tables.** Figure 35 summarizes the findings for basic home characteristics.

Figure 35. Residential Dwelling Type Profile

Characteristic	Market Characterization
Dwelling Type	Approximately 73% of all dwellings are single-family (detached, 64% and attached, 9%) homes. Approximately 19% of Nova Scotia residents live in a condominium, apartment or other multi-family dwelling with three units or more. Approximately 4% of Nova Scotia residents live in a mobile home or trailer. Approximately 3% of Nova Scotia residents live in a multi-family dwelling with two units.
Dwelling Ownership	The majority (67%) of all residents in Nova Scotia own their homes while the remaining 33% rent.
Dwelling Age	50% of homes in Nova Scotia were reported to be 35 years old or less, while 44% were reported to be 36 years old or older. 6% of respondents did not know the age of their home.
Household Income	29% of respondents indicated they are low income (low income cut-offs based on Statistics Canada measures). 71% of respondents are not low income.
Utility Bill Payment	89% of residents surveyed pay their own electricity bill.
Location	Halifax Regional Municipality – 43.4% Elsewhere in Mainland Nova Scotia – 42.1% Cape Breton Island – 14.5%

4.1.2 Residential Lighting

A summary of the distribution of all lighting types for both interior and exterior lamps is shown in Figure 36. There was an average of 42 lamps installed per household, after on-site corrections were applied. The survey sought to identify a variety of different lamp types ranging from general service bulbs, linear fluorescent bulbs, specialty lighting, LED lighting and Smart or connected lighting. Additional information on manual dimming and both indoor and outdoor motion detectors was also collected.

Figure 36. Residential Lighting Characterization Profile

Measure / Characteristic	Market Share
General Service Bulbs	80% of light bulbs were general service bulbs.
Specialty Bulbs	Specialty bulbs accounted for an additional 13% of lighting..
Linear Fluorescent Bulbs	Respondents reported more than 7% of bulbs were linear fluorescent lights.
LEDs	Of all types of bulbs surveyed 59% were LED bulbs, and 2% of these bulbs were smart or connected to the internet.
Manual Dinning Controls	41% of residents surveyed had at least one manual dimmer in the home.
Indoor & Outdoor Motion Detection	5% of respondents had one or more indoor motion detectors; 31% had at least one outdoor motion detecting light.

4.1.3 Residential HVAC

Figure 37 summarizes the online survey findings for residential HVAC equipment.

Figure 37. Residential Heating Equipment Profile

Measure / Characteristic	Online Survey Findings
Electric Heating - Primary	33% of all primary heating systems are electric.
Electric Heating - Backup	62% of households have a secondary heating system installed. Of these, 26% use some form of electric heating as a backup source.
Fuel Oil Heating	31% of primary heating systems are fuel oil.
Programmable Thermostats	27% of residents surveyed reported having at least one programmable thermostat. Of those programmable thermostats 3% were connected to the internet.
Mini-Split Heat Pumps	Approximately 25% of all customers surveyed had at least one mini-split heat pump, 19% having a single unit and 6% having two or more units.

4.1.4 Residential Water Heating and Water Conservation

Figure 38 presents details on the water heating equipment present in the surveyed homes.

Figure 38. Residential Water Heating Profile

Measure / Characteristics	Online Survey Findings
Electric Water Heating	71% of surveyed primary water heaters were electric resistance. 39% of water heaters were reported to be 5 years old or newer, while 38% were between 5 years and 10 years old, and 23% ten years old or older. 46% of all water heaters were reported to have a tank wrap.
Non-Electric Water Heating	Approximately 29% of water heaters surveyed had fuel types other than electric resistance.
Heat Pump and Smart Water Heating	Of the 1002 households surveyed online, 0 reported owning a heat pump water heater and 3% claimed to have a smart water heater.

A summary of shower heads and faucets is shown in Figure 39.

Figure 39. Residential Water Conservation Profile

Measure / Characteristic	Online Survey Findings
Shower Heads	92% of residential homes have one or two shower heads with 6% having more than two shower heads. 2% of respondents did not recall how many shower heads were present in the home. Of those shower heads, 64% of respondents reported that they had a low flow shower head(s) installed.
Faucets	Roughly a quarter of homes surveyed had either two or four faucets (25% each). 30% reported having three faucets and 19% reported five or more faucets. Of those faucets, 35% had at least one faucet aerator installed.

4.1.5 Residential Appliances

Figure 40 summarizes the findings for all refrigerators, freezers and mini or wine refrigerators.

Figure 40. Residential Appliances Profile

Measure / Characteristic	Online Survey Findings
Residential Refrigerators	85% of all homes surveyed report having one full size refrigerator while 11% of respondents reported owning a second full sized refrigerator.
	29% of refrigerators are less than 5 years old. 42% at least 5 years but less than 10 years old, and 29% are 10 years or older.
Residential Freezers	55% of homes surveyed reported having one or more stand-alone freezer (not attached to their refrigerator). 36% of homes surveyed had no stand-alone freezers, 6% had two or more and 3% of respondents did not know how many freezers were in the home.
	24% of stand-alone freezers are less than 5 years old. 33% are at least 5 years but less than 10 years old, and 43% are 10 years or older.
Residential Mini Refrigerators or Wine Fridges	75% of homes reported having no mini refrigerator or wine fridge. 20% of homes reported having one such refrigerator and 2% reported having two or more.
	42% of mini refrigerator or wine fridges are less than 5 years old. 38% are at least 5 years but less than 10 years old, and 21% are 10 years or older.
Residential Clothes Washers	The majority (89%) of households surveyed have a single clothes washer, while 7% had no clothes washer, and 4% had two or more.
	Nearly 60% of residential respondents reported that their clothes washer was not a high efficiency machine. 27% of respondents had front loading high efficiency clothes washers, and 14% had high efficiency top loading clothes washers. 35% of clothes washers were reported to be 5 years old or newer, while 40% were between 5 years and 10 years old, and 25% 10 years old or older.
Residential Clothes Dryers	The majority (87%) of households surveyed have a single clothes dryer, while 8% had no clothes dryer and 3% had two or more.
	67% of residential respondents reported that their clothes dryer was not a heat pump dryer, while 17% indicated that they did own a heat pump clothes dryer. 29% of clothes dryers were reported to be 5 years old or newer, while 44% were between 5 years and 10 years old, and 27% ten years old or older.
Power Bars	96% of homes have at least one power bar – 1 (13%), 2 (22%), 3 (24%), 4 (12%) and 5 or more (20%). 6% of residential respondents reported that they had a smart power bar or one that turns off automatically when the room is empty.

4.2 Business, Nonprofit and Institutional Sector Findings

The following sections present the results for BNI building characteristics.

4.2.1 BNI – General Building Information

A summary of general building information is listed in Figure 41.

Figure 41. BNI General Buildings Profile

Characteristic	Online Survey Findings
Facility Ownership	The majority (59%) of businesses own their facility, while 24% rent and 17% lease.
Utility Bill Payment	67% of facilities surveyed pay their own electricity bill, 23% pay through a head office or other department, and the landlord pays for 10% of those surveyed.
Building Size	18% of all BNI facilities are 1,000 sq. ft. or less. 12% of facilities are between 1,001 and 2,000 sq. ft. 21% of facilities are between 2,001 and 5,000 sq. ft. 22% of facilities are between 5,001 and 10,000 sq. ft. 14% of facilities are between 10,001 and 25000 sq. ft. 14% of facilities are 25,001 sq. ft. or greater.
Business Type	11% of BNI facilities are health care and social assistance. 9% of BNI facilities are retail trade. 9% of BNI facilities are construction. 8% of BNI facilities are educational services. 8% of BNI facilities are other services (except public administration). 6% of BNI facilities are professional, scientific, and technical services. 5% of BNI facilities are public administration. 5% of BNI facilities are accommodation and food services. 5% of BNI facilities are manufacturing. 5% of BNI facilities are finance and insurance. 4% of BNI facilities are administration and support, waste management and remediation services. 4% of BNI facilities are information and cultural industries. 4% of BNI facilities are wholesale trade. 3% of BNI facilities are arts, entertainment, and recreation. 3% of BNI facilities are transportation and warehousing. 2% of BNI facilities are agriculture, forestry, fishing and hunting. 2% of BNI facilities are real estate and rental and leasing. 2% of BNI facilities are utilities. 1% of BNI facilities are management of companies and enterprises. 1% of BNI facilities are mining, and oil and gas extraction. 4% of BNI facilities are other.

Location	Halifax Regional Municipality – 60.5% Elsewhere in Mainland Nova Scotia – 28.5% Cape Breton Island – 11%

4.2.2 Lighting

Figure 42 lists findings for the BNI lighting profile in Nova Scotia.

Figure 42. BNI Indoor Lighting Profile

Measure / Characteristic	Online Survey Findings
Interior Fixture Types	LEDs comprise a significant portion of lighting systems, with Track/mono-point direction LED lights the most popular type of lighting among business respondents, followed by downlight LED luminaires, LED exterior floodlights, pole mounted LED exterior area lights, general service LED lights, and linear lighting LEDs..
Control Types	29% of facilities have occupancy sensors to control lighting. 21% have fixtures that can turn off automatically. 21% of lighting systems have been commissioned.

4.2.3 Controlling Energy Usage

Figure 43 lists findings for controlling energy usage in BNI facilities..

Figure 43. BNI Controls Profile

Measure / Characteristic	Online Survey Findings
Power Bars	94% of respondents have at least one power bar, with an average of 15 power bars installed; the vast majority are not smart power bars, which comprise 6%.
Computer Servers	77% of respondents have a computer server onsite, with an average of 6 servers onsite; 31% of servers use virtualization and decommissioning.
Strategic Energy Management (SEM)	22% of respondents indicated they employ a Strategic Energy Management approach to addressing facility energy usage.
Variable Frequency Drive (VFD)	22% of respondents indicated fans and pumps have a Variable Frequency Drive .
Door Heater Control	13% of respondents indicated refrigeration units had door heater controls installed.
Electrically Commutated Motor (ECM)	43% of respondents indicated HVAC equipment, refrigeration equipment, or appliances had an ECM installed.

APPENDIX B-1 – RESIDENTIAL SECTOR ONLINE SURVEY INSTRUMENT

Appendix B-1 includes the online survey instrument used to query Nova Scotians about the energy-related characteristics of their residential dwelling units.

APPENDIX B-2 – BUSINESS, NONPROFIT AND INSTITUTIONAL SECTOR ONLINE SURVEY INSTRUMENT

Appendix B-2 includes the online survey instrument used to query Nova Scotia businesses, nonprofits and institutions about the energy-related characteristics of their facilities.

APPENDIX B-3 – RESIDENTIAL SECTOR ONLINE SURVEY RESULTS

Appendix B-3 includes the tabulated results of the online survey for the residential sector.

APPENDIX B-4 – BNI SECTOR ONLINE SURVEY RESULTS

Appendix B-4 includes the tabulated results of the online survey for the BNI sector.

Quota of n=1,000 Nova Scotia residents 18 or older

ALL QUESTIONS ARE MANDATORY

ALL PROGRAMMING NOTES ARE PRESENTED IN BOLD CAPS

FOR ALL NUMERIC RESPONSES, RANGES ARE NOT ACCEPTED

NOTE: QUESTION NUMBERING VARIES BASED ON CHANGES TO THE SURVEY INSTRUMENT, QUESTION NUMBERING DISPLAYED CORRESPONDS WITH TABULAR RESULTS

efficiency NOVA SCOTIA is conducting a study to help understand Nova Scotia specific energy usage. Your responses will help Efficiency Nova Scotia improve energy-related programs that assist customers in saving energy and money, and ultimately benefit the environment.

All responses will be kept strictly anonymous and will be analyzed as a whole, not individually. No attempt will be made to identify you. We appreciate your feedback!

As you go through the survey, if you do not have a particular equipment type, please enter '0' in the quantity box.

Section A: Background/Ownership

To begin…

1. Do you reside in… **CODE ONE ONLY**

   1 Cape Breton Island
   2 Halifax Regional Municipality (HRM)
   3 Elsewhere on Mainland Nova Scotia outside HRM
   4 None of the above **THANK & TERMINATE**

2. What are the first three digits of your postal code? **[RECORD FIRST THREE DIGITS, MUST BE WITHIN NS]**

   98 Don't know/not sure

3. Are you...? **ALLOW ONE RESPONSE**

1 Male
2 Female
3 Gender diverse
8 Prefer not to answer

4. Are you: **CODE ONE ONLY**

0 Under 18 **THANK AND TERMINATE**
1 18-24
2 25-34
3 35-44
4 45-54
5 55-64
6 65 or older
7 I prefer not to answer **THANK AND TERMINATE**

5. Do you currently own or rent your primary place of residence in Nova Scotia? **PRESENT IN ORDER – ALLOW ONE RESPONSE**

1 Own (even if it is still being paid for)
2 Rent (even if no cash rent is paid)
7 Other **THANK & TERMINATE**
8 Don't know/Not sure **THANK & TERMINATE**

6. Which one of the following best describes your primary place of residence in Nova Scotia? **CODE ONE ONLY**

01 Single family detached house
02 Single family attached house such as a duplex, townhouse, or row house
03 Mobile home or trailer
04 Multi-family dwelling with two units
05 Condominium, apartment or other multi-family dwelling with three or more units
97 Other (please specify: _________________)
98 Don't know /Not sure

Please note that in the remaining questions, home refers to your primary place of residence in Nova Scotia.

Section B: Appliances

Thinking of the appliances in your home…

7. How many **electric clothes dryers** do you have in your home?

   RECORD NUMBER_______________

   98 Don't know

8. **[ONLY POSE IF '1' OR MORE IN Q.7**] Of this/these [**INSERT NUMBER FROM Q.7]** clothes dryer(s), how many are *heat pump dryers*? **[ONLY ALLOW NUMBER EQUAL TO OR LESS THAN WHAT WAS ENTERED IN Q.7]**

   RECORD NUMBER_______________

   98 Don't know

9. **[ONLY POSE IF '1' OR MORE IN Q.7**] Of this/these [**INSERT NUMBER FROM Q.7]** clothes dryer(s), how many are **[TOTAL FOR A TO C MUST EQUAL OR BE LESS THAN WHAT WAS ENTERED IN Q.7]**

   a. Less than 5 years old
   b. At least 5 years but less than 10 years old
   c. Ten years or older

   RECORD NUMBER_______________

   98 Don't know

10. How many **clothes washers** do you have in your home?

   RECORD NUMBER_______________

   98 Don't know

11. **[ONLY POSE IF '1' OR MORE IN Q.10**] Of this/these [**INSERT NUMBER FROM Q.10]** clothes washer(s), how many are: **[FOR EACH A TO C ONLY ALLOW NUMBER EQUAL TO OR LESS THAN WHAT WAS ENTERED IN Q.10; SUM OF 'A' AND 'B' CANNOT EXCEED NUMBER ENTERED IN Q.10]**

	RECORD NUMBER	***Don't know***
a) *Front-loading?*	_______	O8
b) *Top-loading <u>with</u> an agitator in the tub?*	_______	O8
c) *Top loading <u>without</u> an agitator in the tub?*	_______	O8

12. **[ONLY POSE IF '1' OR MORE IN Q.10**] Of this/these [**INSERT NUMBER FROM Q.10]** clothes washer(s), how many are **[TOTAL FOR A TO C MUST EQUAL OR BE LESS THAN WHAT WAS ENTERED IN Q.10]**

a. Less than 5 years old
b. At least 5 years but less than 10 years old
c. Ten years or older

RECORD NUMBER_______________

98 Don't know

13. How many of the following do you have in your home…

	RECORD NUMBER	***Don't know***
a) *Full-size refrigerators (Note: these do not include mini fridges or wine fridges)?*	_______	O8
b) *Mini refrigerators or wine fridges?*	_______	O8
c) *Stand-alone freezers, that is, freezers that are <u>not</u> attached to refrigerators?*	_______	O8

14. **[ONLY POSE IF '1' OR MORE IN Q.13A**] Of this/these [**INSERT NUMBER FROM Q.7]** full-size refrigerator(s), how many are **[TOTAL FOR A TO C MUST EQUAL OR BE LESS THAN WHAT WAS ENTERED IN Q.13A]**

a. Less than 5 years old
b. At least 5 years but less than 10 years old
c. Ten years or older

RECORD NUMBER________________

98 Don't know

15. **[ONLY POSE IF '1' OR MORE IN Q.13B**] Of this/these [**INSERT NUMBER FROM Q.13B]** mini or wine refrigerator(s), how many are **[TOTAL FOR A TO C MUST EQUAL OR BE LESS THAN WHAT WAS ENTERED IN Q.13B]**

a. Less than 5 years old
b. At least 5 years but less than 10 years old
c. Ten years or older

RECORD NUMBER________________

98 Don't know

16. **[ONLY POSE IF '1' OR MORE IN Q.13C**] Of this/these [**INSERT NUMBER FROM Q.13C]** stand-alone freezers(s), how many are **[TOTAL FOR A TO C MUST EQUAL OR BE LESS THAN WHAT WAS ENTERED IN Q.13C]**

a. Less than 5 years old
b. At least 5 years but less than 10 years old
c. Ten years or older

RECORD NUMBER________________

98 Don't know

Section C: Consumer Electronics

17. How many **power bars** do you have in your home? A power bar is a block of electrical sockets that attaches to the end of a flexible cable allowing multiple electrical devices to be powered from a single electrical socket. **DISPLAY POWER STRIP IMAGE**

RECORD NUMBER________________

98 Don't know

18. **[POSE ONLY IF 1 OR MORE IN Q.17]** Of this/these [**INSERT NUMBER FROM Q.17]** power bar(s), how many are smart power bars, that is, can be controlled via smart phone or computer or turn off automatically when you leave the room? **DO NOT ALLOW NUMBER ENTERED TO EXCEED NUMBER ENTERED IN 17**

RECORD NUMBER:__________
98 Don't Know

Section D: Domestic Hot Water

19. How many **hot water heaters** do you have in your home?
RECORD NUMBER________________

98 Don't know

20. [**ONLY POSE IF 1 OR MORE IN Q.19**] Of this/these [**INSERT NUMBER FROM Q.19]** hot water heater(s), how many: **[FOR EACH A TO C ONLY ALLOW NUMBER EQUAL TO OR LESS THAN WHAT WAS ENTERED IN Q.19]**

	RECORD NUMBER	*Don't know*
a) Have a large metal duct for exhaust gas?	_______	○8
b) Are smart water heaters, that is, they can be controlled over the internet via a smart phone or computer?	_______	○8
c) Have a hot water heater tank wrap, that is, have insulation overtop of the metal exterior of the tank?	_______	○8

20d. **[DO NOT POSE IF Q20A=TOTAL ENTERED IN Q19]** Of this/these remaining **[INSERT NUMBER Q19 TOTAL MINUS Q20A TOTAL]** hot water heaters, how many are heat pump water heaters?

RECORD NUMBER:____________

98 Don't know/Not sure

21. **[ONLY POSE IF '1' OR MORE IN Q.19**] Of this/these [**INSERT NUMBER FROM Q.19]** hot water heater(s), how many are **[TOTAL FOR A TO C MUST EQUAL OR BE LESS THAN WHAT WAS ENTERED IN Q.19]**

a. Less than 5 years old
b. At least 5 years but less than 10 years old
c. Ten years or older

RECORD NUMBER_______________

98 Don't know

22. How many **shower heads** do you have in your home?

RECORD NUMBER_______________

98 Don't know

23. **[POSE ONLY IF 1 OR MORE IN Q.22]** Of this/these **[INSERT NUMBER FROM Q.22]** shower head(s), how many are low-flow, that is, they use less water to reduce your water usage? **[ONLY ALLOW NUMBER EQUAL TO OR LESS THAN WHAT WAS ENTERED IN Q.22]**

RECORD NUMBER_______________

98 Don't know

24. How many **water faucets** do you have in your home?

RECORD NUMBER_______________

98 Don't know

25. **[POSE ONLY IF 1 OR MORE IN Q.24]** Of this/these [**INSERT NUMBER FROM Q.24**] faucet(s), how many have low-flow faucet aerators? Faucet aerators attach to the tip of the faucets to prevent splashing, conserve water, and reduce energy costs. **[ONLY ALLOW NUMBER EQUAL TO OR LESS THAN WHAT WAS ENTERED IN Q.24]**

RECORD NUMBER________________

98 Don't know

Section E: Heat pumps

26. How many **mini-split heat pumps** do you have at your home? Please count only the **exterior condensing units** at your home. For example, if you have multiple indoor blowers connected to a single exterior unit, then this would be counted as one.

GRAPHIC WILL HAVE ARROW POINTING TO INTERIOR AND EXTERIOR UNITS

RECORD NUMBER________________

98 Don't know

Section F: Whole Home

27. How many **thermostats** does your home have to change the indoor temperature?

RECORD NUMBER________________

98 Don't know

28. **[POSE ONLY IF 1 OR MORE IN Q.27]** Of this/these **[INSERT NUMBER FROM Q.27]** thermostat(s), how many are: **[ONLY ALLOW NUMBER FOR EACH EQUAL TO OR LESS THAN WHAT WAS ENTERED IN Q.21]**

	RECORD NUMBER	***Don't know***
b) programmable, that is, you can set schedules to control the temperature?	_______	○8

28aa. **[POSE ONLY IF 1 OR MORE IN Q 28B]** Of this/these **[INSERT NUMBER FROM Q.28B]** *programmable* thermostat(s), how many are

	RECORD NUMBER	***Don't know***
a) smart thermostats you can control via a cell phone or the internet?	_______	○8

29. How many, if any, of the following does your home have?

	RECORD NUMBER	*Don't know*
a) Dehumidifier	_______	O8
b) Clothes line	_______	O8
c) Wood stove	_______	O8

Section G: Lighting

30. Please walk around your home and count all light bulbs, including those in closets, attics, garages, outdoor lights, etc. Please take note of how many bulbs are LED, how many screw into traditional light sockets, how many have a special screw-in base, how many are linear fluorescents (i.e., tube lights), and how many are smart lights.

Next, please indicate the total number of lightbulbs you have:

RECORD NUMBER______________

98 Don't know/Not sure

31. Next, please indicate…. **DO NOT ALLOW NUMBERS ENTERED IN 'B' OR 'D' EXCEED VALUE ENTERED IN 30. DO NOT ALLOW THE SUM OF C+D TO EXCEED Q30**

	RECORD NUMBER	*Don't know*
b) How many are LED bulbs?	_______	O8
c) How many have a base sized like a normal light bulb, that is, they screw into your regular light sockets? **INSERT IMAGE**	_______	O8
d) How many have a specialty base? For example, a candelabra or are pin based?	_______	O8
e) How many are smart lights, that is, they can be controlled over the internet via a smart phone or computer?	_______	O8
f) How many are linear fluorescents (i.e., tube lights) **INSERT IMAGE**	_______	O8

31a. How many of the following are in your home?

	RECORD NUMBER	*Don't know*
a) Manual light dimmers **DISPLAY IMAGE**	______	O8
b) Indoor motion sensors that activate/turnoff lights	______	O8
c) Outdoor motion sensors that activate/turn off lights **DISPLAY IMAGE**	______	O8

Section H: Willingness/Awareness

RANDOMIZE ORDER OF 32-35 & 33-34

32. Before today, how familiar were you with: **ROTATE LIST; RANDOMLY POSE ONLY ONE OF THESE ITEMS**

	0 - Completely Unfamiliar	1	2	3	4	5	6	7	8	9	10 – Completely familiar
a. Heat Pump Water Heaters											
b. ENERGY STAR Mini Split Heat Pumps											
c. Heat Pump Clothes Dryers											
d. Energy Efficient Clothes Washers											

35. Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing new **[INSERT RANDOM SELECTION OF ITEM FROM Q.32].** Would you generally pursue an energy efficiency project where the cost to you after utility rebates is **<u>$1,000</u>** if the project saved $[**INSERT RANDOM AMOUNT FROM TABLE BELOW**] per year?

IF 'YES,' DECREASE AND ASK UNTIL 'NO' OR NONE REMAINING. IF 'NO,' INCREASE AND ASK UNTIL 'YES,' OR NONE REMAINING

	Yes	*No*	*Don't know*
a) $100	○1	○2	○8
b) $250	○1	○2	○8
c) $400	○1	○2	○8
d) $550	○1	○2	○8
e) $700	○1	○2	○8
f) $850	○1	○2	○8
g) $1000	○1	○2	○8
h) $1,150	○1	○2	○8
i) $1,300	○1	○2	○8

33. Before today, how familiar were you with: **ROTATE LIST; RANDOMLY POSE ONLY ONE OF THESE ITEMS**

	0- Completely Unfamiliar	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 – Completely Familiar**
a. Networked/Connected – Indoor LED lights (i.e., smart lightbulbs)											
b. LED Screw-in General Service Lights (i.e., LED lights that screw into your existing sockets)											
c. Smart Power Bars											
d. Dimmer Switches											
e. Programmable or Smart thermostats											
f. Occupancy Sensors											
g. Low flow Showerheads											
h. Low-Flow Faucet Aerators											
i. Outdoor Motion Sensors											

34. Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed. An example might be **[INSERT RANDOM SELECTION OF ITEM FROM Q.33]**. Would you generally pursue an energy efficiency project where the cost to you after utility rebates is <u>**$75**</u> if the project saved $[**INSERT RANDOM AMOUNT FROM TABLE BELOW**] per year?

IF 'YES,' DECREASE AND ASK UNTIL 'NO' OR NONE REMAINING. IF 'NO,' INCREASE AND ASK UNTIL 'YES,' OR NONE REMAINING

	Yes	No	Don't know
a) $15	O1	O2	O8
b) $25	O1	O2	O8
c) $35	O1	O2	O8
d) $45	O1	O2	O8
e) $55	O1	O2	O8
f) $65	O1	O2	O8
g) $75	O1	O2	O8
h) $85	O1	O2	O8
i) $95	O1	O2	O8

Section I: Demographics

And now, some questions to help us classify our results. Please remember that all information is confidential and anonymous – this information will not be identified in any way with your responses.

36. Including yourself, how many household members live in your home?

a. Number of adults 18 or older **[RECORD NUMBER]**

b. Number of children under age of 18 **[RECORD NUMBER]**

37a. **[POSE IF TOTAL IN Q36 A AND B=1]** Was your household income before taxes last year below $21,822?

1 Yes
2 No
3 Prefer not to say
98 Don't know/Not sure

37b. **[POSE IF TOTAL IN Q36 A AND B=2 TO 4]** Was your household income before taxes last year below $40,548?

1 Yes
2 No
3 Prefer not to say
98 Don't know/Not sure

37c. **[POSE IF TOTAL IN Q36 A AND B=5 or more]** Was your household income before taxes last year below $57,747?

1 Yes
2 No
3 Prefer not to say
98 Don't know/Not sure

38. Do you live within a First Nations Community?

1 Yes
2 No
3 Prefer not to say
98 Don't know/Not sure

39. What is the ***main*** source of energy used to heat your principal place of residence? **RANDOMIZE PRESENTATION, KEEPING "OTHER" AND "DON'T KNOW" LAST – CODE ONE ONLY**

01 Oil
02 Electricity
03 Heat pump/Mini-split heat pump
04 Wood/pellets
05 Propane
06 Natural gas
07 Solar
98 Don't know/No answer
99 Other [**SPECIFY**: ___________________]

40. **[DO NOT POSE IF "DON'T KNOW/NOT SURE" IN Q.39]** What other types of heating, if any, do you currently have for your principal place of residence? Please select all that apply. **PRESENT IN SAME ORDER AS Q.34 –ALLOW MULTIPLE RESPONSES – DO NOT DISPLAY ANY ITEMS ALREADY SELECTED IN Q 41**

 01 Oil
 02 Electricity
 03 Heat pump/Mini-split heat pump
 04 Wood/pellets
 05 Propane
 06 Natural gas
 07 Solar
 99 Other [**SPECIFY**: ___________________]
 97 None – no other type of heating is used in my home
 98 Don't know/Not sure

41. **[POSE IF 'ELECTRICITY' IN Q 39 OR 40]** What type of electric heating does your residence use? **CODE ONE ONLY**

 1 Electric Baseboards *(e.g., small electric heaters, places throughout your building, typically under windows)*
 2 Electric resistance Furnace *(i.e., a central furnace which uses an electric heating element and distributes heat through forced-air)*
 3 Electric resistance Boiler *(i.e., a central furnace which uses an electric heating element and distributes heat through hot water, to your floor or radiators)*
 4 Central Air-Source Heat Pump *(i.e., a central heat pump system that heats all or most of the building, through distributed hot water or hot air)*
 5 Ductless/Mini-Split Heat Pump *(i.e., a heat pump system that has an indoor unit placed on a wall, that typically only heats a small area of the building)*
 6 Ground-Source Heat Pump *(i.e., a central heat pump that collects heat from tubes in the ground outside of your building)*
 7 Other *(Please Specify:_______________)*
 98 Don't Know/Not Sure

42. **[POSE ONLY IF 'OWNED' IN Q.5]** And approximately how many years old is your home?

Number of years: ______ years
 98 Don't know/Not sure

43. Does your household pay for its own electricity or does someone else pay for it?

1 Household pays for it
2 Someone else pays for it
4 Don't know/Not sure

That concludes the survey. Thank you for your assistance and input.
It is greatly appreciated!

Quota of n=200 Nova Scotia Businesses

SOFT QUOTAS ON REGION

ALL PROGRAMMING NOTES ARE PRESENTED IN BOLD CAPS

FOR ALL NUMERIC RESPONSES, RANGES ARE NOT ACCEPTED

ALL QUESTIONS ARE MANDATORY

NOTE: QUESTION NUMBERING VARIES BASED ON CHANGES TO THE SURVEY INSTRUMENT, QUESTION NUMBERING DISPLAYED CORRESPONDS WITH TABULAR RESULTS

efficiency NOVA SCOTIA is conducting a study to help understand Nova Scotia specific energy usage. Your responses will help Efficiency Nova Scotia improve energy-related programs that assist Nova Scotians in saving energy and money, and ultimately benefit the environment.

All responses will be kept strictly anonymous and will be analyzed as a whole, not individually. No attempt will be made to identify you. We appreciate your feedback!

As you go through the survey, if you do not have a particular equipment type, please enter '0' in the quantity box.

Section A: Background/Characteristics

To begin…

1. Please indicate in which of the following areas your business is located. If your business has multiple locations, please indicate the location at which you work specifically. **CODE ONE ONLY**

    1 Cape Breton Island
    2 Halifax Regional Municipality (HRM)
    3 Elsewhere on Mainland Nova Scotia outside HRM
    4 None of the above **THANK & TERMINATE**

2. What are the first three digits of your business' postal code? **RECORD FIRST THREE DIGITS**

    98 Don't Know/Not sure

For the remainder of the survey, please think about the business location where you personally work.

3. Do you currently own, lease, or rent the premises at your business' Nova Scotia location where you work?
PRESENT IN ORDER – ALLOW ONE RESPONSE

1 Own
2 Lease
3 Rent
8 Don't know/Not sure

Section B: Electronics

Thinking about your business' electronics…

4. How many **electrical power bars** do you have at your business' Nova Scotia location where you work? A power bar is a block of electrical sockets that attaches to the end of a flexible cable allowing multiple electrical devices to be powered from a single electrical socket.

RECORD NUMBER__________________

98 Don't know/Not sure

5. **[POSE ONLY IF 1 OR MORE IN Q.4]** Of this/these **[INSERT NUMBER FROM Q.4]** power bar(s), how many… **[ONLY ALLOW NUMBER FOR EACH EQUAL TO OR LESS THAN WHAT WAS ENTERED IN Q.4]**

	RECORD NUMBER	*Don't know*
b) Are smart power bars, that is, can be controlled via smart phone or computer or turn off automatically when you leave the room?	______	O8

6. How many **computer servers** does your business have onsite at your business' Nova Scotia location where you work? There may be many servers on a single rack, but we want to know the number of individual servers.
RECORD NUMBER__________________

98 Don't know/Not sure

7. **[POSE ONLY IF 1 OR MORE IN Q6]** Of this/these **[INSERT NUMBER FROM Q.6]** server(s), how many use server virtualization and decommissioning? Server virtualization is a way of reducing the number of physical computer servers by running multiple, independent operating systems on a single server.

[ONLY ALLOW NUMBER EQUAL TO OR LESS THAN WHAT WAS ENTERED IN Q.6]
RECORD NUMBER________________

98 Don't know/Not sure

Section C: Hot Water Heaters

8. How many **hot water heaters** do you have for your business' Nova Scotia location where you work? **RECORD NUMBER**

98 Don't know/Not sure

9. **[POSE IF 1 OR MORE IN Q.8]** Of this/these hot water heater(s), [**INSERT NUMBER FROM Q.8**] hot water heater(s), how many: [**FOR EACH A TO E ONLY ALLOW NUMBER EQUAL TO OR LESS THAN WHAT WAS ENTERED IN Q.8]**

	RECORD NUMBER	***Don't know***
a) Have a large duct for exhaust gas?	______	○8
b) Are smart water heaters, that is, they can be controlled over the internet via a smart phone or computer?	______	○8
c) Have a hot water heater tank wrap, that is, have insulation overtop of the metal exterior of the tank?	______	○8

9d. **[DO NOT POSE IF Q9A=TOTAL ENTERED IN Q8]** Of this/these remaining **[INSERT NUMBER Q8 TOTAL MINUS Q9A TOTAL]** hot water heaters, how many are heat pump water heaters?

RECORD NUMBER:____________

98 Don't know/Not sure

Section D: HVAC & Refrigeration

Thinking about your building for your business' Nova Scotia location where you work …

10. Does your building … **ALLOW ONE RESPONSE FOR EACH – ROTATE ORDER**

	Yes	*No*	*Don't know*	*Not Applicable*
a) *Have open coolers, that is, coolers that do not have covers or doors?*	O1	O2	O8	O9
b) *Have strategic energy management or organized management approach? This is the process of monitoring, controlling, and conserving energy within and organization in a systematic way..*	O1	O2	O8	O9
c) *Have Door heater controls such as anti-sweat heaters (ASH)? These are electric resistance heaters that are installed in the frames and doors of refrigerated cases to reduce condensation and prevent fogging. These are particularly common in grocery and convenience stores.*	O1	O2	O8	O9
d) *Have a packaged terminal heat pump (PTHP)? A PTHP provides heating and cooling room by room often for applications common in hotels and motels.*	O1	O2	O8	O9
e) *In your heating, cooling and ventilation systems, is the speed of any fans or pumps automatically controlled by a variable frequency drive (VFD)?*	O1	O2	O8	O9

11. **[ONLY DISPLAY ITEMS RESPONDENT ANSWERED 'YES' TO IN Q10]** How many of each does your business have? **ROTATE ORDER**

	RECORD NUMBER	*Don't know*
a) Open coolers, that is, coolers that do not have covers or doors?	________	○8
b) Door heater controls such as anti-sweat heaters (ASH)? These are electric resistance heaters that are installed in the frames and doors of refrigerated cases to reduce condensation and prevent fogging. These are particularly common in grocery and convenience stores.	_______	○8
c) Packaged terminal heat pumps (PTHP)? A PTHP provides heating and cooling room by room often for applications common in hotels and motels.	_______	○8
d) Systems with variable frequency drive (VFD)? In your heating, cooling and ventilation systems, VFD automatically controls the speed of any fans or pumps.	_______	○8

13. Approximately, how many motors does your business' HVAC, refrigeration equipment or appliances have?

RECORD NUMBER:_________________________

98 Don't know/Not sure

14. **[POSE IF 1 OR MORE IN Q.13]** Of this/these motors, how many of your HVAC, refrigeration equipment, or appliances use EC Motors? *EC Motors refer to an electronically commutated motor that uses electronic controls to vary its speed. They may be known as brushless DC motors.* **[ALLOW NUMBER EQUAL TO OR LESS THAN WHAT WAS ENTERED IN Q.13]**

RECORD NUMBER:_________________________

98 Don't know/Not sure

Section F: Lighting

Now thinking about lighting…

15. Please walk around your business' location and count all light bulbs, including those in closets, and parking garages. Next please indicate how many…

	Number of LED Bulbs	***Number of Non-LED Bulbs***	***Don't know***
f) Parking garage lights (Please count these lights separately from the other categories listed below)	___	___	O8
a) Linear lighting (e.g. fluorescent or LED tubes)	___	___	O8
b) *Pole mounted area lights which is exterior lighting generally used to provide illumination to areas for vehicle and pedestrian use, with light fixtures mounted to poles*	___	___	O8
c) Track/Mono-point direction lights, which is a lighting system in which the lights are fitted on tracks, allowing variable positioning	___	___	O8
d) Downlight luminaire which is a small spotlight set in a ceiling and directed downwards	___	___	O8
f) Flood lights, which are outdoor fixture mounted on a building, structure, or ground. They are typically used to illuminate or highlight outdoor objects and features).	____	___	O8
e) General service lights (i.e. have a base sized like a normal light bulb and screw into regular light sockets)	___	___	O8

16. **[SHOW ITEMS FROM Q.15 WHERE 1 OR MORE LEDS ARE ENTERED]** Of these LED light bulbs, how many are connected to the internet (i.e., smart lightbulbs)? Smart LED light lightbulbs allow users to control the lights colour and brightness, among other functions, via the internet or a central control system such as an Energy Management System. **RECORD NUMBER FOR EACH – EACH NUMBER ENTERED CANNOT EXCEED CORRESPONDING NUMBER ENTERED IN Q.15 PROMPT RESPONDENT WITH NUMBER OF LIGHTS ENTERED PREVIOUSLY**

	Number of Smart LED Bulbs	***Don't know***
a) Linear lighting (i.e., Tube lamps)	___	O8
b) *Pole mounted area lights which is exterior lighting generally used to provide illumination to areas for vehicle and pedestrian use, with light fixtures mounted to poles*	___	O8
c) Track/Mono-point direction lights, which is a lighting system in which the lights are fitted on tracks, allowing variable positioning	___	O8
d) Downlight luminaire which is a small spotlight set in a ceiling and directed downwards	___	O8
e) Flood lights, which are outdoor fixture mounted on a building, structure, or ground. They are typically used to illuminate or highlight outdoor objects and features).	___	O8
f) General service lights (i.e. have a base sized like a normal light bulb and screw into regular light sockets)	___	O8
g) Parking garage lights	___	O8

17. Approximately, how many occupancy sensors does your business' building/facility have? Occupancy sensors are motion detectors that will turn off lights when people are not present. **RECORD NUMBER______________**

98 Don't know/Not sure

18. How many rooms in your business' Nova Scotia location where you work have lighting fixtures that automatically turn off if there is sufficient sunlight coming into the building (i.e., daylighting controls)?

RECORD NUMBER___________________

98 Don't know/Not sure

19. Were any of your lighting systems commissioned? Lighting Commissioning involves a professional installing, calibrating and testing the lighting system controls to ensure they operate correctly.

1 Yes
2 No
8 Don't know/Not sure

Section G: Willingness and Awareness

RANDOMIZE ORDER FOR 20-23 & 21-22

Moving on…

20. Before today, how familiar were you with: **ROTATE LIST – ALLOW ONE RESPONSE PER ITEM RANDOMLY POSE ONLY ONE OF THESE ITEMS**

	0- Completely Unfamiliar	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 – Completely familiar**
a. IT load optimization strategy (Server refresh and virtualization) (A *way of reducing the number of physical computer servers by running multiple, independent operating systems on a single server*)											
b. Heat pump water heater											
c. Open to closed cooler conversion (*doors or covers on coolers)*											
d. Door heater control (*These are electric resistance heaters that are installed in the frames and doors of refrigerated cases to reduce condensation and prevent fogging.*)											

e. Packaged Terminal heat pump (*A PTHP provides heating and cooling room by room often for applications such as hotels, motels, apartment buildings, offices, among others)*											
f. EC Motor for Refrigeration applications (*An electronically commutated motor (EC Motor) is a motor that uses electronic controls to vary its speed. There are three types of EC motors: constant cfm, constant rpm, and constant torque*)											
g. Strategic energy management program (*This involves processes that empower an organization to implement energy management actions and consistently achieve energy performance improvements)*											

23. Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing or implementing a(n) **[INSERT RANDOM SELECTION OF ITEM FROM Q20].** Would you generally pursue an energy efficiency project where the cost to you after utility rebates is **<u>$100,000</u>** if the project saved $[**INSERT RANDOM AMOUNT FROM TABLE BELOW**] per year?

IF 'YES,' DECREASE AND ASK UNTIL 'NO' OR NONE REMAINING. IF 'NO,' INCREASE AND ASK UNTIL 'YES,' OR NONE REMAINING

	Yes	*No*	*Don't know*
a) $5,000	O1	O2	O8
b) $20,000	O1	O2	O8
c) $35,000	O1	O2	O8
d) $50,000	O1	O2	O8
e) $65,000	O1	O2	O8
f) $80,000	O1	O2	O8
g) $95,000	O1	O2	O8
h) $110,000	O1	O2	O8
i) $125,000	O1	O2	O8

21. Before today, how familiar were you with: **ROTATE LIST – ALLOW ONE RESPONSE PER ITEM RANDOMLY POSE ONLY ONE OF THESE ITEMS**

	0- Completely Unfamiliar	1	2	3	4	5	6	7	8	9	10 – Completely familiar
a. Networked/Connected Lighting System											
b. LED linear replacement lamp (i.e., LED Tube lamps)											
c. Smart power bar (*power bar that can be controlled via smart phone or computer or turn off automatically when you leave the room*)											
d. LED Pole/Arm-mounted luminaire (*Exterior lighting generally used to provide illumination to areas for vehicle and pedestrian use, with light fixtures mounted to poles)*											
e. LED Parking garage light											
f. Daylight dimming control											
g. LED Track light (*A lighting system in which the lights are fitted on tracks, allowing variable positioning)*											

h. Solid State (LED) Recessed Downlight (*Small spotlight set in a ceiling and directed downwards*)											
i. LED Flood light (*which are downward lights with non-LED bulbs*)											
j. General service light (*have a base sized like a normal light bulb and screw into regular light sockets*)											

22. Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed. An example might be installing or implementing a(n) **[INSERT RANDOM SELECTION OF ITEM FROM Q.21]** Would you generally pursue an energy efficiency project where the cost to your business after utility rebates is **<u>$7,500</u>** if the project saved $[**INSERT RANDOM AMOUNT FROM TABLE BELOW**] per year?

IF 'YES,' DECREASE AND ASK UNTIL 'NO' OR NONE REMAINING. IF 'NO,' INCREASE AND ASK UNTIL 'YES,' OR NONE REMAINING

	Yes	***No***	***Don't know***
a) $500	○$_1$	○$_2$	○$_8$
b) $2,000	○$_1$	○$_2$	○$_8$
c) $3,500	○$_1$	○$_2$	○$_8$
d) $5,000	○$_1$	○$_2$	○$_8$
e) $6,500	○$_1$	○$_2$	○$_8$
f) $8,000	○$_1$	○$_2$	○$_8$
g) $9,500	○$_1$	○$_2$	○$_8$

Section E: Demographics/Characteristics

And now, some questions to help us classify our results. Please remember that all information is confidential and anonymous – this information will not be identified in any way with your responses.

24. How many full-time equivalent employees, including yourself, are currently working at your business location within Nova Scotia?

RECORD NUMBER________________

98 Don't know/Not sure

25. Approximately, what is the square footage of your company's business property at the location where you work? Would you say…? **ALLOW ONE RESPONSE**

1 1,000 square feet or less
2 More than 1,000 square feet up to 2,000 square feet
3 More than 2,000 square feet up to 5,000 square feet
4 More than 5,000 square feet, up to 10,000 square feet
5 More than 10,000 square feet, up to 25,000 square feet, or is it
6 More than 25,000 square feet
98 Don't know/Not sure

26. Does your company pay for its own electricity at your business' Nova Scotia location where you work, or does someone else, such as a landlord pay for it? **ALLOW ONE RESPONSE**

1 Yes, pay for own
2 Head office or other department pays
3 No, landlord pays
98 Don't know/Not sure
99 Other (Please specify:_____________)

26a. **[POSE IF CODES 1 OR 2 IN Q.26]** Please select the electric utility provider that provides electricity at your business' Nova Scotia location where you work. **ALLOW ONE RESPONSE**

1 Nova Scotia Power Incorporated
2 Antigonish Electric Utility
3 Berwick Electric Light Commission
4 Canso Electric Light Commission
5 Lunenburg Electric Utility
6 Mahone Bay Electric Utility
7 Riverport Electric Light Commission
98 Don't know/Not sure

27. **[POSE IF CODE 1 IN Q.26a]** Please select your business' rate code from the drop-down selection below. Your rate code can be found on your Nova Scotia Power bill. **INSERT IMAGE OF POWER BILL; ALLOW ONE RESPONSE**

1	2
2	3
3	4M
4	4B
5	5
6	6
7	10M
8	10B
9	11M
10	11B
11	11MTO
12	12M
13	12MTO
14	21M
15	21MTO
16	22M
17	22MTO
18	23M
19	23MTO
20	25M
21	25MTO
22	999
98	Don't know/Not sure

27.2 **[POSE IF CODES 2-7 IN Q26a]** Please select your business' rate code from the drop-down selection below. Your rate code can be commonly found on your electricity bill. **ALLOW ONE RESPONSE**

1	Residential
2	General
3	General, Transformer owned **ONLY SHOW IF CODE 4**
4	Small General **DO NOT SHOW IF CODE 2**
5	Large General **DO NOT SHOW IF CODE 3, 4, 6**
6	Small Industrial **ONLY SHOW IF CODE 4**
7	Small Industrial, Cust-owned Transf **ONLY POSE IF CODE 4**
8	Industrial **DO NOT SHOW IF CODE 2, 5, 6, OR 7**
9	Industrial, Cust-owned Transf **ONLY POSE IF CODE 4**
98	Don't know/Not sure

28. **[ASK IF 98 IN Q 27]** Approximately, how much does your business spend on electricity each month?

RECORD NUMBER ________________

98 Don't Know/Not sure

29. **[ASK IF 98 IN Q 28]** Would you classify your business as….

1 Large business
2 Small business
3 Large commercial
4 Small Commercial
5 Industrial
6 Institutional
98 Don't know/Not sure

30. What is the main source of energy used to heat your business' Nova Scotia location where you work? **RANDOMIZE PRESENTATION, KEEPING "OTHER" AND "DON'T KNOW" LAST – CODE ONE ONLY**

1 Oil
2 Electricity
3 Heat pump/Mini-split heat pump
4 Wood/pellets/chips
5 Propane
6 Natural gas
7 Solar
98 Don't know/Not sure
99 Other (Please specify:_____________)

31. **[DO NOT POSE IF "DON'T KNOW/NOT SURE" IN Q.30]** What other types of heating, if any, do you currently have for your business' Nova Scotia location where you work? Please select all that apply. **PRESENT IN SAME ORDER AS Q.30 –ALLOW MULTIPLE RESPONSES – DO NOT DISPLAY ANY ITEMS ALREADY SELECTED IN Q30**

1 Oil
2 Electricity
3 Heat pump/Mini-split heat pump
4 Wood/pellets/chips
5 Propane
6 Natural gas
7 Solar
99 Other (Please specify: ___________________)
97 None – no other type of heating is used
98 Don't know/Not sure

32. **[POSE IF 'ELECTRICITY' IN Q 30 OR 31]** What type of electric heating does your business' location use? **CODE ONE ONLY**

1 Electric Baseboards (e.g., small electric heaters, places throughout your building, typically under windows)
2 Electric resistance Furnace (i.e., a central furnace which uses an electric heating element and distributes heat through forced-air)
3 Electric resistance Boiler (i.e., a central furnace which uses an electric heating element and distributes heat through hot water, to your floor or radiators)
4 Central Air-Source Heat Pump (i.e., a central heat pump system that heats all or most of the building, through distributed hot water or hot air)
5 Ductless/Mini-Split Heat Pump (i.e., a heat pump system that has an indoor unit placed on a wall, that typically only heats a small area of the building)
6 Ground-Source Heat Pump (i.e., a central heat pump that collects heat from tubes in the ground outside of your building)
7 Other (Please Specify:_______________)
98 Don't Know/Not Sure

33. In what specific business sector or industry is your organization currently involved as its primary activity? **ALLOW ONE RESPONSE**

1 Agriculture, forestry, fishing and hunting
2 Mining, quarrying, and oil and gas extraction
3 Utilities
4 Construction
5 Manufacturing
6 Wholesale trade
7 Retail trade
8 Transportation and warehousing
9 Information and cultural industries
10 Finance and insurance
11 Real estate and rental and leasing
12 Professional, scientific and technical services **(SPECIFY:___________)**
13 Management of companies and enterprises
14 Administrative and support, waste management and remediation services
15 Educational services
16 Health care and social assistance
17 Arts, entertainment and recreation
18 Accommodation and food services
19 Other services (except public administration)
20 Public administration
98 Don't know/Not sure
99 Other **(SPECIFY: _________________)**

That concludes the survey. Thank you for your assistance and cooperation. It is greatly appreciated!

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 1:

To begin…Do you reside in…

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Halifax Regional Municipality (HRM)	43	100	0	0	44	43	53	45	36	29	48	38	55	38	45	39	42	44	48	42	55	41	34	22
Elsewhere on Mainland Nova Scotia outside HRM	42	0	0	100	42	42	35	41	47	53	38	45	37	43	43	49	44	40	36	44	36	45	50	49
Cape Breton Island	14	0	100	0	14	15	12	13	17	18	14	17	9	20	13	12	13	15	16	14	9	14	16	29
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**

TABLE 3:

Are you...?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Male	48	48	47	48	100	0	49	48	47	46	50	48	47	47	48	48	52	44	57	45	48	54	45	49
Female	52	52	53	52	0	100	50	52	53	53	50	52	52	53	52	52	48	55	42	55	52	46	55	51
Gender diverse	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Prefer not to answer	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 4:

Are you:

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
18-24	9	12	3	9	10	9	39	0	0	14	8	5	18	7	11	6	8	11	12	9	10	1	1	6
25-34	15	17	17	11	15	14	61	0	0	18	14	10	23	11	16	11	13	16	15	15	12	14	6	9
35-44	14	16	13	13	14	14	0	44	0	15	15	14	14	13	15	14	14	14	15	14	16	15	12	10
45-54	18	18	17	18	18	18	0	56	0	15	20	19	16	19	20	17	19	17	15	19	23	25	14	17
55-64	19	17	21	21	19	19	0	0	44	18	19	22	13	24	17	20	20	18	22	18	16	23	21	30
65 or older	24	19	28	28	23	25	0	0	56	22	24	28	15	26	21	31	25	23	21	25	22	22	47	28
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**

TABLE 5:

Do you currently own or rent your primary place of residence in Nova Scotia?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Own (even if it is still being paid for)	67	59	80	71	68	67	43	69	79	54	74	100	0	75	66	85	71	64	73	66	100	100	100	100
Rent (even if no cash rent is paid)	33	41	20	29	32	33	57	31	21	46	26	0	100	25	34	15	29	36	27	34	0	0	0	0
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 6:

Which one of the following best describes your primary place of residence in Nova Scotia?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Single family detached house	64	50	79	72	66	62	47	65	72	53	69	83	23	77	61	75	69	59	67	63	71	83	87	93
Condominium, apartment or other multi-family dwelling with three or more units	19	31	4	13	18	21	30	16	16	25	18	4	52	9	19	10	16	22	14	21	10	3	1	0
Single family attached house such as a duplex, townhouse, or row house	9	13	6	5	9	9	13	10	6	10	8	7	13	8	11	8	8	10	12	8	9	9	7	4
Mobile home or trailer	4	2	4	5	3	5	3	5	3	7	3	4	2	3	4	5	3	4	4	4	8	5	4	1
Multi-family dwelling with two units	3	2	7	3	4	3	6	3	2	4	3	1	7	2	4	2	2	4	2	3	2	1	1	2
Other	1	0	0	1	1	0	0	1	0	1	0	0	1	1	0	0	1	0	1	1	0	0	0	1
Don't know/Not sure	0	0	0	1	1	0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**

TABLE 7:

How many electric clothes dryers do you have in your home?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	8	10	6	8	8	8	10	8	8	13	6	3	19	6	8	3	6	11	5	9	1	2	3	7
1	87	82	92	90	87	87	81	88	90	79	91	95	71	91	87	94	90	85	90	86	96	96	96	92
2 or more	3	6	1	2	4	3	7	3	2	7	2	2	7	3	4	3	4	3	5	3	3	2	0	1
Don't know	1	2	1	0	1	1	2	1	0	1	1	0	3	0	1	1	0	1	0	1	0	0	1	0
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	1.0	1.1	1.0	.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Responses of 'Don't know' were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 8:

[IF Q7 '1' OR MORE] Of this/these [Q7 RESPONSE] clothes dryer(s), how many are heat pump dryers?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	67	68	63	68	65	69	43	67	80	60	71	73	54	70	65	69	72	63	67	67	62	77	80	73
1	13	13	16	12	17	9	31	10	5	20	12	11	19	11	15	14	14	12	25	10	14	9	7	10
2 or more	1	2	0	0	1	1	3	0	0	2	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Don't know	19	17	21	20	16	21	23	22	14	18	17	16	25	18	18	17	13	24	7	22	22	13	13	16
WEIGHTED SAMPLE SIZE (#)	**907**	**382**	**136**	**389**	**434**	**471**	**214**	**296**	**398**	**224**	**592**	**649**	**258**	**396**	**522**	**249**	**426**	**481**	**209**	**698**	**165**	**166**	**137**	**145**
UNWEIGHTED SAMPLE SIZE (#)	**907**	**409**	**127**	**371**	**407**	**498**	**175**	**303**	**429**	**208**	**607**	**659**	**248**	**403**	**523**	**258**	**429**	**478**	**206**	**701**	**166**	**167**	**145**	**143**
MEAN	.2	.2	.2	.1	.2	.1	.5	.1	.1	.3	.2	.1	.3	.2	.2	.2	.2	.2	.3	.1	.2	.1	.1	.2

Responses of 'Don't know' were excluded from calculation of the mean.

TABLE 7+8 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Q7. How many electric clothes dryers do you have in your home?
Q8. [IF Q7 '1' OR MORE] Of this/these [Q7 RESPONSE] clothes dryer(s), how many are heat pump dryers?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Proportion heat pump dryers	17	18	20	15	21	13	43	12	7	24	15	14	24	15	20	18	17	17	28	13	20	12	8	14
WEIGHTED SAMPLE SIZE (#)	**737**	**319**	**108**	**311**	**363**	**374**	**165**	**229**	**342**	**183**	**491**	**545**	**192**	**323**	**427**	**208**	**370**	**367**	**194**	**543**	**129**	**144**	**119**	**122**
UNWEIGHTED SAMPLE SIZE (#)	**734**	**338**	**101**	**295**	**345**	**388**	**132**	**233**	**369**	**167**	**502**	**552**	**182**	**326**	**424**	**218**	**374**	**360**	**191**	**543**	**130**	**145**	**127**	**120**

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 9 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

[IF Q7 '1' OR MORE] Of this/these [Q7 RESPONSE] clothes dryer(s), how many are…

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Less than 5 years old	29	28	29	29	32	26	39	31	22	25	31	27	33	25	31	34	31	26	32	28	38	24	18	24
At least 5 years but less than 10 years old	44	46	45	42	44	44	43	47	42	50	42	43	48	43	46	40	41	47	42	45	37	45	47	44
10 years or older	27	26	26	29	24	30	18	22	36	26	27	30	19	31	22	26	28	26	26	27	25	31	35	32
WEIGHTED SAMPLE SIZE (#)	**831**	**342**	**130**	**359**	**403**	**425**	**174**	**279**	**378**	**200**	**554**	**626**	**204**	**377**	**478**	**232**	**396**	**434**	**199**	**632**	**163**	**160**	**134**	**139**
UNWEIGHTED SAMPLE SIZE (#)	**836**	**369**	**122**	**345**	**385**	**449**	**141**	**287**	**408**	**189**	**567**	**639**	**197**	**384**	**484**	**243**	**403**	**433**	**197**	**639**	**164**	**163**	**143**	**137**

This table excludes responses of 'Don't know'.

TABLE 10:

How many clothes washers do you have in your home?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	7	9	2	5	6	7	8	7	5	12	4	1	18	3	7	1	4	9	4	7	1	2	1	0
1	89	84	98	91	89	89	85	88	92	79	93	97	73	93	88	96	92	86	93	88	96	96	98	98
2 or more	4	6	0	3	4	4	6	3	3	8	2	2	8	4	5	3	4	4	3	4	2	2	1	2
Don't know	1	1	0	0	0	1	1	1	0	0	1	0	2	0	1	0	0	1	0	1	0	0	0	0
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Responses of 'Don't know' were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 11 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

[IF Q10 '1' OR MORE] Of this/these [Q10 RESPONSE] clothes washer(s), how many are…

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Top-loading with an agitator in the tub	60	56	62	63	55	63	60	60	60	72	55	55	69	61	57	53	57	62	54	61	34	64	59	65
Front loading	27	33	23	21	29	25	27	26	26	16	31	30	20	22	30	32	28	25	31	25	48	24	26	22
Top loading without an agitator in the tub	14	11	14	16	16	12	13	14	14	11	14	15	11	17	13	15	15	13	15	13	18	12	15	13
WEIGHTED SAMPLE SIZE (#)	**917**	**384**	**140**	**393**	**438**	**477**	**214**	**296**	**408**	**224**	**603**	**663**	**254**	**405**	**525**	**251**	**436**	**481**	**211**	**706**	**164**	**165**	**141**	**154**
UNWEIGHTED SAMPLE SIZE (#)	**918**	**412**	**130**	**376**	**413**	**503**	**176**	**304**	**438**	**208**	**616**	**672**	**246**	**410**	**527**	**261**	**438**	**480**	**208**	**710**	**166**	**166**	**149**	**152**

This table excludes responses of 'Don't know'.

TABLE 12 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

[IF Q10 '1' OR MORE] Of this/these [Q10 RESPONSE] clothes washer(s), how many are…

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Less than 5 years old	35	33	37	37	39	31	49	34	29	29	37	34	38	32	38	39	39	32	42	33	45	31	23	32
At least 5 years but less than 10 years old	40	41	40	39	38	42	33	44	41	46	38	39	44	41	40	39	36	44	37	41	33	40	47	39
10 years or older	25	26	23	24	23	27	18	22	30	25	25	27	18	26	22	22	26	24	21	26	22	29	31	29
WEIGHTED SAMPLE SIZE (#)	**858**	**354**	**137**	**367**	**416**	**440**	**182**	**282**	**394**	**206**	**573**	**649**	**209**	**393**	**493**	**240**	**414**	**444**	**205**	**653**	**164**	**165**	**139**	**150**
UNWEIGHTED SAMPLE SIZE (#)	**862**	**382**	**127**	**353**	**398**	**462**	**149**	**289**	**424**	**194**	**582**	**659**	**203**	**398**	**496**	**251**	**418**	**444**	**202**	**660**	**165**	**166**	**148**	**147**

This table excludes responses of 'Don't know'.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 13a:

How many of the following do you have in your home…

Full-size refrigerators (Note: these do not include mini fridges or wine fridges)?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	1	1	0	1	1	1	0	1	0	1	0	0	1	1	0	0	0	1	0	1	0	1	0	0
1	85	85	90	84	84	86	86	89	82	86	85	84	88	84	87	83	87	84	87	85	81	83	84	84
2 or more	11	11	8	13	12	11	9	8	15	9	12	13	7	14	9	15	11	11	11	11	16	14	15	13
Don't know	3	3	2	3	3	3	4	2	3	4	2	2	4	2	3	1	2	4	2	3	3	3	1	3
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.1	1.2	1.1	1.1	1.1

Responses of 'Don't know' were excluded from calculation of the mean.

TABLE 14 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

[IF Q13a '1' OR MORE] Of this/these [Q13a RESPONSE] full-size refrigerator(s), how many are…

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Less than 5 years old	29	30	26	28	29	28	36	29	25	30	29	26	37	25	33	34	31	26	36	26	35	24	19	23
At least 5 years but less than 10 years old	42	40	47	42	46	39	46	40	42	44	42	42	41	41	43	41	42	42	40	43	35	44	45	46
10 years or older	29	30	26	30	26	33	18	31	33	26	28	32	22	34	24	25	27	31	25	31	30	33	36	31
WEIGHTED SAMPLE SIZE (#)	**881**	**379**	**136**	**366**	**422**	**457**	**188**	**292**	**400**	**221**	**576**	**634**	**247**	**387**	**509**	**242**	**415**	**466**	**214**	**667**	**160**	**156**	**140**	**145**
UNWEIGHTED SAMPLE SIZE (#)	**890**	**406**	**128**	**356**	**408**	**480**	**159**	**300**	**431**	**213**	**588**	**646**	**244**	**392**	**517**	**252**	**424**	**466**	**210**	**680**	**163**	**160**	**147**	**141**

This table excludes responses of 'Don't know'.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 13b:

How many of the following do you have in your home…

Mini refrigerators or wine fridges?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	75	73	80	75	71	78	75	71	78	77	73	72	81	73	72	71	72	77	71	76	65	68	75	78
1	20	20	16	22	24	17	16	23	20	17	22	24	13	22	22	25	23	17	25	19	29	26	24	17
2 or more	2	3	3	1	2	3	3	4	1	2	3	2	3	2	3	3	2	3	2	3	3	2	1	3
Don't know	3	3	2	2	3	2	7	2	1	4	2	2	3	2	4	1	2	3	3	3	4	4	0	2
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	.3	.3	.2	.3	.3	.3	.3	.3	.2	.3	.3	.3	.2	.3	.3	.3	.3	.3	.3	.3	.4	.3	.3	.4

Responses of 'Don't know' were excluded from calculation of the mean.

TABLE 15 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

[IF Q13b '1' OR MORE] Of this/these [Q13b RESPONSE] mini or wine refrigerator(s), how many are…

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Less than 5 years old	42	44	40	40	43	39	50	50	29	50	40	40	47	38	46	49	41	42	41	42	49	29	32	49
At least 5 years but less than 10 years old	38	37	45	36	35	42	39	32	43	33	39	36	43	40	33	35	39	37	42	36	29	42	28	43
10 years or older	21	19	15	24	22	20	11	18	27	18	22	24	9	22	22	16	20	21	18	22	22	29	40	8
WEIGHTED SAMPLE SIZE (#)	**214**	**94**	**24**	**95**	**117**	**96**	**40**	**83**	**91**	**47**	**149**	**168**	**46**	**97**	**134**	**70**	**113**	**101**	**56**	**158**	**53**	**47**	**34**	**29**
UNWEIGHTED SAMPLE SIZE (#)	**220**	**102**	**25**	**93**	**120**	**99**	**34**	**86**	**100**	**42**	**157**	**175**	**45**	**98**	**136**	**76**	**112**	**108**	**58**	**162**	**56**	**49**	**35**	**29**

This table excludes responses of 'Don't know'.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 13c:

How many of the following do you have in your home…

Stand-alone freezers, that is, freezers that are not attached to refrigerators?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	36	45	32	28	35	37	54	35	26	42	33	27	55	27	37	23	34	38	32	37	32	26	22	24
1	55	47	61	62	55	55	36	57	65	48	58	63	39	65	53	66	57	53	62	53	56	64	71	64
2 or more	6	4	5	8	6	6	2	7	7	5	6	8	2	6	6	10	7	5	4	7	8	8	7	10
Don't know	3	4	2	2	3	2	8	1	2	4	2	3	4	2	4	2	2	3	2	3	4	3	1	3
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	.7	.6	.7	.8	.7	.7	.4	.7	.8	.6	.7	.8	.5	.8	.7	.9	.7	.7	.7	.7	.7	.8	.8	.9

Responses of 'Don't know' were excluded from calculation of the mean.

TABLE 16 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

[IF Q13c '1' OR MORE] Of this/these [Q13a RESPONSE] stand-alone freezer(s), how many are…

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Less than 5 years old	24	21	20	27	29	19	36	25	20	27	23	21	34	23	26	26	26	23	27	23	29	16	20	20
At least 5 years but less than 10 years old	33	32	39	32	29	37	40	32	32	36	32	32	37	31	33	35	32	34	38	31	31	37	32	29
10 years or older	43	47	41	41	42	44	24	43	49	37	45	47	29	46	41	38	43	43	35	46	40	48	48	51
WEIGHTED SAMPLE SIZE (#)	**596**	**219**	**90**	**287**	**286**	**308**	**88**	**201**	**307**	**136**	**401**	**465**	**131**	**291**	**335**	**189**	**285**	**311**	**141**	**455**	**105**	**119**	**109**	**112**
UNWEIGHTED SAMPLE SIZE (#)	**615**	**242**	**87**	**286**	**285**	**328**	**78**	**211**	**326**	**137**	**414**	**478**	**137**	**295**	**348**	**196**	**293**	**322**	**143**	**472**	**106**	**124**	**117**	**108**

This table excludes responses of 'Don't know'.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 17:

How many power bars do you have in your home? A power bar is a block of electrical sockets that attaches to the end of a flexible cable allowing multiple electrical devices to be powered from a single electrical socket.

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	3	2	3	3	3	3	3	4	2	4	3	3	3	2	3	3	3	3	2	3	3	3	2	3
1	13	13	12	13	11	15	15	9	14	16	11	11	15	12	11	9	12	13	11	13	9	9	15	13
2	22	21	25	23	20	25	25	19	23	31	18	21	26	24	22	21	22	23	19	23	17	19	24	26
3	24	28	16	23	24	24	20	27	24	17	27	25	22	22	25	26	26	22	25	24	28	24	24	22
4	12	10	17	13	13	11	11	12	13	10	13	13	10	11	13	14	12	12	11	12	16	14	10	12
5 or more	20	22	19	19	24	17	22	21	19	18	23	21	20	23	22	20	21	20	26	19	18	22	21	21
Don't know	5	4	9	6	6	5	4	8	4	4	6	6	4	6	5	7	4	7	5	5	8	9	4	4
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	3.4	3.4	3.2	3.3	3.5	3.2	3.5	3.5	3.2	3.2	3.5	3.4	3.2	3.5	3.5	3.4	3.4	3.3	3.8	3.2	3.4	3.3	3.2	3.7

Responses of 'Don't know' were excluded from calculation of the mean.

TABLE 18:

[IF Q17 '1' OR MORE] Of this/these [Q17 RESPONSE] power bar(s), how many are smart power bars, that is, can be controlled via smart phone or computer or turn off automatically when you leave the room?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	86	85	87	86	83	88	86	81	89	83	87	86	86	87	82	85	84	87	82	87	81	84	92	86
1	5	6	3	4	6	4	6	8	3	5	5	5	4	4	6	5	6	4	6	5	7	7	3	4
2	3	3	0	3	3	3	3	3	2	4	2	2	4	2	4	4	3	2	3	3	3	3	1	2
3	2	2	1	3	4	1	2	2	2	2	2	2	3	1	3	1	3	1	4	2	3	1	1	2
4	1	0	2	0	0	1	0	1	1	2	0	0	1	0	1	1	1	0	1	0	0	1	0	1
5 or more	0	1	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0	0	1	0	1	1	0	1
Don't know	4	4	6	3	3	4	3	4	4	4	4	4	3	4	4	3	2	5	2	4	4	4	4	4
WEIGHTED SAMPLE SIZE (#)	**919**	**407**	**128**	**384**	**435**	**481**	**225**	**287**	**408**	**241**	**586**	**612**	**308**	**391**	**529**	**231**	**423**	**497**	**205**	**714**	**148**	**149**	**134**	**146**
UNWEIGHTED SAMPLE SIZE (#)	**921**	**435**	**121**	**365**	**412**	**505**	**188**	**292**	**441**	**230**	**598**	**622**	**299**	**394**	**531**	**241**	**428**	**493**	**205**	**716**	**151**	**152**	**140**	**144**
MEAN	.2	.2	.2	.2	.3	.2	.2	.3	.2	.3	.2	.2	.2	.2	.3	.2	.3	.2	.4	.2	.3	.3	.1	.2

Responses of 'Don't know' were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 17+18 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

How many power bars do you have in your home? A power bar is a block of electrical sockets that attaches to the end of a flexible cable allowing multiple electrical devices to be powered from a single electrical socket.
[IF Q17 '1' OR MORE] Of this/these [Q17 RESPONSE] power bar(s), how many are smart power bars, that is, can be controlled via smart phone or computer or turn off automatically when you leave the room?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Proportion smart power bars	6	7	6	6	8	5	6	7	6	10	5	6	7	5	8	6	8	5	9	5	8	7	2	6
WEIGHTED SAMPLE SIZE (#)	**886**	**392**	**120**	**374**	**422**	**460**	**218**	**274**	**393**	**232**	**564**	**587**	**299**	**375**	**507**	**223**	**414**	**472**	**200**	**685**	**142**	**143**	**129**	**140**
UNWEIGHTED SAMPLE SIZE (#)	**885**	**417**	**114**	**354**	**398**	**483**	**182**	**278**	**425**	**222**	**574**	**595**	**290**	**376**	**507**	**232**	**418**	**467**	**199**	**686**	**144**	**145**	**135**	**138**

TABLE 19:

How many hot water heaters do you have in your home?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	17	24	18	9	18	15	15	15	19	19	17	11	28	18	11	10	16	18	17	17	11	10	16	9
1	74	64	78	84	74	75	63	78	77	70	76	84	54	75	79	85	78	71	76	74	80	87	83	87
2 or more	3	3	1	3	5	1	7	2	2	5	3	3	3	3	4	3	4	2	6	2	6	3	1	1
Don't know	6	9	2	4	3	9	14	6	2	6	5	2	15	5	6	2	3	9	2	7	3	1	0	3
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	.9	.8	.8	.9	.9	.9	.9	.9	.8	.9	.9	.9	.7	.8	.9	.9	.9	.8	.9	.8	1.0	.9	.8	.9

Responses of 'Don't know' were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 20 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

[IF Q19 '1' OR MORE] Of this/these [Q19 RESPONSE] hot water heater(s), how many...

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Have a hot water heater tank wrap	46	44	46	47	50	41	45	41	49	46	46	46	43	42	49	55	44	47	51	43	43	50	46	47
Have a large duct for exhaust gas	29	39	23	23	29	29	55	25	22	28	31	26	43	31	30	22	30	28	32	28	34	24	21	21
Are smart water heaters	3	3	2	2	2	3	5	4	1	4	2	1	9	3	3	3	3	3	3	2	1	0	2	0
Are heat pump water heaters	0	0	2	0	1	0	2	0	0	2	0	0	2	1	0	0	1	0	1	0	0	0	1	0
WEIGHTED SAMPLE SIZE (#)	**535**	**196**	**85**	**254**	**295**	**239**	**92**	**176**	**266**	**130**	**361**	**431**	**104**	**222**	**338**	**183**	**271**	**264**	**144**	**391**	**101**	**114**	**98**	**97**
UNWEIGHTED SAMPLE SIZE (#)	**533**	**212**	**79**	**242**	**284**	**248**	**68**	**178**	**287**	**124**	**360**	**433**	**100**	**221**	**342**	**185**	**274**	**259**	**137**	**396**	**100**	**115**	**101**	**97**

This table excludes responses of 'Don't know'.

TABLE 21 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

[IF Q19 '1' OR MORE] Of this/these [Q19 RESPONSE] hot water heater(s), how many are…

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Less than 5 years old	39	37	40	40	40	37	44	41	34	44	38	39	39	35	43	41	40	37	41	38	44	40	32	37
At least 5 years but less than 10 years old	38	41	42	35	39	37	33	38	40	35	39	37	40	41	37	35	37	39	41	37	33	39	37	40
10 years or older	23	23	18	25	21	25	23	20	26	21	24	24	20	24	20	24	22	24	18	25	23	21	31	23
WEIGHTED SAMPLE SIZE (#)	**711**	**267**	**109**	**334**	**346**	**363**	**139**	**242**	**330**	**175**	**467**	**564**	**147**	**312**	**432**	**221**	**339**	**372**	**170**	**541**	**141**	**145**	**116**	**132**
UNWEIGHTED SAMPLE SIZE (#)	**712**	**282**	**102**	**328**	**327**	**383**	**113**	**248**	**351**	**167**	**472**	**568**	**144**	**314**	**439**	**226**	**340**	**372**	**165**	**547**	**139**	**147**	**122**	**130**

This table excludes responses of 'Don't know'.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 22:

How many shower heads do you have in your home?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	1	0	1	2	1	2	1	1	2	2	1	1	2	2	1	0	1	2	0	2	1	1	0	3
1	63	53	71	70	61	64	67	62	61	75	57	57	75	66	60	50	60	65	56	65	28	53	72	72
2	29	37	24	22	29	28	22	30	32	18	33	33	21	26	30	38	33	26	37	26	48	40	23	23
3 or more	6	10	2	4	8	5	8	7	5	2	9	8	2	6	8	11	6	6	6	6	22	5	5	2
Don't know	1	1	1	1	1	0	2	0	0	1	0	1	1	0	1	1	1	1	0	1	2	1	0	0
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	1.4	1.6	1.3	1.3	1.5	1.4	1.4	1.4	1.4	1.2	1.5	1.5	1.2	1.4	1.5	1.6	1.5	1.4	1.5	1.4	2.0	1.5	1.3	1.2

Responses of 'Don't know' were excluded from calculation of the mean.

TABLE 23:

[IF Q22 '1' OR MORE] Of this/these [Q22 RESPONSE] shower head(s), how many are low-flow, that is, they use less water to reduce your water usage?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	26	25	24	29	27	26	41	23	21	27	26	24	31	30	24	22	24	28	23	27	24	22	24	27
1	40	34	47	43	40	40	23	44	46	48	37	42	35	41	41	41	44	37	42	39	27	41	50	51
2	15	19	13	12	17	14	9	15	20	10	17	18	10	14	16	21	19	13	27	12	27	23	12	11
3 or more	2	3	2	2	3	2	2	3	2	0	4	3	0	1	3	5	2	2	2	2	9	3	1	0
Don't know	16	19	15	14	14	18	24	16	12	15	16	13	23	14	16	11	12	20	6	19	12	11	13	10
WEIGHTED SAMPLE SIZE (#)	**981**	**431**	**141**	**410**	**469**	**508**	**236**	**322**	**423**	**251**	**630**	**659**	**322**	**413**	**559**	**256**	**448**	**534**	**220**	**762**	**163**	**166**	**141**	**150**
UNWEIGHTED SAMPLE SIZE (#)	**982**	**459**	**132**	**391**	**444**	**534**	**197**	**330**	**455**	**237**	**642**	**668**	**314**	**419**	**561**	**266**	**452**	**530**	**217**	**765**	**166**	**168**	**149**	**147**
MEAN	.9	1.0	.9	.8	.9	.9	.6	1.0	1.0	.8	1.0	1.0	.7	.8	1.0	1.1	1.0	.9	1.1	.9	1.2	1.1	.9	.8

Responses of 'Don't know' were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 22+23 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Q22. How many shower heads do you have in your home?
Q23. [IF Q22 '1' OR MORE] Of this/these [Q22 RESPONSE] shower head(s), how many are low-flow, that is, they use less water to reduce your water usage?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Proportion low-flow	64	63	70	64	64	65	44	67	72	64	64	67	58	61	65	68	68	61	71	62	63	70	68	66
WEIGHTED SAMPLE SIZE (#)	**822**	**351**	**119**	**352**	**403**	**416**	**179**	**270**	**373**	**214**	**528**	**575**	**247**	**355**	**470**	**229**	**394**	**428**	**207**	**615**	**144**	**147**	**123**	**135**
UNWEIGHTED SAMPLE SIZE (#)	**828**	**378**	**113**	**337**	**387**	**438**	**148**	**277**	**403**	**202**	**540**	**584**	**244**	**360**	**475**	**236**	**402**	**426**	**203**	**625**	**146**	**151**	**128**	**133**

TABLE 24:

How many water faucets do you have in your home?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	2	2	3	1	3	1	4	1	1	4	1	2	2	1	2	1	2	1	2	2	4	1	2	0
2	25	22	27	27	25	24	39	26	16	36	20	16	42	23	24	14	24	25	19	26	10	14	17	18
3	30	28	29	33	31	30	25	29	34	36	27	29	33	29	28	30	29	32	33	30	20	30	34	35
4	23	24	26	22	20	26	17	24	26	14	28	27	15	29	23	30	23	23	27	22	26	26	30	28
5 or more	19	22	15	16	20	18	12	18	23	7	23	25	6	18	21	24	22	16	18	19	38	28	17	17
Don't know	1	2	0	1	1	1	3	1	0	1	1	1	2	0	1	1	1	2	1	1	2	0	0	1
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	3.5	3.6	3.4	3.4	3.5	3.5	3.0	3.4	3.8	2.9	3.7	3.8	2.9	3.5	3.5	3.8	3.5	3.4	3.6	3.4	4.1	3.8	3.5	3.7

Responses of 'Don't know' were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 25:

[IF Q24 '1' OR MORE] Of this/these [Q24 RESPONSE] faucet(s), how many have low-flow faucet aerators? Faucet aerators attach to the tip of the faucets to prevent splashing, conserve water, and reduce energy costs.

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	40	38	37	43	37	43	48	38	37	45	39	38	45	41	40	35	37	42	39	40	38	33	42	37
1	14	13	14	15	15	13	15	13	15	16	14	15	12	15	14	14	15	14	12	15	11	14	17	19
2	13	13	14	13	16	11	6	15	15	15	13	14	11	14	13	12	17	10	17	12	10	12	13	21
3	9	9	9	9	9	9	5	10	10	8	8	9	8	9	9	12	11	6	9	8	11	14	9	4
4	5	5	7	4	5	5	3	4	7	2	6	6	2	5	5	6	6	4	10	3	6	7	8	6
5 or more	3	4	1	2	5	1	1	3	3	0	4	4	0	3	3	4	4	1	5	2	6	5	3	2
Don't know	16	17	17	15	14	18	21	17	13	14	16	13	22	13	17	17	9	22	7	19	18	14	9	10
WEIGHTED SAMPLE SIZE (#)	**987**	**426**	**145**	**417**	**472**	**512**	**235**	**319**	**433**	**256**	**633**	**666**	**321**	**421**	**564**	**255**	**451**	**537**	**218**	**769**	**164**	**168**	**142**	**154**
UNWEIGHTED SAMPLE SIZE (#)	**987**	**455**	**135**	**397**	**446**	**538**	**195**	**326**	**466**	**240**	**645**	**675**	**312**	**426**	**565**	**264**	**454**	**533**	**216**	**771**	**166**	**169**	**150**	**151**
MEAN	1.2	1.3	1.3	1.1	1.4	1.0	.8	1.3	1.4	.9	1.3	1.4	.9	1.2	1.2	1.5	1.4	1.0	1.6	1.1	1.5	1.6	1.3	1.2

Responses of 'Don't know' were excluded from calculation of the mean.

TABLE 24+25 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Q24. How many water faucets do you have in your home?
Q25. [IF Q24 '1' OR MORE] Of this/these [Q24 RESPONSE] faucet(s), how many have low-flow faucet aerators? Faucet aerators attach to the tip of the faucets to prevent splashing, conserve water, and reduce energy costs.

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Proportion low-flow	35	36	37	33	40	30	26	37	37	32	35	36	30	35	33	39	40	29	44	31	36	42	35	33
WEIGHTED SAMPLE SIZE (#)	**822**	**348**	**121**	**353**	**405**	**415**	**185**	**264**	**373**	**220**	**526**	**572**	**250**	**366**	**464**	**210**	**406**	**416**	**204**	**618**	**133**	**144**	**127**	**138**
UNWEIGHTED SAMPLE SIZE (#)	**823**	**374**	**113**	**336**	**383**	**438**	**150**	**269**	**404**	**209**	**535**	**580**	**243**	**368**	**467**	**222**	**409**	**414**	**200**	**623**	**135**	**145**	**133**	**135**

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 26:

How many mini-split heat pumps do you have at your home? Please count only the exterior condensing units at your home. For example, if you have multiple indoor blowers connected to a single exterior unit, then this would be counted as one.

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	67	67	70	66	64	69	61	69	69	71	66	66	69	76	65	12	66	68	58	70	53	67	63	81
1	19	17	17	22	21	18	20	18	20	16	21	22	14	13	21	64	24	16	27	17	32	22	25	11
2	5	4	7	5	6	5	2	5	7	3	6	7	1	6	5	19	5	5	9	4	9	8	9	4
3 or more	1	1	1	0	1	0	1	1	0	0	1	1	0	0	1	2	1	0	2	0	3	0	0	1
Don't know	8	10	5	6	7	8	16	7	3	10	6	4	16	5	8	3	4	11	4	9	4	3	3	3
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	.3	.3	.4	.4	.4	.3	.3	.3	.4	.3	.4	.4	.2	.3	.4	1.1	.4	.3	.5	.3	.6	.4	.4	.2

Responses of 'Don't know' were excluded from calculation of the mean.

TABLE 27:

How many thermostats does your home have to change the indoor temperature?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	3	2	2	5	3	3	4	4	2	5	2	3	3	2	3	1	4	2	5	2	1	3	4	3
1	36	39	37	33	33	39	37	34	37	47	31	29	51	48	23	24	36	37	35	37	18	20	31	47
2	17	15	24	16	18	16	19	14	18	19	17	16	19	24	14	16	17	17	16	17	11	8	26	23
3	9	9	8	9	11	8	12	6	10	7	10	10	7	13	9	12	9	9	11	9	12	10	11	7
4	6	6	4	7	6	6	3	9	6	4	7	6	6	5	7	7	7	6	6	7	13	7	1	4
5 or more	26	26	22	28	28	25	19	30	27	15	31	33	11	8	41	38	26	26	27	26	42	51	26	15
Don't know	2	3	2	2	2	3	6	2	1	2	2	2	4	1	3	2	1	3	1	3	3	1	1	1
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	3.4	3.4	3.1	3.4	3.5	3.2	2.7	3.6	3.5	2.5	3.8	3.9	2.2	2.1	4.5	4.3	3.4	3.3	3.6	3.3	4.6	5.4	3.4	2.5

Responses of 'Don't know' were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 28B:

[IF Q27 '1' OR MORE] Of this/these [Q27 RESPONSE] thermostat(s), how many are…

Programmable, that is, you can set schedules to control the temperature?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	56	52	62	57	52	59	56	53	58	68	52	51	66	52	55	39	52	59	47	58	41	62	47	54
1	22	23	25	19	22	21	19	21	24	17	23	24	18	28	19	27	25	19	24	21	21	12	33	32
2	8	9	6	7	9	7	9	8	7	8	8	8	7	9	8	12	9	7	13	6	9	7	8	10
3	3	3	2	4	5	1	5	2	2	1	4	4	1	3	4	5	5	1	4	3	4	6	3	2
4	2	3	1	1	2	2	0	3	1	0	2	3	0	2	2	3	2	2	2	2	7	3	1	1
5 or more	5	6	2	5	6	4	5	6	5	3	6	7	1	2	8	9	4	6	8	4	11	8	5	1
Don't know	5	5	2	6	4	6	5	6	3	3	3	4	8	4	4	5	2	7	3	5	7	3	4	1
WEIGHTED SAMPLE SIZE (#)	**948**	**416**	**139**	**394**	**455**	**490**	**218**	**307**	**424**	**243**	**616**	**641**	**307**	**411**	**541**	**248**	**429**	**519**	**208**	**740**	**161**	**161**	**136**	**150**
UNWEIGHTED SAMPLE SIZE (#)	**952**	**447**	**128**	**377**	**433**	**516**	**185**	**312**	**455**	**228**	**632**	**650**	**302**	**416**	**543**	**256**	**433**	**519**	**207**	**745**	**163**	**162**	**144**	**148**
MEAN	.9	1.0	.6	1.0	1.1	.8	.9	1.0	.9	.6	1.1	1.2	.5	.7	1.2	1.6	1.0	.9	1.3	.8	1.7	1.3	1.0	.7

Responses of 'Don't know' were excluded from calculation of the mean.

TABLE 28aa:

[IF Q28B '1' OR MORE] Of this/these [Q28B RESPONSE] programmable thermostat(s), how many are…

Smart thermostats you can control via a cell phone or the internet?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	82	76	83	89	83	81	76	79	87	76	83	83	77	85	77	79	80	84	77	84	75	83	89	89
1	10	13	10	5	13	6	17	9	6	15	8	8	13	7	13	10	13	6	15	8	11	10	6	6
2	4	5	3	3	1	7	5	6	2	8	4	4	5	4	5	5	4	4	6	4	7	1	2	1
3	1	1	0	1	0	1	1	1	0	1	1	0	2	0	1	1	1	0	0	1	1	0	0	0
4	0	1	0	0	1	0	0	1	1	0	1	1	0	0	0	1	0	1	1	0	1	1	0	0
5 or more	1	1	1	0	1	1	2	1	0	0	1	1	0	1	1	1	1	1	1	1	2	2	0	1
Don't know	2	3	2	2	1	4	0	2	4	1	3	3	2	2	3	3	1	4	1	3	3	3	2	3
WEIGHTED SAMPLE SIZE (#)	**373**	**178**	**50**	**144**	**200**	**172**	**83**	**124**	**165**	**71**	**272**	**290**	**83**	**178**	**219**	**140**	**195**	**177**	**104**	**268**	**85**	**58**	**67**	**68**
UNWEIGHTED SAMPLE SIZE (#)	**374**	**187**	**49**	**138**	**193**	**180**	**68**	**128**	**178**	**66**	**277**	**296**	**78**	**176**	**218**	**148**	**197**	**177**	**98**	**276**	**88**	**55**	**71**	**69**
MEAN	.3	.4	.2	.1	.3	.3	.4	.4	.1	.3	.3	.3	.3	.2	.3	.3	.3	.2	.4	.2	.4	.3	.1	.1

Responses of 'Don't know' were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 27+28B+28aa (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Q27. How many thermostats does your home have to change the indoor temperature?
Q28B. [IF Q27 '1' OR MORE] Of this/these [Q27 RESPONSE] thermostat(s), how many are…
Q28aa. [IF Q28B '1' OR MORE] Of this/these [Q28B RESPONSE] programmable thermostat(s), how many are…

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Proportion programmable	27	29	20	26	30	24	30	27	25	24	27	28	20	34	25	35	28	26	35	24	37	22	29	25
Proportion smart	3	5	3	1	3	3	5	4	1	4	3	3	4	5	3	4	4	3	5	2	5	2	2	2
WEIGHTED SAMPLE SIZE (#)	**893**	**390**	**135**	**368**	**437**	**454**	**206**	**284**	**403**	**236**	**587**	**611**	**282**	**389**	**512**	**231**	**416**	**477**	**201**	**692**	**148**	**156**	**129**	**147**
UNWEIGHTED SAMPLE SIZE (#)	**897**	**422**	**125**	**350**	**417**	**477**	**175**	**290**	**432**	**219**	**602**	**617**	**280**	**391**	**513**	**237**	**419**	**478**	**199**	**698**	**151**	**155**	**136**	**144**

TABLE 29A:

How many, if any, of the following does your home have?

Dehumidifier

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	51	54	43	50	50	51	55	51	48	60	48	42	68	42	51	45	47	54	44	53	49	42	28	46
1	41	40	48	41	42	41	35	41	45	32	45	50	24	49	41	47	45	39	48	39	43	51	63	46
2 or more	5	4	7	5	5	5	3	5	5	3	6	6	2	5	4	7	6	4	6	4	6	6	8	6
Don't know	3	3	2	4	4	3	6	3	2	5	2	2	6	3	3	2	3	3	2	4	2	2	1	2
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	.5	.5	.6	.6	.5	.5	.5	.5	.6	.4	.6	.6	.3	.6	.5	.7	.6	.5	.6	.5	.6	.6	.8	.7

Responses of 'Don't know' were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 29B:

How many, if any, of the following does your home have?

Clothes line

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	42	51	45	32	44	41	50	41	38	42	43	33	60	35	43	37	36	47	38	43	53	33	22	24
1	53	44	49	63	51	54	45	53	57	49	53	61	36	59	52	59	59	47	56	52	44	64	71	67
2 or more	3	2	4	3	2	4	2	4	3	5	2	4	2	4	3	3	4	3	4	3	3	2	5	5
Don't know	2	3	2	2	3	1	3	2	2	4	2	2	3	2	3	2	2	2	2	2	1	2	1	4
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	.6	.5	.6	.7	.6	.6	.5	.6	.7	.7	.6	.7	.4	.7	.6	.7	.7	.5	.7	.6	.5	.7	.8	.8

Responses of 'Don't know' were excluded from calculation of the mean.

TABLE 29C:

How many, if any, of the following does your home have?

Wood stove

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	74	84	75	64	71	77	74	77	73	75	75	67	89	78	73	71	70	78	71	75	78	61	60	69
1	23	12	22	34	26	20	21	21	24	21	22	30	8	20	23	26	27	19	25	22	19	36	37	26
2 or more	1	1	1	1	1	1	2	0	1	1	1	1	0	0	1	1	1	1	2	1	0	1	2	3
Don't know	2	3	2	1	2	2	4	1	2	3	2	2	3	2	3	2	2	2	2	2	3	2	1	2
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	.3	.1	.2	.4	.3	.2	.3	.2	.3	.2	.2	.3	.1	.2	.3	.3	.3	.2	.3	.2	.2	.4	.4	.3

Responses of 'Don't know' were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 30:

Please walk around your home and count all light bulbs, including those in closets, attics, garages, outdoor lights, etc. Please take note of how many bulbs are LED, how many screw into traditional light sockets, how many have a special screw-in base, how many are linear fluorescents (i.e., tube lights), and how many are smart lights.

Next, please indicate the total number of lightbulbs you have:

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
1-10	12	14	14	10	14	11	21	12	7	24	8	6	26	10	13	7	11	14	12	12	6	5	2	9
11-20	29	27	29	30	28	29	37	29	24	40	25	23	41	28	30	21	25	32	26	29	22	21	24	22
21-30	23	23	26	22	21	25	23	20	25	18	25	26	17	26	23	24	26	20	30	21	24	25	25	29
31-40	13	13	14	13	13	13	4	16	16	8	15	17	5	15	12	17	13	12	13	13	13	17	20	20
41-50	7	6	8	7	7	7	3	7	9	2	9	9	2	6	7	11	8	6	4	8	12	9	8	9
51 or more	10	10	5	11	11	9	4	9	14	4	13	14	1	9	10	16	13	7	13	9	19	17	15	8
Don't know	6	6	4	7	5	7	8	7	5	4	6	5	9	6	4	4	5	8	2	7	4	5	5	3
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	26.0	25.6	24.5	27.0	26.2	25.8	19.0	26.0	29.9	19.0	28.9	30.5	16.5	27.1	25.9	31.7	28.1	24.2	26.8	25.8	32.3	32.1	31.4	28.6

Responses of 'Don't know' or above 85 were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 31B:

[IF Q30 NOT 'Don't know'] Next, please indicate…

How many are LED bulbs?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	10	8	9	11	10	9	14	8	8	14	8	7	15	11	7	6	5	13	6	11	6	4	8	11
1-10	35	36	31	35	37	33	46	31	31	42	32	27	51	33	35	29	33	36	33	35	21	27	26	33
11-20	25	23	26	26	25	25	21	27	25	26	24	28	18	23	28	27	28	22	29	24	25	30	32	23
21-30	14	14	15	14	14	14	6	14	18	6	17	17	8	19	12	16	15	13	18	13	17	16	16	19
31-40	6	8	4	4	5	6	1	10	5	3	6	8	1	6	5	6	7	5	4	6	10	5	9	8
41-50	4	3	2	5	4	3	1	3	5	1	5	5	1	3	4	8	5	2	5	3	8	7	5	0
51 or more	3	3	3	3	4	3	0	4	4	2	3	4	0	3	4	7	4	2	5	3	7	8	2	1
Don't know	5	5	9	3	2	7	10	2	3	6	4	4	5	3	5	2	3	6	2	5	6	3	3	5
WEIGHTED SAMPLE SIZE (#)	**939**	**408**	**139**	**392**	**452**	**484**	**223**	**303**	**413**	**251**	**603**	**639**	**300**	**397**	**547**	**248**	**433**	**505**	**215**	**723**	**160**	**160**	**135**	**151**
UNWEIGHTED SAMPLE SIZE (#)	**936**	**435**	**128**	**373**	**425**	**508**	**186**	**308**	**442**	**237**	**611**	**643**	**293**	**399**	**547**	**256**	**436**	**500**	**212**	**724**	**161**	**159**	**142**	**148**
MEAN	15.8	16.0	15.7	15.5	15.5	16.0	9.6	17.7	17.4	11.2	17.4	18.9	9.0	16.0	16.2	20.0	17.8	14.0	17.5	15.2	22.6	21.2	17.4	15.1

Responses of 'Don't know' or above 85 were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 31C:

[IF Q30 NOT 'Don't know'] How many have a base sized like a normal light bulb, that is, they screw into your regular light sockets?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	4	5	1	5	6	3	3	3	5	5	4	4	4	3	5	3	3	5	4	4	5	5	5	3
1-10	25	30	28	20	26	25	37	23	21	38	20	18	42	23	26	18	23	28	26	25	17	13	15	20
11-20	28	25	33	29	29	27	34	29	24	28	29	25	34	28	29	23	28	28	28	28	23	29	30	21
21-30	19	16	21	21	17	20	12	17	23	11	21	23	10	24	16	21	19	18	21	18	22	17	20	32
31-40	10	12	6	10	9	11	5	13	11	5	12	13	4	11	9	11	12	9	7	11	11	13	21	11
41-50	4	3	4	6	5	4	1	3	7	4	4	6	0	5	4	9	5	4	5	4	8	6	5	6
51 or more	4	4	2	3	4	3	0	4	5	1	5	5	1	3	4	7	5	2	4	3	8	9	2	1
Don't know	6	5	5	6	4	7	9	6	4	8	4	6	4	3	7	7	5	6	5	6	6	8	2	5
WEIGHTED SAMPLE SIZE (#)	**939**	**408**	**139**	**392**	**452**	**484**	**223**	**303**	**413**	**251**	**603**	**639**	**300**	**397**	**547**	**248**	**433**	**505**	**215**	**723**	**160**	**160**	**135**	**151**
UNWEIGHTED SAMPLE SIZE (#)	**936**	**435**	**128**	**373**	**425**	**508**	**186**	**308**	**442**	**237**	**611**	**643**	**293**	**399**	**547**	**256**	**436**	**500**	**212**	**724**	**161**	**159**	**142**	**148**
MEAN	19.2	18.4	18.7	20.2	18.7	19.7	13.2	20.3	21.5	14.5	21.1	22.4	12.7	20.1	18.8	23.9	20.6	18.0	19.2	19.2	23.8	24.2	22.2	20.9

Responses of 'Don't know' or above 85 were excluded from calculation of the mean.

TABLE 31D:

[IF Q30 NOT 'Don't know'] How many have a specialty base? For example, a candelabra or are pin based?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	49	51	50	48	48	50	50	52	47	49	50	43	62	50	49	44	48	51	52	48	44	42	46	42
1-10	33	32	31	35	33	33	28	33	36	33	32	36	27	35	31	37	34	33	30	34	31	38	40	38
11-20	7	7	4	8	7	6	7	6	6	5	8	9	1	6	7	7	9	4	7	7	10	10	9	9
21-30	1	1	1	1	1	1	0	0	2	0	1	1	0	1	1	2	1	1	2	1	2	0	2	1
31-40	0	0	0	1	1	0	0	1	0	0	1	0	0	0	1	0	0	0	0	0	1	1	0	0
41-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
51 or more	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Don't know	9	9	14	8	9	10	14	8	8	13	8	9	10	8	11	10	8	11	9	10	11	9	4	10
WEIGHTED SAMPLE SIZE (#)	**939**	**408**	**139**	**392**	**452**	**484**	**223**	**303**	**413**	**251**	**603**	**639**	**300**	**397**	**547**	**248**	**433**	**505**	**215**	**723**	**160**	**160**	**135**	**151**
UNWEIGHTED SAMPLE SIZE (#)	**936**	**435**	**128**	**373**	**425**	**508**	**186**	**308**	**442**	**237**	**611**	**643**	**293**	**399**	**547**	**256**	**436**	**500**	**212**	**724**	**161**	**159**	**142**	**148**
MEAN	3.1	3.1	2.6	3.3	3.5	2.8	2.5	2.9	3.6	2.2	3.6	3.9	1.4	3.1	3.3	3.4	3.6	2.7	3.2	3.1	4.4	4.0	3.7	3.6

Responses of 'Don't know' or above 85 were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 31E:

[IF Q31B NOT 'Don't know'] How many are smart lights, that is, they can be controlled over the internet via a smart phone or computer?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	86	84	87	89	84	89	82	82	92	87	86	86	87	87	83	82	87	86	81	88	76	84	94	91
1-10	9	12	6	7	13	6	17	13	3	8	10	9	10	8	13	14	11	8	16	7	15	12	5	4
11-20	1	0	0	1	1	0	0	2	0	1	0	1	0	1	0	0	0	1	0	1	1	2	0	0
21-30	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0
31-40	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
51 or more	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Don't know	4	3	5	3	3	4	1	4	4	2	3	4	2	4	3	4	2	5	2	4	8	1	1	4
WEIGHTED SAMPLE SIZE (#)	**896**	**390**	**126**	**380**	**443**	**450**	**200**	**297**	**399**	**237**	**577**	**611**	**285**	**385**	**518**	**242**	**419**	**477**	**212**	**684**	**150**	**156**	**131**	**143**
UNWEIGHTED SAMPLE SIZE (#)	**895**	**417**	**118**	**360**	**417**	**475**	**167**	**301**	**427**	**226**	**585**	**618**	**277**	**387**	**521**	**250**	**423**	**472**	**208**	**687**	**153**	**155**	**138**	**141**
MEAN	.5	.5	.8	.4	.6	.4	.4	.9	.2	.5	.5	.5	.4	.5	.6	.6	.5	.5	.8	.4	.6	1.0	.3	.3

Responses of 'Don't know' or above 85 were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 31F:

[IF Q31B LESS THAN Q30] How many are linear fluorescents (i.e., tube lights)?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	51	58	53	44	48	55	63	58	40	50	52	44	69	45	54	48	48	54	56	50	51	46	35	42
1-10	44	38	39	51	45	43	31	37	55	45	43	51	28	50	41	49	47	41	35	46	43	51	59	52
11-20	2	2	3	2	3	1	1	2	3	1	2	3	1	3	2	2	2	3	4	2	2	3	3	4
21-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
41-50	0	0	0	1	1	0	1	0	0	0	1	1	0	0	0	0	1	0	2	0	0	0	2	0
51 or more	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Don't know	2	2	6	1	3	1	4	3	1	4	1	2	2	2	3	1	3	2	3	2	4	1	1	3
WEIGHTED SAMPLE SIZE (#)	**723**	**303**	**109**	**311**	**350**	**370**	**184**	**215**	**324**	**192**	**472**	**499**	**223**	**320**	**414**	**187**	**330**	**393**	**160**	**563**	**108**	**126**	**108**	**134**
UNWEIGHTED SAMPLE SIZE (#)	**712**	**324**	**96**	**292**	**323**	**386**	**151**	**216**	**345**	**177**	**474**	**497**	**215**	**319**	**413**	**194**	**328**	**384**	**157**	**555**	**107**	**126**	**113**	**128**
MEAN	1.8	1.3	1.3	2.4	2.2	1.3	1.7	1.2	2.2	1.2	1.9	2.2	.7	1.9	1.5	1.8	2.1	1.5	2.2	1.6	2.1	1.9	3.2	2.1

Responses of 'Don't know' or above 85 were excluded from calculation of the mean.

TABLE 31B-F (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

[IF Q30 NOT 'Don't know'] Next, please indicate…

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Q31C. Proportion with a normal base	72	70	72	73	69	75	69	77	69	76	71	71	77	73	71	73	71	73	70	73	69	71	69	75
Q31B. Proportion LED	59	61	64	56	59	60	50	67	58	57	59	60	55	59	61	60	63	55	63	58	65	65	56	52
Q31D. Proportion with specialty base	11	12	9	11	13	10	12	10	12	10	12	12	7	11	12	11	12	10	12	11	13	12	12	11
Q31F. Proportion linear fluorescent	5	4	3	7	6	4	8	3	5	5	5	6	3	6	4	4	5	5	6	5	4	4	8	6
Q31E. Proportion smart lights	2	2	4	1	2	2	2	4	1	3	2	2	2	2	2	2	2	2	3	2	2	3	1	1
WEIGHTED SAMPLE SIZE (#)	**756**	**330**	**103**	**323**	**377**	**377**	**171**	**250**	**336**	**197**	**496**	**513**	**243**	**337**	**430**	**197**	**369**	**387**	**180**	**576**	**116**	**133**	**119**	**122**
UNWEIGHTED SAMPLE SIZE (#)	**758**	**357**	**97**	**304**	**358**	**398**	**142**	**253**	**363**	**190**	**503**	**520**	**238**	**338**	**433**	**206**	**372**	**386**	**177**	**581**	**119**	**134**	**126**	**119**

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 31aa:

How many of the following are in your home?

Manual light dimmers

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	54	49	59	58	48	60	61	57	49	65	52	46	71	54	52	46	52	56	43	58	36	46	51	48
1	18	19	18	18	21	17	11	17	24	16	19	22	11	21	18	25	19	18	21	18	20	23	25	24
2	11	14	7	10	13	10	9	11	13	9	12	14	6	12	12	13	13	10	15	10	13	19	13	13
3	3	4	2	3	5	2	4	3	3	2	4	4	1	2	3	7	4	3	5	3	6	4	4	3
4	3	2	5	3	3	3	2	3	4	2	4	4	1	4	4	2	3	3	5	2	4	1	4	7
5 or more	6	8	3	4	5	6	6	5	6	3	7	7	4	5	6	5	6	6	8	5	15	5	3	3
Don't know	4	4	6	4	5	3	8	4	2	4	3	3	5	3	4	1	4	4	3	4	5	3	1	3
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	1.1	1.3	.8	.9	1.2	.9	1.1	1.0	1.1	.6	1.2	1.3	.6	1.0	1.2	1.3	1.2	1.0	1.5	.9	2.0	1.1	1.0	1.1

Responses of 'Don't know' or above 15 were excluded from calculation of the mean.

TABLE 31ab:

How many of the following are in your home?

Indoor motion sensors that activate/turn off lights

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	92	90	92	93	92	92	87	92	94	89	94	92	92	92	90	92	90	93	91	92	89	93	92	95
1	3	5	4	2	3	3	4	4	3	4	3	4	3	4	4	5	4	3	4	3	4	3	5	2
2	1	2	0	1	1	1	2	1	1	1	1	1	1	0	2	2	1	1	2	1	1	1	1	0
3	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0	1	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
5 or more	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Don't know	3	3	4	3	4	3	6	3	1	4	2	3	4	3	3	1	4	3	2	4	4	3	1	2
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	.1	.1	.0	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.1	.0

Responses of 'Don't know' or above 5 were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 31ac:

How many of the following are in your home?

Outdoor motion sensors that activate/turn off lights

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	66	68	64	64	62	69	72	67	62	72	65	59	81	62	63	56	59	72	64	66	60	58	53	59
1	19	16	22	22	22	17	16	19	21	17	20	23	12	22	21	26	23	17	20	19	21	25	24	25
2	9	9	6	9	8	9	4	10	11	4	10	12	2	11	9	13	10	7	11	8	12	11	16	10
3	1	1	2	1	2	0	0	0	2	0	1	2	0	2	1	1	1	1	1	1	1	3	2	2
4	1	1	0	1	1	0	0	1	1	1	1	1	0	1	1	1	1	0	1	1	0	0	2	1
5 or more	1	1	1	1	1	1	1	0	1	1	1	1	0	1	1	2	2	0	1	1	3	1	2	0
Don't know	3	4	4	3	3	3	7	3	2	4	2	3	5	3	3	1	4	3	3	4	3	2	0	3
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	.5	.5	.5	.5	.6	.4	.3	.5	.6	.4	.5	.6	.2	.6	.6	.7	.7	.4	.5	.5	.7	.7	.8	.6

Responses of 'Don't know' were excluded from calculation of the mean.

TABLE 32_1:

Before today, how familiar were you with:

Heat Pump Water Heaters

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	10	13	7	8	11	9	12	8	11	10	10	10	11	10	13	22	16	5	50	0	17	6	5	11
9	3	4	3	1	3	3	4	1	3	1	3	2	3	3	2	3	2	3	14	0	3	0	7	0
8	3	1	6	3	3	2	4	2	2	7	1	2	4	5	2	0	4	1	13	0	0	0	3	6
7	5	3	5	6	8	2	8	4	3	0	7	4	6	5	5	3	6	3	23	0	2	4	2	8
6	7	7	6	8	6	8	4	11	7	10	6	7	7	7	9	6	5	10	0	9	13	2	9	10
5	12	10	3	16	12	12	20	7	11	9	12	12	12	8	12	9	11	12	0	15	12	17	13	2
4	7	8	16	3	3	10	8	8	5	7	7	6	8	6	8	5	6	8	0	9	2	10	6	6
3	4	4	9	2	2	5	3	2	5	3	4	4	3	3	3	1	0	7	0	4	2	5	6	0
2	6	8	3	6	4	8	6	7	5	6	6	7	4	5	7	9	3	9	0	8	11	8	5	6
1	5	5	5	5	6	3	3	4	6	7	4	4	5	5	5	1	3	6	0	6	4	1	3	13
0 - Completely unfamiliar	39	37	36	42	40	38	27	46	42	40	40	41	36	43	34	43	43	36	0	49	34	47	40	39
WEIGHTED SAMPLE SIZE (#)	**252**	**107**	**34**	**111**	**122**	**129**	**68**	**81**	**103**	**64**	**159**	**163**	**89**	**111**	**141**	**69**	**121**	**131**	**51**	**201**	**38**	**50**	**40**	**30**
UNWEIGHTED SAMPLE SIZE (#)	**250**	**115**	**32**	**103**	**111**	**138**	**55**	**84**	**111**	**58**	**163**	**165**	**85**	**113**	**137**	**72**	**120**	**130**	**48**	**202**	**39**	**46**	**43**	**31**
TOP 3 (8-10)	16	18	17	13	17	15	21	11	16	19	14	14	18	19	17	24	22	9	77	0	20	6	15	17
MID 4 (4-7)	31	28	31	33	30	32	40	30	26	26	31	29	34	26	34	22	28	33	23	33	29	33	31	25
BOTTOM 4 (0-3)	54	53	52	54	53	54	39	59	59	56	55	57	48	55	49	53	50	57	0	67	51	61	54	58
MEAN	3.4	3.6	3.4	3.2	3.5	3.3	4.3	2.9	3.2	3.3	3.3	3.2	3.7	3.4	3.7	3.8	3.7	3.1	8.9	2.0	3.9	2.6	3.3	3.3

This question was randomly posed to approximately one in four respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 32_2:

Before today, how familiar were you with:

ENERGY STAR Mini Split Heat Pumps

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	10	8	9	13	12	9	5	11	13	12	10	15	1	6	11	25	18	5	41	0	16	27	8	4
9	4	6	0	3	5	2	5	6	1	4	4	4	2	3	4	5	8	1	14	0	2	2	4	7
8	7	7	4	7	12	2	10	1	8	6	6	8	3	6	6	14	13	2	26	0	8	5	18	8
7	5	2	9	6	7	2	2	4	7	6	5	6	2	6	4	5	6	4	19	0	9	2	4	11
6	5	2	2	9	6	4	7	5	3	2	7	5	4	5	7	10	10	1	0	7	9	5	4	4
5	12	13	8	13	12	12	9	13	14	10	12	14	7	17	10	15	13	12	0	16	15	14	13	15
4	5	8	5	3	4	6	8	3	5	3	6	5	6	5	5	5	6	4	0	7	9	2	4	5
3	8	3	20	8	3	12	14	8	4	7	8	5	14	11	6	2	4	10	0	10	1	6	9	1
2	2	2	2	2	3	2	1	2	3	1	2	2	3	3	3	4	1	3	0	3	2	0	0	4
1	6	6	5	6	4	8	6	6	5	4	7	4	9	6	5	0	3	8	0	8	0	7	7	6
0 - Completely unfamiliar	37	42	37	32	32	41	33	40	37	46	34	31	48	33	40	16	19	50	0	49	28	31	30	36
WEIGHTED SAMPLE SIZE (#)	**255**	**106**	**42**	**107**	**123**	**132**	**67**	**74**	**113**	**59**	**168**	**173**	**82**	**102**	**154**	**58**	**106**	**149**	**65**	**191**	**45**	**42**	**29**	**45**
UNWEIGHTED SAMPLE SIZE (#)	**252**	**112**	**41**	**99**	**113**	**138**	**60**	**73**	**119**	**57**	**164**	**176**	**76**	**99**	**153**	**63**	**104**	**148**	**63**	**189**	**47**	**45**	**29**	**42**
TOP 3 (8-10)	20	21	13	23	29	13	20	18	22	22	20	28	6	15	21	44	38	8	81	0	27	34	30	19
MID 4 (4-7)	27	25	24	30	29	24	25	25	29	21	30	30	20	33	26	34	35	22	19	30	42	22	25	34
BOTTOM 4 (0-3)	53	54	64	47	42	63	54	57	49	57	50	42	75	52	53	22	27	70	0	70	32	43	46	47
MEAN	3.7	3.4	3.2	4.1	4.4	2.9	3.6	3.4	3.8	3.4	3.8	4.4	2.1	3.5	3.6	6.1	5.5	2.3	8.8	1.9	4.8	4.8	4.2	3.7

This question was randomly posed to approximately one in four respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 32_3:

Before today, how familiar were you with:

Heat Pump Clothes Dryers

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	3	6	0	1	5	1	10	1	2	0	4	1	8	5	3	1	3	3	36	0	2	0	0	1
9	2	1	3	2	1	2	3	2	1	4	0	2	0	1	2	4	3	0	18	0	6	0	0	4
8	1	2	0	1	2	1	5	1	0	5	0	1	2	0	2	1	3	0	14	0	0	2	0	2
7	3	3	3	2	4	2	4	4	1	0	4	3	2	3	3	3	4	1	32	0	3	3	0	6
6	2	2	0	2	4	0	1	2	2	4	1	1	5	1	2	0	2	2	0	2	0	0	0	3
5	4	5	7	1	3	4	4	6	2	8	3	4	4	6	2	1	3	5	0	4	5	0	4	7
4	3	3	6	2	4	2	7	5	0	4	2	4	1	2	4	0	4	2	0	3	3	6	0	2
3	3	2	0	6	3	3	6	3	2	8	1	2	7	1	4	2	1	6	0	4	1	4	0	2
2	4	5	0	4	4	3	6	2	4	5	3	3	5	3	5	3	2	5	0	4	4	0	3	5
1	6	5	9	7	6	7	2	7	7	6	7	6	7	7	7	9	5	8	0	7	7	5	7	4
0 - Completely unfamiliar	69	65	73	74	63	74	52	67	78	56	74	74	57	70	66	76	70	69	0	76	70	81	86	65
WEIGHTED SAMPLE SIZE (#)	**248**	**115**	**35**	**98**	**111**	**137**	**45**	**94**	**108**	**67**	**158**	**174**	**73**	**119**	**134**	**63**	**123**	**124**	**22**	**226**	**40**	**40**	**39**	**42**
UNWEIGHTED SAMPLE SIZE (#)	**256**	**121**	**34**	**101**	**112**	**144**	**42**	**93**	**121**	**66**	**166**	**181**	**75**	**124**	**140**	**65**	**128**	**128**	**20**	**236**	**40**	**42**	**42**	**45**
TOP 3 (8-10)	6	10	3	3	8	4	18	3	3	9	4	4	10	6	8	6	9	3	68	0	7	2	0	7
MID 4 (4-7)	12	15	15	7	15	9	16	17	5	16	10	11	13	13	10	4	13	10	32	10	10	9	4	17
BOTTOM 4 (0-3)	82	76	82	90	77	87	65	80	92	75	86	85	77	81	82	90	78	87	0	90	83	90	96	76
MEAN	1.4	1.9	1.1	1.0	1.9	1.1	2.8	1.4	.8	2.0	1.2	1.1	2.1	1.4	1.5	1.0	1.7	1.2	8.6	.7	1.4	.7	.3	1.8

This question was randomly posed to approximately one in four respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 32_4:

Before today, how familiar were you with:

Energy Efficient Clothes Washers

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	13	13	20	10	10	16	8	13	15	12	14	14	10	11	16	11	21	7	38	0	11	7	15	27
9	4	7	3	2	3	5	3	6	4	3	5	5	3	4	3	6	5	4	13	0	2	8	9	5
8	7	9	6	7	9	6	1	10	9	4	6	8	7	12	6	7	14	2	22	0	6	4	10	11
7	9	12	20	3	10	8	11	11	6	6	11	10	8	10	8	11	11	8	27	0	15	8	9	9
6	12	10	6	16	9	15	4	16	14	9	12	14	8	9	14	22	7	15	0	18	18	21	3	10
5	19	20	13	19	20	16	23	11	21	20	19	22	13	19	19	22	18	19	0	28	28	17	29	11
4	8	8	6	9	11	6	16	6	6	11	9	7	11	5	10	5	4	11	0	13	8	10	4	6
3	9	9	0	12	8	10	12	14	4	13	8	6	14	10	7	7	8	10	0	14	0	7	10	8
2	3	4	3	2	5	2	4	3	3	3	2	4	2	4	4	0	1	4	0	5	5	4	2	3
1	3	1	6	4	3	3	6	1	3	1	2	2	4	1	2	1	0	5	0	4	2	2	3	3
0 - Completely unfamiliar	13	8	17	16	12	13	13	10	14	19	10	8	20	14	10	7	10	14	0	19	4	12	7	8
WEIGHTED SAMPLE SIZE (#)	**247**	**107**	**33**	**107**	**121**	**124**	**62**	**76**	**109**	**71**	**154**	**162**	**85**	**91**	**143**	**67**	**104**	**144**	**83**	**164**	**44**	**37**	**34**	**38**
UNWEIGHTED SAMPLE SIZE (#)	**244**	**116**	**28**	**100**	**114**	**128**	**45**	**83**	**116**	**65**	**158**	**159**	**85**	**92**	**143**	**68**	**106**	**138**	**87**	**157**	**43**	**37**	**36**	**35**
TOP 3 (8-10)	24	29	29	19	22	27	12	29	28	19	26	27	20	27	25	25	40	13	73	0	19	19	34	42
MID 4 (4-7)	48	49	44	48	51	45	54	43	48	45	52	53	39	43	51	60	40	54	27	58	70	56	44	36
BOTTOM 4 (0-3)	28	22	26	34	27	27	34	27	24	35	22	20	41	29	24	16	20	33	0	42	11	25	22	22
MEAN	5.2	5.7	5.5	4.7	5.1	5.4	4.5	5.6	5.4	4.6	5.6	5.7	4.4	5.2	5.4	5.9	6.2	4.5	8.6	3.5	5.8	5.1	5.9	6.3

This question was randomly posed to approximately one in four respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 35A:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing new [ITEM SEEN IN Q32].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $1,000 if the project saved $[100] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	29	30	29	29	29	30	34	33	23	26	30	29	29	23	29	25	29	29	39	26	38	30	26	23
No	71	70	71	71	71	70	66	67	77	74	70	71	71	77	71	75	71	71	61	74	62	70	74	77
WEIGHTED SAMPLE SIZE (#)	**501**	**222**	**73**	**207**	**261**	**238**	**140**	**160**	**202**	**142**	**330**	**336**	**165**	**208**	**297**	**138**	**236**	**266**	**125**	**376**	**91**	**86**	**62**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**493**	**235**	**66**	**192**	**243**	**248**	**111**	**162**	**220**	**129**	**334**	**336**	**157**	**206**	**289**	**145**	**233**	**260**	**123**	**370**	**96**	**84**	**62**	**80**

This table excludes those who responded 'Don't know' to any of Q35a-i.

TABLE 35B:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing new [ITEM SEEN IN Q32].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $1,000 if the project saved $[250] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	41	43	46	37	45	37	43	46	36	35	44	44	35	37	39	43	44	38	55	36	52	42	46	40
No	59	57	54	63	55	63	57	54	64	65	56	56	65	63	61	57	56	62	45	64	48	58	54	60
WEIGHTED SAMPLE SIZE (#)	**501**	**222**	**73**	**207**	**261**	**238**	**140**	**160**	**202**	**142**	**330**	**336**	**165**	**208**	**297**	**138**	**236**	**266**	**125**	**376**	**91**	**86**	**62**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**493**	**235**	**66**	**192**	**243**	**248**	**111**	**162**	**220**	**129**	**334**	**336**	**157**	**206**	**289**	**145**	**233**	**260**	**123**	**370**	**96**	**84**	**62**	**80**

This table excludes those who responded 'Don't know' to any of Q35a-i.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 35C:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing new [ITEM SEEN IN Q32].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $1,000 if the project saved $[400] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	52	55	61	45	55	49	55	54	49	42	57	57	41	49	52	55	56	49	68	47	65	52	61	54
No	48	45	39	55	45	51	45	46	51	58	43	43	59	51	48	45	44	51	32	53	35	48	39	46
WEIGHTED SAMPLE SIZE (#)	**501**	**222**	**73**	**207**	**261**	**238**	**140**	**160**	**202**	**142**	**330**	**336**	**165**	**208**	**297**	**138**	**236**	**266**	**125**	**376**	**91**	**86**	**62**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**493**	**235**	**66**	**192**	**243**	**248**	**111**	**162**	**220**	**129**	**334**	**336**	**157**	**206**	**289**	**145**	**233**	**260**	**123**	**370**	**96**	**84**	**62**	**80**

This table excludes those who responded 'Don't know' to any of Q35a-i.

TABLE 35D:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing new [ITEM SEEN IN Q32].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $1,000 if the project saved $[550] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	61	62	71	56	65	56	70	61	55	56	65	67	50	62	61	69	64	59	77	56	75	63	65	64
No	39	38	29	44	35	44	30	39	45	44	35	33	50	38	39	31	36	41	23	44	25	37	35	36
WEIGHTED SAMPLE SIZE (#)	**501**	**222**	**73**	**207**	**261**	**238**	**140**	**160**	**202**	**142**	**330**	**336**	**165**	**208**	**297**	**138**	**236**	**266**	**125**	**376**	**91**	**86**	**62**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**493**	**235**	**66**	**192**	**243**	**248**	**111**	**162**	**220**	**129**	**334**	**336**	**157**	**206**	**289**	**145**	**233**	**260**	**123**	**370**	**96**	**84**	**62**	**80**

This table excludes those who responded 'Don't know' to any of Q35a-i.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 35E:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing new [ITEM SEEN IN Q32].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $1,000 if the project saved $[700] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	69	70	78	65	73	64	81	70	59	63	73	73	61	67	69	77	71	67	83	64	85	69	69	70
No	31	30	22	35	27	36	19	30	41	37	27	27	39	33	31	23	29	33	17	36	15	31	31	30
WEIGHTED SAMPLE SIZE (#)	**501**	**222**	**73**	**207**	**261**	**238**	**140**	**160**	**202**	**142**	**330**	**336**	**165**	**208**	**297**	**138**	**236**	**266**	**125**	**376**	**91**	**86**	**62**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**493**	**235**	**66**	**192**	**243**	**248**	**111**	**162**	**220**	**129**	**334**	**336**	**157**	**206**	**289**	**145**	**233**	**260**	**123**	**370**	**96**	**84**	**62**	**80**

This table excludes those who responded 'Don't know' to any of Q35a-i.

TABLE 35F:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing new [ITEM SEEN IN Q32].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $1,000 if the project saved $[850] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	72	74	81	67	75	68	84	74	63	66	76	77	62	70	73	82	74	71	85	68	87	74	75	74
No	28	26	19	33	25	32	16	26	37	34	24	23	38	30	27	18	26	29	15	32	13	26	25	26
WEIGHTED SAMPLE SIZE (#)	**501**	**222**	**73**	**207**	**261**	**238**	**140**	**160**	**202**	**142**	**330**	**336**	**165**	**208**	**297**	**138**	**236**	**266**	**125**	**376**	**91**	**86**	**62**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**493**	**235**	**66**	**192**	**243**	**248**	**111**	**162**	**220**	**129**	**334**	**336**	**157**	**206**	**289**	**145**	**233**	**260**	**123**	**370**	**96**	**84**	**62**	**80**

This table excludes those who responded 'Don't know' to any of Q35a-i.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 35G:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing new [ITEM SEEN IN Q32].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $1,000 if the project saved $[1000] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	78	78	87	75	82	74	89	81	70	71	82	85	65	78	79	88	79	77	86	76	93	84	82	83
No	22	22	13	25	18	26	11	19	30	29	18	15	35	22	21	12	21	23	14	24	7	16	18	17
WEIGHTED SAMPLE SIZE (#)	**501**	**222**	**73**	**207**	**261**	**238**	**140**	**160**	**202**	**142**	**330**	**336**	**165**	**208**	**297**	**138**	**236**	**266**	**125**	**376**	**91**	**86**	**62**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**493**	**235**	**66**	**192**	**243**	**248**	**111**	**162**	**220**	**129**	**334**	**336**	**157**	**206**	**289**	**145**	**233**	**260**	**123**	**370**	**96**	**84**	**62**	**80**

This table excludes those who responded 'Don't know' to any of Q35a-i.

TABLE 35H:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing new [ITEM SEEN IN Q32].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $1,000 if the project saved $[1150] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	81	83	89	77	84	78	91	84	73	72	86	88	69	82	82	89	84	79	88	79	94	85	88	84
No	19	17	11	23	16	22	9	16	27	28	14	12	31	18	18	11	16	21	12	21	6	15	12	16
WEIGHTED SAMPLE SIZE (#)	**501**	**222**	**73**	**207**	**261**	**238**	**140**	**160**	**202**	**142**	**330**	**336**	**165**	**208**	**297**	**138**	**236**	**266**	**125**	**376**	**91**	**86**	**62**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**493**	**235**	**66**	**192**	**243**	**248**	**111**	**162**	**220**	**129**	**334**	**336**	**157**	**206**	**289**	**145**	**233**	**260**	**123**	**370**	**96**	**84**	**62**	**80**

This table excludes those who responded 'Don't know' to any of Q35a-i.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 35I:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing new [ITEM SEEN IN Q32].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $1,000 if the project saved $[1300] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	83	84	90	79	85	81	92	86	74	74	88	89	71	85	84	89	85	81	89	81	95	87	88	86
No	17	16	10	21	15	19	8	14	26	26	12	11	29	15	16	11	15	19	11	19	5	13	12	14
WEIGHTED SAMPLE SIZE (#)	**501**	**222**	**73**	**207**	**261**	**238**	**140**	**160**	**202**	**142**	**330**	**336**	**165**	**208**	**297**	**138**	**236**	**266**	**125**	**376**	**91**	**86**	**62**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**493**	**235**	**66**	**192**	**243**	**248**	**111**	**162**	**220**	**129**	**334**	**336**	**157**	**206**	**289**	**145**	**233**	**260**	**123**	**370**	**96**	**84**	**62**	**80**

This table excludes those who responded 'Don't know' to any of Q35a-i.

TABLE 33_1:

Before today, how familiar were you with:

Networked/Connected – Indoor LED lights (i.e., smart light bulbs)

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	7	6	22	2	9	5	0	13	9	5	6	8	6	3	9	6	28	0	18	4	10	17	0	7
9	3	4	0	5	1	6	6	2	3	4	3	5	0	5	3	10	13	0	0	4	4	6	7	0
8	5	5	9	3	5	5	4	5	6	12	3	4	7	5	3	6	19	0	7	4	7	0	11	0
7	11	7	17	14	11	11	23	11	4	10	11	12	9	15	12	2	41	0	3	13	18	7	17	7
6	7	8	0	7	8	5	6	15	2	13	4	3	13	16	4	2	0	9	7	6	0	0	0	12
5	13	12	11	15	17	9	21	6	13	4	17	17	6	5	17	20	0	18	13	13	26	15	0	28
4	9	10	10	6	11	6	6	7	12	7	10	9	7	6	8	9	0	12	12	8	8	18	10	0
3	4	5	0	5	5	3	8	0	4	0	5	5	2	5	3	12	0	5	7	3	3	0	11	11
2	8	8	0	13	10	7	7	2	13	9	8	6	12	9	8	8	0	11	4	10	7	0	6	14
1	6	5	5	8	10	1	0	0	14	6	6	8	2	7	7	6	0	8	5	6	6	13	5	12
0 - Completely unfamiliar	26	30	26	22	13	43	20	40	22	29	27	22	35	24	26	19	0	36	22	28	9	23	33	7
WEIGHTED SAMPLE SIZE (#)	**108**	**52**	**19**	**37**	**59**	**49**	**30**	**31**	**47**	**28**	**76**	**69**	**38**	**37**	**71**	**30**	**29**	**79**	**24**	**84**	**20**	**16**	**11**	**16**
UNWEIGHTED SAMPLE SIZE (#)	**105**	**52**	**16**	**37**	**56**	**49**	**24**	**31**	**50**	**28**	**73**	**69**	**36**	**39**	**69**	**30**	**28**	**77**	**22**	**83**	**21**	**14**	**11**	**15**
TOP 3 (8-10)	16	15	30	10	16	16	10	20	17	22	12	17	13	13	15	21	59	0	26	13	22	22	18	7
MID 4 (4-7)	39	38	38	42	47	31	55	38	30	34	42	41	36	42	41	34	41	39	36	40	52	41	27	48
BOTTOM 4 (0-3)	45	48	32	48	38	53	35	43	53	44	46	42	50	45	44	45	0	61	39	47	26	37	56	45
MEAN	4.0	3.7	5.0	3.8	4.4	3.4	4.5	4.1	3.6	4.1	3.7	4.2	3.5	4.0	4.0	4.2	8.3	2.4	4.6	3.8	5.2	4.3	3.6	4.1

This question was randomly posed to approximately one in nine respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 33_2:

Before today, how familiar were you with:

LED Screw-in General Service Lights (i.e., LED light that screw into your existing sockets)

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	39	37	31	43	43	36	41	27	48	47	39	39	40	47	42	44	59	0	47	37	31	37	39	47
9	12	10	0	16	11	13	0	9	19	3	11	11	13	14	9	12	18	0	24	9	15	6	22	0
8	8	8	19	7	7	9	0	13	7	10	9	7	11	7	8	15	12	0	8	8	8	7	12	0
7	8	13	20	0	9	6	6	12	5	11	8	10	0	9	8	4	11	0	9	7	4	10	7	28
6	7	6	18	6	4	10	11	6	7	13	7	8	5	3	8	8	0	22	0	9	14	4	5	7
5	10	8	0	14	13	7	16	15	4	3	11	12	6	2	9	17	0	30	12	10	15	10	15	0
4	8	8	0	9	10	6	6	11	6	8	4	6	14	15	5	0	0	23	0	10	3	9	0	18
3	2	4	0	1	4	1	9	2	0	0	4	3	0	0	4	0	0	7	0	3	7	4	0	0
2	2	3	0	1	0	4	7	2	0	0	3	0	8	1	0	0	0	6	0	2	0	0	0	0
1	1	2	0	0	0	1	0	0	2	0	1	1	0	0	1	0	0	2	0	1	0	4	0	0
0 - Completely unfamiliar	3	2	12	3	0	6	5	2	4	4	4	3	3	2	6	0	0	10	0	4	3	9	0	0
WEIGHTED SAMPLE SIZE (#)	**101**	**44**	**8**	**48**	**47**	**54**	**19**	**36**	**45**	**21**	**68**	**74**	**26**	**47**	**55**	**31**	**67**	**34**	**20**	**80**	**26**	**18**	**16**	**11**
UNWEIGHTED SAMPLE SIZE (#)	**102**	**48**	**8**	**46**	**45**	**57**	**14**	**38**	**50**	**20**	**70**	**74**	**28**	**47**	**56**	**33**	**68**	**34**	**21**	**81**	**23**	**19**	**16**	**11**
TOP 3 (8-10)	59	54	50	65	60	58	41	50	73	61	60	57	65	68	59	71	89	0	79	54	54	50	72	47
MID 4 (4-7)	33	36	38	29	36	30	39	44	21	35	29	36	24	29	29	29	11	75	21	36	36	33	28	53
BOTTOM 4 (0-3)	8	10	12	6	4	13	21	6	6	4	11	8	11	3	12	0	0	25	0	11	10	18	0	0
MEAN	7.5	7.4	7.1	7.7	7.8	7.2	6.6	7.1	8.2	7.9	7.5	7.5	7.4	8.0	7.4	8.3	9.2	4.1	8.7	7.2	7.3	6.7	8.4	7.8

This question was randomly posed to approximately one in nine respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 33_3:

Before today, how familiar were you with:

Smart Power Bars

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	9	9	15	5	11	8	9	13	7	10	10	9	8	6	11	10	37	0	19	7	12	0	9	12
9	6	2	13	5	6	6	0	4	9	8	5	7	4	4	8	13	24	0	17	3	4	0	16	6
8	3	5	0	4	1	6	0	3	5	10	1	4	2	4	4	0	14	0	4	3	8	4	0	4
7	6	2	8	8	6	4	0	17	2	7	5	6	6	10	6	0	25	0	16	4	5	0	0	13
6	4	2	3	6	7	1	0	10	2	0	6	5	3	4	4	3	0	5	6	3	12	8	0	0
5	12	16	8	11	17	8	13	3	17	18	10	9	19	10	11	10	0	16	5	13	6	19	11	0
4	2	5	0	0	3	0	0	4	1	0	2	1	4	3	2	2	0	2	0	2	0	0	0	3
3	9	7	7	11	7	10	4	13	8	10	9	9	8	7	6	17	0	11	5	9	14	0	14	8
2	7	12	4	4	4	8	16	9	1	8	5	7	6	6	9	3	0	9	10	6	12	10	0	9
1	8	10	4	8	7	10	12	0	11	0	11	9	6	5	12	9	0	11	0	10	8	28	3	0
0 - Completely unfamiliar	35	29	38	38	31	40	46	25	37	29	37	36	34	41	27	32	0	46	18	39	18	32	47	45
WEIGHTED SAMPLE SIZE (#)	**93**	**32**	**24**	**38**	**46**	**45**	**19**	**27**	**48**	**26**	**60**	**65**	**28**	**47**	**46**	**25**	**23**	**71**	**17**	**76**	**14**	**15**	**17**	**17**
UNWEIGHTED SAMPLE SIZE (#)	**101**	**40**	**23**	**38**	**45**	**54**	**19**	**30**	**52**	**24**	**67**	**71**	**30**	**50**	**51**	**28**	**25**	**76**	**19**	**82**	**17**	**16**	**18**	**18**
TOP 3 (8-10)	18	16	28	14	18	19	9	20	20	28	15	20	15	14	22	23	75	0	40	13	24	4	25	22
MID 4 (4-7)	24	26	19	25	33	13	13	33	22	25	22	20	32	27	24	15	25	23	28	23	24	27	11	16
BOTTOM 4 (0-3)	58	59	53	61	49	68	78	47	57	47	62	60	54	59	54	61	0	77	32	64	52	69	64	62
MEAN	3.5	3.3	4.1	3.2	3.9	3.1	2.1	4.5	3.4	4.4	3.2	3.5	3.5	3.3	3.9	3.6	8.7	1.8	5.8	3.0	4.4	2.2	3.3	3.5

This question was randomly posed to approximately one in nine respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 33_4:

Before today, how familiar were you with:

Dimmer Switches

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	36	41	37	32	33	40	31	37	39	32	40	39	32	37	38	32	59	0	53	31	36	44	35	48
9	12	9	20	12	12	11	2	16	13	17	11	17	3	9	15	16	19	0	22	8	12	19	18	16
8	5	6	0	6	5	6	11	3	4	3	6	5	6	6	5	8	9	0	6	5	5	3	6	8
7	9	12	5	6	11	6	4	12	8	8	10	9	8	14	5	6	14	0	7	9	8	14	3	10
6	6	2	11	9	8	5	0	10	7	8	5	7	6	12	3	5	0	17	0	9	0	3	6	6
5	11	5	0	19	14	7	11	12	9	5	12	9	13	7	14	14	0	28	2	14	18	5	14	4
4	6	10	0	3	3	9	11	4	4	10	1	3	10	5	7	0	0	15	0	7	8	0	0	4
3	2	2	5	2	2	3	2	1	3	4	2	2	4	1	3	3	0	6	0	3	5	0	0	3
2	3	2	0	5	2	5	0	0	8	4	3	4	2	5	1	5	0	9	0	5	8	0	10	0
1	1	0	0	2	0	2	0	0	2	0	1	1	0	0	2	0	0	2	0	1	0	6	0	0
0 - Completely unfamiliar	9	11	23	3	11	6	27	4	2	9	8	5	15	4	9	12	0	22	11	8	0	6	9	0
WEIGHTED SAMPLE SIZE (#)	**124**	**52**	**14**	**59**	**65**	**60**	**28**	**47**	**50**	**29**	**80**	**77**	**47**	**57**	**72**	**24**	**77**	**47**	**32**	**92**	**15**	**19**	**19**	**19**
UNWEIGHTED SAMPLE SIZE (#)	**125**	**57**	**13**	**55**	**62**	**63**	**22**	**47**	**56**	**28**	**81**	**80**	**45**	**59**	**72**	**25**	**82**	**43**	**31**	**94**	**15**	**20**	**20**	**19**
TOP 3 (8-10)	53	57	57	50	50	57	44	57	56	52	57	61	41	51	58	56	86	0	81	44	53	66	58	72
MID 4 (4-7)	31	28	15	38	36	27	26	38	28	32	28	27	38	38	28	24	14	60	9	39	35	22	23	24
BOTTOM 4 (0-3)	15	15	28	12	14	16	30	6	16	17	15	12	21	11	14	20	0	40	11	17	13	12	19	3
MEAN	7.0	7.1	6.6	7.0	6.9	7.1	5.5	7.7	7.2	6.9	7.3	7.6	6.1	7.3	7.1	6.8	9.2	3.4	8.3	6.6	7.2	7.8	7.0	8.4

This question was randomly posed to approximately one in nine respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 33_5:

Before today, how familiar were you with:

Programmable or Smart thermostats

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	14	12	16	14	19	9	7	5	22	21	11	15	11	15	14	20	38	0	39	7	10	6	31	14
9	4	12	0	0	3	5	3	3	6	4	3	6	0	7	2	2	12	0	13	2	3	10	0	13
8	7	12	6	4	4	10	13	5	6	3	9	7	9	7	9	12	21	0	14	6	3	12	3	4
7	10	9	9	11	16	5	7	12	10	4	15	9	13	8	10	2	28	0	4	11	10	7	20	0
6	14	14	17	14	17	12	7	28	10	7	20	16	10	9	23	21	0	22	5	17	26	19	10	12
5	16	25	16	8	9	19	11	29	9	12	18	17	11	15	13	9	0	24	9	17	15	12	4	34
4	6	6	6	5	2	9	9	2	6	4	6	5	7	10	2	9	0	9	8	5	13	8	0	0
3	4	3	0	7	2	6	8	5	2	8	3	3	7	2	5	2	0	7	0	6	0	4	0	4
2	6	0	18	6	11	2	20	0	2	11	3	1	16	7	5	0	0	9	0	7	0	0	0	6
1	6	2	6	9	6	6	0	2	11	8	6	9	0	5	9	8	0	9	5	6	6	7	18	6
0 - Completely unfamiliar	13	5	6	21	9	16	13	7	16	19	6	12	15	15	7	14	0	20	3	15	14	16	13	6
WEIGHTED SAMPLE SIZE (#)	**106**	**40**	**18**	**49**	**49**	**57**	**26**	**30**	**50**	**29**	**66**	**74**	**33**	**43**	**58**	**28**	**37**	**69**	**23**	**83**	**20**	**16**	**17**	**18**
UNWEIGHTED SAMPLE SIZE (#)	**101**	**40**	**15**	**46**	**44**	**56**	**20**	**31**	**50**	**26**	**65**	**75**	**26**	**43**	**54**	**28**	**38**	**63**	**22**	**79**	**21**	**17**	**17**	**17**
TOP 3 (8-10)	25	36	22	18	27	24	23	14	33	28	23	28	20	29	25	34	72	0	65	14	16	28	34	32
MID 4 (4-7)	46	54	49	38	45	46	36	72	35	27	59	48	42	42	49	41	28	55	27	51	64	45	34	46
BOTTOM 4 (0-3)	29	11	29	44	28	30	41	14	31	45	18	25	38	29	26	24	0	45	8	35	20	27	32	22
MEAN	5.2	6.3	5.2	4.4	5.6	4.9	4.6	5.5	5.4	4.7	5.7	5.4	4.8	5.2	5.5	5.5	8.6	3.4	7.6	4.6	5.1	5.1	5.8	5.7

This question was randomly posed to approximately one in nine respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 33_6:

Before today, how familiar were you with:

Occupancy Sensors

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	5	5	6	4	7	1	0	4	7	7	4	5	4	7	4	10	36	0	17	1	5	0	6	4
9	1	1	5	0	1	1	0	2	2	0	1	2	0	0	2	3	10	0	0	2	0	0	4	4
8	2	4	0	0	1	3	0	4	1	0	3	2	1	3	0	0	16	0	0	3	0	11	0	0
7	5	4	0	7	9	0	0	10	3	0	7	5	4	6	5	3	39	0	2	6	10	7	0	5
6	5	5	5	5	7	2	5	7	3	4	4	5	4	2	8	8	0	6	6	4	11	4	6	0
5	15	12	31	13	10	20	3	14	21	14	16	21	3	25	11	8	0	17	13	16	13	15	29	23
4	8	12	8	4	9	7	18	2	9	0	12	8	9	10	9	8	0	9	20	5	15	0	5	11
3	8	5	19	8	5	11	6	10	7	7	8	5	14	8	8	6	0	9	17	5	5	0	8	6
2	8	3	0	17	12	4	22	9	2	21	5	8	9	3	13	11	0	10	3	10	0	25	0	11
1	6	12	8	0	4	9	11	5	6	0	8	5	9	4	7	5	0	7	0	8	0	8	9	5
0 - Completely unfamiliar	37	37	18	42	34	40	36	33	40	46	32	34	42	31	34	38	0	42	21	41	41	30	33	31
WEIGHTED SAMPLE SIZE (#)	**116**	**54**	**14**	**48**	**62**	**54**	**23**	**42**	**51**	**27**	**76**	**79**	**37**	**55**	**65**	**27**	**15**	**101**	**25**	**91**	**20**	**16**	**18**	**21**
UNWEIGHTED SAMPLE SIZE (#)	**118**	**58**	**14**	**46**	**60**	**58**	**21**	**42**	**55**	**23**	**81**	**80**	**38**	**54**	**64**	**30**	**16**	**102**	**26**	**92**	**20**	**16**	**20**	**20**
TOP 3 (8-10)	8	10	11	4	9	6	0	10	10	7	8	9	6	10	6	13	61	0	17	5	5	11	9	7
MID 4 (4-7)	33	33	43	30	36	30	26	33	36	18	39	39	20	44	32	27	39	32	41	31	49	26	40	39
BOTTOM 4 (0-3)	59	56	46	67	55	64	74	57	54	74	53	52	74	46	62	60	0	68	41	64	46	63	50	54
MEAN	2.9	2.9	3.9	2.6	3.3	2.5	1.9	3.3	3.0	2.3	3.2	3.2	2.3	3.5	2.8	3.1	8.4	2.1	4.3	2.5	3.2	2.9	3.3	3.1

This question was randomly posed to approximately one in nine respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 33_7:

Before today, how familiar were you with:

Low flow Showerheads

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	30	27	24	36	31	29	14	45	29	34	23	30	29	31	30	29	49	0	54	25	22	38	20	33
9	5	4	6	7	6	4	0	7	7	2	8	6	2	4	5	7	9	0	7	5	0	15	11	0
8	13	12	0	19	14	11	12	7	17	14	14	13	11	10	17	23	21	0	18	12	26	15	17	5
7	13	12	6	16	16	9	16	13	10	6	17	14	10	15	10	15	21	0	9	13	6	14	18	20
6	7	6	12	6	4	10	10	5	6	4	9	8	2	10	5	14	0	17	6	7	8	5	15	11
5	8	11	9	5	9	8	10	2	11	6	11	9	8	6	11	9	0	21	0	10	12	5	8	11
4	9	12	15	3	6	12	6	6	12	11	8	6	15	9	9	4	0	22	0	11	8	5	11	5
3	3	2	12	0	4	2	7	4	0	7	2	3	4	7	2	0	0	7	0	4	0	0	0	10
2	2	4	0	0	0	3	2	0	2	0	1	1	2	0	1	0	0	4	6	1	9	0	0	0
1	2	0	12	0	4	0	7	0	0	7	0	3	0	0	3	0	0	5	0	2	0	0	0	0
0 - Completely unfamiliar	9	11	5	9	7	11	16	10	4	8	8	6	17	9	7	0	0	23	0	11	9	4	0	5
WEIGHTED SAMPLE SIZE (#)	**111**	**49**	**18**	**45**	**55**	**57**	**30**	**31**	**50**	**31**	**67**	**81**	**30**	**49**	**61**	**29**	**67**	**44**	**19**	**92**	**13**	**23**	**16**	**22**
UNWEIGHTED SAMPLE SIZE (#)	**109**	**52**	**16**	**41**	**48**	**61**	**26**	**31**	**52**	**29**	**67**	**77**	**32**	**46**	**62**	**30**	**65**	**44**	**21**	**88**	**14**	**20**	**19**	**18**
TOP 3 (8-10)	48	42	29	62	51	45	26	60	54	51	45	50	42	45	52	59	79	0	79	41	48	68	48	38
MID 4 (4-7)	36	41	43	29	34	38	42	26	40	28	45	37	34	40	35	41	21	60	14	41	34	28	52	47
BOTTOM 4 (0-3)	16	17	28	9	14	17	32	14	7	22	10	13	23	15	13	0	0	40	6	18	18	4	0	15
MEAN	6.7	6.3	5.5	7.5	7.0	6.4	5.1	7.4	7.1	6.5	6.8	7.0	5.9	6.7	6.8	7.8	8.9	3.3	8.6	6.3	6.3	8.0	7.3	6.8

This question was randomly posed to approximately one in nine respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 33_8:

Before today, how familiar were you with:

Low-Flow Faucet Aerators

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	20	21	0	25	18	20	11	12	31	10	23	23	14	18	26	32	39	0	34	14	25	28	25	10
9	4	2	0	8	4	5	0	4	8	8	3	6	2	6	4	2	9	0	12	2	0	8	0	11
8	10	9	16	8	18	5	13	4	13	12	11	7	15	7	3	9	19	0	25	4	0	0	21	11
7	16	20	8	14	23	12	32	12	9	11	17	13	22	22	9	7	32	0	8	19	15	8	9	23
6	5	3	17	2	2	6	0	11	2	0	6	7	0	0	6	12	0	9	8	3	15	5	0	9
5	13	19	0	10	9	15	22	19	3	24	9	7	24	11	19	15	0	26	5	16	9	13	6	0
4	4	5	0	4	7	2	0	3	8	0	7	6	0	2	5	2	0	8	6	3	4	9	7	5
3	5	3	27	0	2	7	0	7	7	0	7	6	3	10	5	0	0	10	0	7	11	3	9	6
2	3	2	7	2	8	0	0	2	6	6	3	4	1	5	3	0	0	6	3	3	0	5	0	11
1	2	1	5	3	0	4	2	6	0	0	3	4	0	4	2	5	0	5	0	3	8	0	12	0
0 - Completely unfamiliar	18	13	20	23	8	24	20	21	14	30	11	17	19	17	17	15	0	36	0	25	14	21	12	15
WEIGHTED SAMPLE SIZE (#)	**111**	**53**	**14**	**44**	**42**	**69**	**29**	**37**	**45**	**32**	**64**	**72**	**39**	**39**	**56**	**29**	**55**	**56**	**29**	**82**	**17**	**22**	**12**	**17**
UNWEIGHTED SAMPLE SIZE (#)	**108**	**53**	**15**	**40**	**38**	**70**	**24**	**38**	**46**	**33**	**61**	**71**	**37**	**40**	**55**	**29**	**51**	**57**	**28**	**80**	**16**	**21**	**12**	**17**
TOP 3 (8-10)	34	32	16	41	40	30	24	19	52	30	37	36	30	31	34	43	68	0	71	20	25	36	46	32
MID 4 (4-7)	38	48	25	30	42	35	54	45	22	35	39	33	47	34	39	37	32	43	27	42	43	36	22	36
BOTTOM 4 (0-3)	29	20	59	29	18	35	22	36	27	35	24	31	23	35	27	20	0	57	3	38	32	29	33	32
MEAN	5.6	5.9	3.9	5.7	6.3	5.1	5.5	4.7	6.4	4.8	6.0	5.6	5.6	5.5	5.7	6.3	8.6	2.6	8.0	4.7	5.4	5.6	5.7	5.6

This question was randomly posed to approximately one in nine respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 33_9:

Before today, how familiar were you with:

Outdoor Motion Sensors

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
10 - Completely familiar	30	23	19	42	29	31	28	32	30	34	29	34	25	27	33	32	47	0	41	27	29	43	26	32
9	8	10	7	6	3	11	3	4	15	10	6	10	4	10	6	11	12	0	9	7	6	3	15	22
8	16	10	31	18	30	6	28	13	8	17	17	15	18	19	14	18	25	0	37	10	18	15	3	19
7	10	8	18	10	16	6	5	13	12	9	11	13	5	11	10	9	16	0	3	12	10	17	28	0
6	5	6	6	4	5	6	2	10	3	4	5	5	6	6	6	8	0	15	6	5	5	0	7	12
5	12	17	13	7	9	15	11	8	18	11	15	12	13	14	10	9	0	34	0	16	21	7	7	10
4	4	6	7	1	1	7	6	6	1	5	3	3	6	6	5	0	0	12	0	5	6	0	3	5
3	3	4	0	1	0	4	2	2	4	0	3	0	6	1	2	6	0	7	0	3	0	0	0	0
2	4	6	0	2	3	4	3	0	7	0	6	4	4	0	4	6	0	10	0	5	0	11	0	0
1	3	5	0	2	4	2	0	9	0	6	2	0	8	4	4	0	0	8	0	4	0	0	0	0
0 - Completely unfamiliar	5	6	0	6	0	7	11	3	2	4	4	4	6	1	6	2	0	14	3	6	6	3	10	0
WEIGHTED SAMPLE SIZE (#)	**132**	**61**	**16**	**55**	**54**	**76**	**39**	**45**	**47**	**39**	**83**	**80**	**52**	**50**	**90**	**33**	**84**	**48**	**30**	**102**	**23**	**25**	**15**	**17**
UNWEIGHTED SAMPLE SIZE (#)	**133**	**64**	**15**	**54**	**52**	**80**	**32**	**45**	**56**	**35**	**86**	**84**	**49**	**50**	**90**	**35**	**85**	**48**	**28**	**105**	**22**	**27**	**17**	**18**
TOP 3 (8-10)	54	43	56	66	62	48	60	49	53	61	51	58	47	56	53	61	84	0	87	44	53	62	45	73
MID 4 (4-7)	32	37	44	23	31	33	24	37	34	30	34	34	29	38	31	25	16	61	10	38	41	24	45	27
BOTTOM 4 (0-3)	14	20	0	11	7	18	16	14	13	10	15	8	24	6	15	14	0	39	3	18	6	14	10	0
MEAN	7.0	6.3	7.5	7.6	7.6	6.6	6.7	6.9	7.2	7.3	6.9	7.5	6.2	7.3	6.9	7.4	8.9	3.6	8.5	6.5	7.1	7.6	7.1	8.1

This question was randomly posed to approximately one in nine respondents.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 34A:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed. An example might be [ITEM SEEN IN Q33].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $75 if the project saved $[15] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	37	33	48	37	38	35	39	36	36	44	35	34	42	32	35	28	42	32	46	33	33	37	26	37
No	63	67	52	63	62	65	61	64	64	56	65	66	58	68	65	72	58	68	54	67	67	63	74	63
WEIGHTED SAMPLE SIZE (#)	**511**	**220**	**75**	**215**	**268**	**241**	**147**	**160**	**204**	**134**	**338**	**343**	**167**	**215**	**300**	**144**	**245**	**266**	**139**	**371**	**98**	**91**	**58**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**504**	**234**	**68**	**202**	**244**	**258**	**118**	**164**	**222**	**122**	**342**	**346**	**158**	**215**	**294**	**149**	**243**	**261**	**133**	**371**	**102**	**90**	**59**	**80**

This table excludes those who responded 'Don't know' to any of Q34a-i.

TABLE 34B:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed. An example might be [ITEM SEEN IN Q33].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $75 if the project saved $[25] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	50	47	61	48	52	46	49	53	48	51	50	50	50	47	49	42	55	45	59	46	46	53	47	52
No	50	53	39	52	48	54	51	47	52	49	50	50	50	53	51	58	45	55	41	54	54	47	53	48
WEIGHTED SAMPLE SIZE (#)	**511**	**220**	**75**	**215**	**268**	**241**	**147**	**160**	**204**	**134**	**338**	**343**	**167**	**215**	**300**	**144**	**245**	**266**	**139**	**371**	**98**	**91**	**58**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**504**	**234**	**68**	**202**	**244**	**258**	**118**	**164**	**222**	**122**	**342**	**346**	**158**	**215**	**294**	**149**	**243**	**261**	**133**	**371**	**102**	**90**	**59**	**80**

This table excludes those who responded 'Don't know' to any of Q34a-i.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 34C:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed. An example might be [ITEM SEEN IN Q33].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $75 if the project saved $[35] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	56	55	61	55	59	53	56	61	53	57	57	57	55	55	54	49	61	52	67	52	54	60	57	56
No	44	45	39	45	41	47	44	39	47	43	43	43	45	45	46	51	39	48	33	48	46	40	43	44
WEIGHTED SAMPLE SIZE (#)	**511**	**220**	**75**	**215**	**268**	**241**	**147**	**160**	**204**	**134**	**338**	**343**	**167**	**215**	**300**	**144**	**245**	**266**	**139**	**371**	**98**	**91**	**58**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**504**	**234**	**68**	**202**	**244**	**258**	**118**	**164**	**222**	**122**	**342**	**346**	**158**	**215**	**294**	**149**	**243**	**261**	**133**	**371**	**102**	**90**	**59**	**80**

This table excludes those who responded 'Don't know' to any of Q34a-i.

TABLE 34D:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed. An example might be [ITEM SEEN IN Q33].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $75 if the project saved $[45] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	63	65	63	60	65	60	67	65	57	62	65	63	62	60	63	59	66	60	72	59	63	67	59	60
No	37	35	37	40	35	40	33	35	43	38	35	37	38	40	37	41	34	40	28	41	37	33	41	40
WEIGHTED SAMPLE SIZE (#)	**511**	**220**	**75**	**215**	**268**	**241**	**147**	**160**	**204**	**134**	**338**	**343**	**167**	**215**	**300**	**144**	**245**	**266**	**139**	**371**	**98**	**91**	**58**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**504**	**234**	**68**	**202**	**244**	**258**	**118**	**164**	**222**	**122**	**342**	**346**	**158**	**215**	**294**	**149**	**243**	**261**	**133**	**371**	**102**	**90**	**59**	**80**

This table excludes those who responded 'Don't know' to any of Q34a-i.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 34E:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed. An example might be [ITEM SEEN IN Q33].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $75 if the project saved $[55] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	69	70	70	66	71	66	71	72	64	63	73	69	67	65	70	69	72	66	81	64	76	73	63	63
No	31	30	30	34	29	34	29	28	36	37	27	31	33	35	30	31	28	34	19	36	24	27	37	37
WEIGHTED SAMPLE SIZE (#)	**511**	**220**	**75**	**215**	**268**	**241**	**147**	**160**	**204**	**134**	**338**	**343**	**167**	**215**	**300**	**144**	**245**	**266**	**139**	**371**	**98**	**91**	**58**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**504**	**234**	**68**	**202**	**244**	**258**	**118**	**164**	**222**	**122**	**342**	**346**	**158**	**215**	**294**	**149**	**243**	**261**	**133**	**371**	**102**	**90**	**59**	**80**

This table excludes those who responded 'Don't know' to any of Q34a-i.

TABLE 34F:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed. An example might be [ITEM SEEN IN Q33].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $75 if the project saved $[65] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	73	74	80	70	74	72	78	77	67	67	77	74	70	70	76	74	77	70	83	70	80	80	65	71
No	27	26	20	30	26	28	22	23	33	33	23	26	30	30	24	26	23	30	17	30	20	20	35	29
WEIGHTED SAMPLE SIZE (#)	**511**	**220**	**75**	**215**	**268**	**241**	**147**	**160**	**204**	**134**	**338**	**343**	**167**	**215**	**300**	**144**	**245**	**266**	**139**	**371**	**98**	**91**	**58**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**504**	**234**	**68**	**202**	**244**	**258**	**118**	**164**	**222**	**122**	**342**	**346**	**158**	**215**	**294**	**149**	**243**	**261**	**133**	**371**	**102**	**90**	**59**	**80**

This table excludes those who responded 'Don't know' to any of Q34a-i.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 34G:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed. An example might be [ITEM SEEN IN Q33].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $75 if the project saved $[75] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	80	82	87	77	81	80	85	83	75	76	84	82	77	78	83	83	85	77	87	78	87	86	78	77
No	20	18	13	23	19	20	15	17	25	24	16	18	23	22	17	17	15	23	13	22	13	14	22	23
WEIGHTED SAMPLE SIZE (#)	**511**	**220**	**75**	**215**	**268**	**241**	**147**	**160**	**204**	**134**	**338**	**343**	**167**	**215**	**300**	**144**	**245**	**266**	**139**	**371**	**98**	**91**	**58**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**504**	**234**	**68**	**202**	**244**	**258**	**118**	**164**	**222**	**122**	**342**	**346**	**158**	**215**	**294**	**149**	**243**	**261**	**133**	**371**	**102**	**90**	**59**	**80**

This table excludes those who responded 'Don't know' to any of Q34a-i.

TABLE 34H:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed. An example might be [ITEM SEEN IN Q33].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $75 if the project saved $[85] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	83	84	89	80	83	83	87	86	78	77	86	85	79	81	85	88	88	79	91	80	90	87	86	78
No	17	16	11	20	17	17	13	14	22	23	14	15	21	19	15	12	12	21	9	20	10	13	14	22
WEIGHTED SAMPLE SIZE (#)	**511**	**220**	**75**	**215**	**268**	**241**	**147**	**160**	**204**	**134**	**338**	**343**	**167**	**215**	**300**	**144**	**245**	**266**	**139**	**371**	**98**	**91**	**58**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**504**	**234**	**68**	**202**	**244**	**258**	**118**	**164**	**222**	**122**	**342**	**346**	**158**	**215**	**294**	**149**	**243**	**261**	**133**	**371**	**102**	**90**	**59**	**80**

This table excludes those who responded 'Don't know' to any of Q34a-i.

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 34I:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your home, but changes the amount of energy consumed. An example might be [ITEM SEEN IN Q33].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $75 if the project saved $[95] per year?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	86	88	90	83	86	86	90	88	81	82	88	88	82	84	88	92	89	83	93	84	92	90	91	80
No	14	12	10	17	14	14	10	12	19	18	12	12	18	16	12	8	11	17	7	16	8	10	9	20
WEIGHTED SAMPLE SIZE (#)	**511**	**220**	**75**	**215**	**268**	**241**	**147**	**160**	**204**	**134**	**338**	**343**	**167**	**215**	**300**	**144**	**245**	**266**	**139**	**371**	**98**	**91**	**58**	**82**
UNWEIGHTED SAMPLE SIZE (#)	**504**	**234**	**68**	**202**	**244**	**258**	**118**	**164**	**222**	**122**	**342**	**346**	**158**	**215**	**294**	**149**	**243**	**261**	**133**	**371**	**102**	**90**	**59**	**80**

This table excludes those who responded 'Don't know' to any of Q34a-i.

TABLE 36A:

Including yourself, how many household members live in your home?

Number of adults 18 or older

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
1	26	26	25	27	24	28	24	25	28	36	23	20	40	24	26	15	25	28	28	26	18	17	16	29
2	55	54	55	57	56	55	53	52	60	46	59	63	40	52	57	67	57	54	54	56	65	65	67	58
3	13	16	13	11	15	12	16	16	10	12	13	13	12	17	11	14	14	13	13	13	13	12	14	11
4 or more	5	4	7	5	6	4	7	7	3	5	5	4	7	7	6	4	5	5	6	5	4	7	3	3
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	2.0	2.0	2.0	2.0	2.1	1.9	2.1	2.1	1.9	1.9	2.0	2.0	1.9	2.1	2.0	2.1	2.0	2.0	2.0	2.0	2.0	2.1	2.0	1.9

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 36B:

Including yourself, how many household members live in your home?

Number of children under age of 18

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
None (0)	76	75	74	78	75	76	63	60	95	78	74	74	79	77	72	76	75	76	70	77	61	77	83	78
1	12	14	12	11	14	10	21	17	4	12	13	11	15	12	15	12	12	13	17	11	18	8	8	9
2	9	8	9	9	9	9	12	16	1	6	11	11	4	8	9	9	10	8	11	8	12	12	8	11
3	2	3	4	2	2	3	3	5	0	2	3	4	0	2	3	3	3	2	2	3	8	3	1	2
4 or more	1	0	1	1	0	1	1	1	0	2	0	0	2	1	1	0	0	1	1	1	1	0	0	0
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**
MEAN	1.7	1.6	1.8	1.7	1.5	1.8	1.6	1.8	1.3	1.7	1.7	1.7	1.5	1.7	1.6	1.6	1.7	1.6	1.6	1.7	1.8	1.7	1.6	1.7

TABLE 37A:

[IF Q36A AND Q36B TOTAL 1] Was your household income before taxes last year below $21,822?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	31	24	35	39	29	33	29	37	30	100	0	25	38	29	32	28	27	35	34	31	7	41	25	23
No	59	67	56	52	62	57	69	57	57	0	100	67	52	57	63	66	63	56	49	62	78	59	70	67
Prefer not to say	7	8	6	6	7	6	2	6	8	0	0	6	7	9	5	6	6	7	10	6	14	0	0	5
Don't know/Not sure	3	2	4	3	1	4	0	0	5	0	0	3	3	5	0	0	3	2	6	1	0	0	6	4
WEIGHTED SAMPLE SIZE (#)	**230**	**104**	**31**	**95**	**93**	**136**	**47**	**65**	**118**	**72**	**136**	**114**	**115**	**90**	**125**	**32**	**96**	**133**	**54**	**176**	**24**	**25**	**19**	**41**
UNWEIGHTED SAMPLE SIZE (#)	**226**	**109**	**28**	**89**	**86**	**140**	**41**	**62**	**123**	**71**	**133**	**110**	**116**	**92**	**120**	**31**	**97**	**129**	**51**	**175**	**25**	**20**	**18**	**41**

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 37B:

[IF Q36A AND Q36B TOTAL 2-4] Was your household income before taxes last year below $40,548?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	24	15	32	30	24	24	36	19	21	100	0	21	34	27	24	15	25	23	20	25	14	16	15	37
No	65	71	63	59	68	63	53	74	66	0	100	70	51	62	68	75	65	65	72	63	80	77	68	56
Prefer not to say	8	10	5	7	5	11	5	7	11	0	0	7	10	8	7	10	8	8	6	8	5	6	15	4
Don't know/Not sure	3	3	1	4	3	3	7	1	2	0	0	2	6	4	1	0	2	4	1	3	1	1	2	3
WEIGHTED SAMPLE SIZE (#)	**719**	**309**	**101**	**308**	**361**	**355**	**178**	**227**	**313**	**173**	**467**	**525**	**193**	**305**	**412**	**215**	**331**	**388**	**153**	**566**	**128**	**138**	**118**	**110**
UNWEIGHTED SAMPLE SIZE (#)	**724**	**336**	**94**	**294**	**344**	**377**	**146**	**237**	**341**	**158**	**485**	**539**	**185**	**309**	**419**	**225**	**333**	**391**	**153**	**571**	**130**	**144**	**127**	**107**

TABLE 37C:

[IF Q36A AND Q36B TOTAL 5 OR MORE] Was your household income before taxes last year below $57,747?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	29	14	32	46	19	35	31	29	24	100	0	17	48	34	26	38	39	20	27	30	0	17	39	26
No	66	81	60	54	77	61	69	67	39	0	100	76	52	62	68	53	61	72	66	67	92	68	61	74
Prefer not to say	2	0	8	0	5	0	0	0	37	0	0	3	0	0	3	9	0	4	7	0	0	15	0	0
Don't know/Not sure	2	5	0	0	0	4	0	3	0	0	0	4	0	4	3	0	0	4	0	3	8	0	0	0
WEIGHTED SAMPLE SIZE (#)	**54**	**22**	**13**	**19**	**22**	**30**	**17**	**33**	**3**	**16**	**36**	**32**	**21**	**28**	**35**	**11**	**27**	**27**	**14**	**40**	**15**	**7**	**5**	**4**
UNWEIGHTED SAMPLE SIZE (#)	**52**	**19**	**13**	**20**	**20**	**31**	**15**	**34**	**3**	**17**	**33**	**32**	**20**	**27**	**34**	**12**	**28**	**24**	**14**	**38**	**14**	**6**	**5**	**5**

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 38:

Do you live within a First Nations Community?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Yes	2	2	4	1	2	2	5	1	1	6	1	3	1	2	3	2	3	1	5	1	5	1	0	2
No	96	95	95	97	95	97	91	97	98	91	98	97	95	96	95	97	96	96	93	97	93	98	100	96
Prefer not to say	1	1	0	1	1	0	1	1	0	1	0	0	1	0	1	1	1	1	1	1	0	1	0	0
Don't know/Not sure	1	1	1	1	1	1	4	1	0	3	0	0	2	1	1	0	0	2	0	1	1	0	0	1
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**

TABLE 39:

What is the main source of energy used to heat your principal place of residence?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Electricity	33	39	27	29	34	32	49	34	24	32	36	28	44	8	58	19	31	35	33	34	44	39	13	13
Oil	31	29	46	28	30	32	18	31	38	34	29	34	24	74	13	12	34	29	29	32	16	22	44	57
Heat pump/Mini-split heat pump	16	14	12	19	15	17	8	16	20	11	18	21	7	9	16	61	17	15	19	15	25	20	29	12
Wood/pellets	9	2	9	16	9	9	11	11	6	11	8	12	3	9	9	3	9	9	8	9	7	15	11	13
Natural gas	4	8	1	0	4	3	3	2	5	2	4	1	8	0	1	3	4	3	5	3	5	0	0	1
Propane	2	1	1	2	2	1	2	3	0	3	1	2	2	0	2	0	2	1	3	1	1	2	1	3
Solar	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	2	1	4	2	2	2	2	1	3	3	2	2	3	1	1	1	2	2	3	2	1	1	2	3
Don't know/Not sure	3	5	0	3	3	4	7	2	3	4	2	0	9	0	0	0	2	5	1	4	2	0	0	0
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 40:

[IF Q39 NOT 'Don't know/Not sure'] What other types of heating, if any, do you currently have for your principal place of residence? Please select all that apply.

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Electricity	26	21	25	30	24	27	17	29	27	25	26	30	16	22	43	41	28	23	28	25	30	31	27	31
Wood/pellets	16	9	19	22	17	15	12	15	19	13	16	21	5	14	15	26	19	14	20	15	15	24	28	19
Oil	12	8	12	15	12	11	14	11	11	12	11	13	8	26	8	19	11	12	12	11	11	9	16	17
Heat pump/Mini-split heat pump	10	10	10	11	12	9	11	9	11	7	12	12	6	11	11	39	11	9	16	9	19	10	13	7
Propane	6	7	9	3	7	6	7	5	6	5	7	6	5	5	7	7	7	5	9	5	13	8	0	3
Natural gas	2	3	1	0	3	0	5	1	0	3	1	1	2	1	2	2	2	1	4	1	6	0	0	0
Solar	1	1	1	1	2	1	2	1	1	1	2	1	1	2	2	2	1	2	3	1	2	1	2	1
Other	1	2	1	0	1	2	1	2	0	2	1	1	0	1	1	1	1	1	1	1	2	2	2	1
None – no other type of heating is used in my home	38	43	37	32	36	39	41	35	38	40	37	30	55	37	29	3	34	41	28	40	26	28	31	34
Don't know/Not sure	3	6	2	0	1	5	7	2	1	5	2	1	8	1	3	1	1	5	2	3	2	1	0	1
WEIGHTED SAMPLE SIZE (#)	**968**	**412**	**145**	**411**	**463**	**502**	**225**	**321**	**422**	**251**	**628**	**669**	**299**	**423**	**572**	**258**	**447**	**521**	**218**	**750**	**164**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**970**	**439**	**135**	**396**	**439**	**528**	**189**	**329**	**452**	**235**	**640**	**679**	**291**	**428**	**573**	**268**	**452**	**518**	**215**	**755**	**167**	**170**	**150**	**153**

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 39+40:

What is the main source of energy used to heat your principal place of residence?

[IF Q39 NOT 'Don't know/Not sure'] What other types of heating, if any, do you currently have for your principal place of residence? Please select all that apply.

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Electricity	58	59	51	58	57	58	65	62	50	57	61	57	59	30	100	60	58	57	60	57	73	69	41	43
Oil	42	36	57	43	42	43	31	42	49	45	40	47	32	100	22	32	45	40	41	42	27	31	60	74
Heat pump/Mini-split heat pump	26	23	22	30	26	26	18	25	31	18	30	33	12	19	27	100	28	24	35	23	44	30	42	18
Wood/pellets	24	11	28	37	26	23	22	25	25	24	24	33	8	23	24	29	28	22	27	24	22	39	38	31
Propane	7	8	11	5	9	6	8	8	6	7	8	8	6	5	8	8	9	6	12	6	14	10	2	6
Natural gas	5	11	2	0	7	3	8	3	5	5	5	3	10	1	3	4	6	4	9	4	11	0	0	1
Solar	1	1	1	1	2	1	2	1	1	1	2	1	1	2	2	2	1	1	3	1	2	1	2	1
Other	3	3	4	2	2	3	3	3	3	4	2	3	3	2	1	1	3	3	4	3	2	3	3	3
Don't know/Not sure	3	5	0	3	3	4	7	2	3	4	2	0	9	0	0	0	2	5	1	4	2	0	0	0
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**

TABLE 41:

[IF Q39 OR Q40 'Electricity] What type of electric heating does your residence use?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Electric Baseboards (e.g., small electric heaters, places throughout your building, typically under windows)	66	65	68	66	65	66	60	72	63	62	68	67	63	48	66	56	62	69	52	70	60	78	69	61
Ductless/Mini-Split Heat Pump (i.e., a heat pump system that has an indoor unit placed on a wall, that typically only heats a small area of the building)	6	6	1	8	7	5	6	6	7	6	7	8	2	7	6	20	9	4	14	4	11	7	10	4
Electric Resistance Boiler (i.e., a central furnace which uses an electric heating element and distributes heat through hot water, to your floor or radiators)	5	7	7	3	5	6	7	3	5	7	4	4	7	4	5	7	4	6	6	5	9	1	2	3
Electric Resistance Furnace (i.e., a central furnace which uses an electric heating element and distributes heat through forced-air)	4	7	2	2	4	4	9	3	1	4	4	3	6	9	4	0	5	3	8	3	4	0	3	3
Central Air-Source Heat Pump (i.e., a central heat pump system that heats all or most of the building, through distributed hot water or hot air)	4	4	4	4	5	3	3	3	5	3	4	4	4	3	4	9	6	2	5	3	6	2	1	4
Ground-Source Heat Pump (i.e., a central heat pump that collects heat from tubes in the ground outside of your building)	0	1	0	0	0	1	2	0	0	0	0	0	1	1	0	0	0	1	0	1	1	0	0	0
Other	7	4	9	10	7	8	2	7	11	10	6	9	5	14	7	6	10	6	12	6	5	7	12	15
Don't know/Not sure	7	7	9	8	7	8	11	6	7	9	6	5	13	13	7	2	4	10	4	9	4	4	2	8

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 41:

[IF Q39 OR Q40 'Electricity] What type of electric heating does your residence use?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
WEIGHTED SAMPLE SIZE (#)	**577**	**256**	**74**	**247**	**274**	**300**	**157**	**203**	**217**	**148**	**388**	**384**	**193**	**126**	**572**	**155**	**263**	**314**	**133**	**445**	**122**	**116**	**58**	**67**
UNWEIGHTED SAMPLE SIZE (#)	**579**	**270**	**69**	**240**	**260**	**316**	**134**	**206**	**239**	**142**	**392**	**395**	**184**	**134**	**573**	**163**	**272**	**307**	**131**	**448**	**120**	**118**	**67**	**68**

TABLE 42:

[IF Q5 'Owned'] And approximately how many years old is your home?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
20 years or less	25	36	13	20	25	25	35	29	19	14	29	25	0	14	32	33	22	27	27	24	100	0	0	0
21-35 years	25	27	20	25	28	22	24	30	22	23	27	25	0	17	31	24	27	23	20	27	0	100	0	0
36-50 years	21	19	19	24	20	23	9	16	28	17	21	21	0	27	15	27	22	20	19	22	0	0	100	0
51 or more years	23	13	40	25	23	23	23	19	26	36	20	23	0	36	17	13	23	23	28	22	0	0	0	100
Don't know/Not sure	6	4	8	6	4	8	8	6	4	9	4	6	0	7	6	3	5	6	5	6	0	0	0	0
WEIGHTED SAMPLE SIZE (#)	**672**	**255**	**116**	**302**	**323**	**349**	**104**	**226**	**342**	**142**	**470**	**672**	**0**	**318**	**380**	**218**	**323**	**350**	**160**	**512**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**681**	**275**	**110**	**296**	**315**	**365**	**88**	**232**	**361**	**135**	**480**	**681**	**0**	**327**	**391**	**224**	**327**	**354**	**162**	**519**	**169**	**170**	**150**	**153**
MEAN	42.5	32.9	53.9	46.4	41.6	43.4	37.3	38.3	46.6	55.1	38.5	42.5	.	53.7	36.0	34.9	44.1	40.9	46.1	41.3	12.2	28.9	43.8	88.3

NAVIGANT

2019 Electricity Usage Surveys - Residential

TABLE 43:

Does your household pay for its own electricity or does someone else pay for it?

	OVERALL %	REGION			GENDER		AGE			LOW INCOME		HOME		HEATING TYPE(S)			INEXPENSIVE UPGRADES		EXPENSIVE UPGRADES		AGE OF HOME			
		HRM	Cape Breton	Other Mainland NS	Male	Female	18-34	35-54	55+	Yes	No	Own	Rent	Oil	Electricity	Heat pump	Familiar (7-10)	Unfamiliar (0-6)	Familiar (7-10)	Unfamiliar (0-6)	0-20 yrs	21-35 yrs	36-50 yrs	51+ yrs
Household pays for it	89	89	91	87	87	91	78	91	93	84	92	98	71	94	88	93	91	87	91	88	96	100	98	98
Someone else pays for it	10	10	8	11	12	9	19	8	6	14	7	2	26	6	11	7	8	11	8	10	4	0	2	2
Don't know/Not sure	1	1	1	2	1	1	3	1	0	1	1	0	4	0	1	0	1	1	0	1	0	0	0	0
WEIGHTED SAMPLE SIZE (#)	**1002**	**435**	**145**	**422**	**477**	**521**	**242**	**326**	**434**	**261**	**639**	**672**	**330**	**423**	**572**	**258**	**454**	**548**	**220**	**782**	**167**	**169**	**142**	**156**
UNWEIGHTED SAMPLE SIZE (#)	**1002**	**464**	**135**	**403**	**450**	**548**	**202**	**333**	**467**	**246**	**651**	**681**	**321**	**428**	**573**	**268**	**458**	**544**	**218**	**784**	**169**	**170**	**150**	**153**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 1:

Please indicate in which of the following areas your business is located. If your business has multiple locations, please indicate the location at which you work specifically.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Halifax Regional Municipality (HRM)	61	100	0	0	64	59	49	47	84	47	65	75	48	64	58
Elsewhere on Mainland Nova Scotia outside HRM	28	0	0	100	25	28	38	40	9	38	27	13	38	25	29
Cape Breton Island	11	0	100	0	11	13	13	13	7	16	8	13	14	11	13
SAMPLE SIZE (#)	**200**	**121**	**22**	**57**	**110**	**78**	**53**	**53**	**45**	**45**	**63**	**40**	**63**	**111**	**45**

This and all subsequent questions were optional.

TABLE 3:

For the remainder of the survey, please think about the business location where you personally work. Do you currently own, lease, or rent the premises at your business' Nova Scotia location where you work?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Own	59	60	55	56	100	0	57	55	60	56	61	62	61	60	75
Lease	17	16	32	12	0	41	11	22	21	11	19	22	12	15	9
Rent	24	23	14	32	0	59	32	22	19	33	19	16	27	26	16
SAMPLE SIZE (#)	**188**	**116**	**22**	**50**	**110**	**78**	**53**	**49**	**43**	**45**	**62**	**37**	**59**	**109**	**44**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 4:

How many electrical power bars do you have at your business' Nova Scotia location where you work? A power bar is a block of electrical sockets that attaches to the end of a flexible cable allowing multiple electrical devices to be powered from a single electrical socket.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	6	2	14	11	4	7	6	6	0	5	2	6	6	2	5
1	10	9	0	20	10	12	19	6	3	19	7	3	13	5	14
2	12	13	14	9	13	12	17	10	8	17	17	6	8	14	14
3	10	10	19	7	14	6	19	8	5	21	7	3	8	13	11
4	7	6	10	9	9	4	9	4	13	12	2	9	11	10	5
5	7	8	0	9	5	10	15	8	3	12	12	0	8	9	9
6-10	20	18	24	22	17	22	9	40	5	12	26	14	25	21	23
11 or more	27	34	19	15	27	25	6	17	63	2	28	60	23	26	20
SAMPLE SIZE (#)	**172**	**105**	**21**	**46**	**99**	**67**	**47**	**48**	**38**	**42**	**58**	**35**	**53**	**96**	**44**
MEAN	14.5	18.7	11.5	6.7	14.2	12.4	5.8	8.0	29.3	3.9	13.3	33.1	11.7	14.7	11.7

Responses of greater than 225 were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 5:

[IF Q4 1 OR MORE] Of this/these [Q4 RESPONSE] power bar(s), how many are smart power bars, that is, can be controlled via smart phone or computer or turn off automatically when you leave the room?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	83	83	67	93	82	84	86	91	71	90	79	76	76	80	83
1	3	4	0	2	1	6	0	4	3	0	4	3	6	4	2
2	4	4	6	5	6	2	9	2	3	5	7	3	6	5	7
3	2	1	17	0	2	3	0	2	3	3	4	0	4	2	0
4	1	0	6	0	1	0	2	0	0	3	0	0	0	1	0
5	2	3	0	0	3	0	0	0	8	0	5	0	0	2	2
6-10	2	3	0	0	2	2	0	0	8	0	2	6	4	2	2
11 or more	2	3	6	0	2	3	2	0	5	0	0	12	4	3	2
SAMPLE SIZE (#)	**162**	**103**	**18**	**41**	**95**	**62**	**44**	**45**	**38**	**40**	**57**	**33**	**50**	**94**	**42**
MEAN	.8	.8	2.5	.1	.8	.9	.3	.2	2.7	.3	.7	2.5	1.3	.9	.5

Responses of greater than 30 were excluded from calculation of the mean.

TABLE 4+5 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Q4. How many electrical power bars do you have at your business' Nova Scotia location where you work? A power bar is a block of electrical sockets that attaches to the end of a flexible cable allowing multiple electrical devices to be powered from a single electrical socket.
Q5. [IF Q4 1 OR MORE] Of this/these [Q4 RESPONSE] power bar(s), how many are smart power bars, that is, can be controlled via smart phone or computer or turn off automatically when you leave the room?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Proportion smart	6	4	19	2	6	6	7	2	10	7	5	8	12	6	5
SAMPLE SIZE (#)	**158**	**99**	**18**	**41**	**93**	**60**	**43**	**45**	**36**	**40**	**57**	**29**	**49**	**90**	**41**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 6:

How many computer servers does your business have onsite at your business' Nova Scotia location where you work? There may be many servers on a single rack, but we want to know the number of individual servers.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	22	22	10	26	22	23	32	11	14	32	16	9	25	14	20
1	35	31	40	43	38	33	43	46	27	32	42	32	38	40	29
2	12	13	10	13	12	14	11	13	11	20	11	3	9	12	17
3	6	6	0	9	8	5	2	11	5	5	11	0	5	5	7
4	2	3	5	0	2	3	2	4	3	2	2	6	4	2	5
5	4	4	5	2	1	8	4	0	8	2	2	9	4	2	0
6 or more	18	21	30	7	18	14	6	15	32	7	18	41	15	24	22
SAMPLE SIZE (#)	**161**	**95**	**20**	**46**	**93**	**64**	**47**	**46**	**37**	**41**	**57**	**34**	**55**	**92**	**41**
MEAN	6.4	8.5	4.5	2.9	6.8	5.3	1.4	5.7	13.7	2.9	6.5	13.1	5.0	7.6	7.4

Responses of greater than 100 were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 7:

[IF Q6 1 OR MORE] Of this/these [Q6 RESPONSE] server(s), how many use server virtualization and decommissioning? Server virtualization is a way of reducing the number of physical computer servers by running multiple, independent operating systems on a single server.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	55	51	39	71	49	61	69	63	28	64	44	45	59	56	39
1	21	16	33	24	25	16	9	29	28	21	29	13	20	16	27
2	6	9	0	3	5	8	13	2	0	7	10	0	0	6	12
3	4	1	17	3	5	2	6	0	3	7	2	6	7	3	3
4	1	1	0	0	0	2	0	0	3	0	2	0	0	1	0
5	3	4	6	0	4	2	0	2	9	0	2	10	2	3	6
6 or more	10	16	6	0	11	8	3	2	28	0	10	26	12	15	12
SAMPLE SIZE (#)	**126**	**74**	**18**	**34**	**73**	**49**	**32**	**41**	**32**	**28**	**48**	**31**	**41**	**79**	**33**
MEAN	2.5	3.7	1.7	.4	3.2	1.5	.7	1.2	6.9	.6	2.9	5.2	2.4	3.1	2.2

Responses of greater than 65 were excluded from calculation of the mean.

TABLE 6+7 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Q6. How many computer servers does your business have onsite at your business' Nova Scotia location where you work? There may be many servers on a single rack, but we want to know the number of individual servers.
Q7. [IF Q6 1 OR MORE] Of this/these [Q6 RESPONSE] server(s), how many use server virtualization and decommissioning? Server virtualization is a way of reducing the number of physical computer servers by running multiple, independent operating systems on a single server.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Proportion using virtualization	31	35	33	10	35	28	36	19	50	14	32	43	36	38	34
SAMPLE SIZE (#)	**122**	**70**	**18**	**34**	**71**	**48**	**32**	**41**	**28**	**28**	**46**	**29**	**41**	**75**	**32**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 8:

How many hot water heaters do you have for your business' Nova Scotia location where you work?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	17	19	24	10	12	26	22	13	10	19	16	11	9	12	9
1	56	53	43	68	61	49	69	65	35	74	57	31	62	59	68
2	15	15	19	14	14	16	4	21	30	2	20	31	19	18	14
3 or more	11	13	14	8	13	9	6	2	25	5	7	26	10	11	9
SAMPLE SIZE (#)	**175**	**104**	**21**	**50**	**101**	**69**	**51**	**48**	**40**	**43**	**61**	**35**	**58**	**100**	**44**
MEAN	1.3	1.3	1.4	1.2	1.4	1.1	1.0	1.1	1.8	1.0	1.2	2.0	1.4	1.4	1.2

Responses of greater than 6 were excluded from calculation of the mean.

TABLE 9A-D (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

[IF Q8 '1' OR MORE] Of this/these [Q8 RESPONSE] how water heater(s), how many...

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Have a hot water heater tank wrap	38	47	13	33	39	40	53	31	38	64	51	27	45	46	29
Are heat pump water heaters	21	33	13	6	24	19	13	15	38	7	23	34	25	22	35
Are smart water heaters	11	14	27	2	13	8	6	5	21	4	9	18	11	8	16
Have a large duct for exhaust gas	8	14	0	2	10	6	6	5	15	0	9	16	12	12	12
SAMPLE SIZE (#)	**90**	**48**	**8**	**34**	**58**	**30**	**25**	**29**	**22**	**25**	**30**	**19**	**35**	**50**	**26**

This table excludes responses of 'Don't know'.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 10A:

Thinking about your building for your business' Nova Scotia location where you work... Does your building...

Have open coolers, that is, coolers that do not have covers or doors?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	9	12	10	4	10	8	6	10	14	9	10	17	11	11	20
No	61	58	75	61	69	51	63	56	64	61	66	72	53	66	61
Not applicable	30	30	15	35	22	41	31	35	21	30	25	11	35	23	18
SAMPLE SIZE (#)	**182**	**108**	**20**	**54**	**102**	**74**	**52**	**52**	**42**	**44**	**61**	**36**	**62**	**104**	**44**

TABLE 10B:

Thinking about your building for your business' Nova Scotia location where you work... Does your building...

Have strategic energy management or organized management approach? This is the process of monitoring, controlling, and conserving energy within and organization in a systematic way.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	22	30	26	6	21	25	10	18	47	7	27	43	19	28	27
No	53	45	58	69	57	46	66	60	34	68	53	51	58	54	58
Not applicable	24	25	16	25	22	29	24	22	18	25	20	6	24	18	16
SAMPLE SIZE (#)	**174**	**104**	**19**	**51**	**101**	**69**	**50**	**50**	**38**	**44**	**59**	**35**	**59**	**101**	**45**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 10C:

Thinking about your building for your business' Nova Scotia location where you work... Does your building...

Have Door heater controls such as anti-sweat heaters (ASH)? These are electric resistance heaters that are installed in the frames and doors of refrigerated cases to reduce condensation and prevent fogging. These are particularly common in grocery and convenience stores.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	13	17	15	2	14	10	8	12	23	11	14	22	12	14	22
No	64	57	70	76	66	59	66	70	56	67	66	69	63	67	62
Not applicable	24	26	15	22	20	31	26	18	21	22	20	8	25	19	16
SAMPLE SIZE (#)	**176**	**106**	**20**	**50**	**101**	**71**	**50**	**50**	**39**	**45**	**59**	**36**	**60**	**101**	**45**

TABLE 10D:

Thinking about your building for your business' Nova Scotia location where you work... Does your building...

Have a packaged terminal heat pump (PTHP)? A PTHP provides heating and cooling room by room often for applications common in hotels and motels.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	25	27	48	10	28	21	18	27	37	14	34	32	27	28	52
No	53	50	33	67	54	47	59	57	45	61	49	59	50	57	32
Not applicable	23	24	19	22	18	31	24	16	18	25	17	9	23	15	16
SAMPLE SIZE (#)	**175**	**105**	**21**	**49**	**101**	**70**	**51**	**49**	**38**	**44**	**59**	**34**	**60**	**100**	**44**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 10E:

Thinking about your building for your business' Nova Scotia location where you work... Does your building...

In your heating, cooling and ventilation systems, is the speed of any fans or pumps automatically controlled by a variable frequency drive (VFD)?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	22	28	20	12	23	19	10	22	38	11	34	25	21	22	33
No	53	47	55	64	57	48	60	60	38	60	52	63	50	60	49
Not applicable	25	26	25	24	20	33	30	18	24	29	14	13	29	17	18
SAMPLE SIZE (#)	**168**	**98**	**20**	**50**	**99**	**67**	**50**	**45**	**37**	**45**	**56**	**32**	**58**	**98**	**45**

TABLE 11A:

[IF Q10A 'Yes', OR CODED AS ZERO IF Q10A 'No'] How many of each does your business have?

Open coolers, that is, coolers that do not have covers or doors?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	90	89	88	94	90	93	94	88	84	93	91	84	85	89	82
1	5	7	6	0	6	2	3	6	6	7	7	3	5	5	9
2	3	4	6	0	4	2	3	3	6	0	2	10	8	5	9
3 or more	2	0	0	6	0	2	0	3	3	0	0	3	3	1	0
SAMPLE SIZE (#)	**125**	**73**	**17**	**35**	**79**	**42**	**36**	**33**	**32**	**30**	**45**	**31**	**39**	**79**	**34**
MEAN	.3	.2	.2	.6	.1	.4	.1	.5	.4	.1	.1	.6	.4	.3	.3

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 11B:

[IF Q10C 'Yes', OR CODED AS ZERO IF Q10C 'No'] How many of each does your business have?

Door heater controls such as anti-sweat heaters (ASH)? These are electric resistance heaters that are installed in the frames and doors of refrigerated cases to reduce condensation and prevent fogging. These are particularly common in grocery and convenience stores.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	89	84	88	97	88	91	92	88	77	91	87	81	89	88	82
1	8	11	6	3	9	6	6	10	13	9	11	6	5	8	13
2	2	4	0	0	4	0	3	2	3	0	2	6	5	3	5
3 or more	2	1	6	0	0	2	0	0	6	0	0	6	2	3	0
SAMPLE SIZE (#)	**131**	**76**	**16**	**39**	**80**	**47**	**36**	**41**	**31**	**34**	**46**	**32**	**44**	**80**	**38**
MEAN	.2	.2	.5	.0	.2	.2	.1	.1	.5	.1	.2	.5	.3	.3	.2

TABLE 11C:

[IF Q10D 'Yes', OR CODED AS ZERO IF Q10D 'No'] How many of each does your business have?

Packaged terminal heat pumps (PTHP)? A PTHP provides heating and cooling room by room often for applications common in hotels and motels.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	76	77	50	87	73	80	82	73	67	87	69	73	77	75	44
1	14	17	13	8	16	11	10	15	20	13	17	13	12	12	25
2	6	6	19	0	7	4	5	7	10	0	10	7	5	8	22
3 or more	4	0	19	5	4	4	3	5	3	0	4	7	7	5	8
SAMPLE SIZE (#)	**131**	**77**	**16**	**38**	**81**	**46**	**39**	**41**	**30**	**31**	**48**	**30**	**43**	**83**	**36**
MEAN	.4	.3	1.2	.3	.5	.3	.4	.4	.5	.1	.4	.6	.6	.5	1.1

Responses of greater than 6 were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 11D:

[IF Q10E 'Yes', OR CODED AS ZERO IF Q10E 'No'] How many of each does your business have?

Systems with variable frequency drive (VFD)? In your heating, cooling and ventilation systems, VFD automatically controls the speed of any fans or pumps.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	78	71	73	92	77	79	86	78	58	94	67	77	79	76	67
1	14	19	13	5	16	12	11	17	23	6	23	8	13	15	19
2	5	6	7	3	5	5	0	6	12	0	8	4	3	5	8
3 or more	3	4	7	0	3	5	3	0	8	0	2	12	5	4	6
SAMPLE SIZE (#)	**121**	**69**	**15**	**37**	**77**	**43**	**35**	**36**	**26**	**31**	**48**	**26**	**39**	**79**	**36**
MEAN	.4	.5	.6	.1	.4	.3	.3	.3	.8	.1	.4	.7	.4	.4	.6

Responses of greater than 6 were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 13:

Approximately, how many motors does your business' HVAC, refrigeration equipment or appliances have?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	32	26	42	39	31	33	39	30	9	38	23	9	40	20	27
1	31	34	32	25	28	36	34	33	26	41	38	25	26	31	37
2	16	17	0	23	17	16	18	19	24	15	19	19	10	22	10
3 or more	21	24	26	14	24	16	9	19	41	5	19	47	24	26	27
SAMPLE SIZE (#)	**152**	**89**	**19**	**44**	**87**	**64**	**44**	**43**	**34**	**39**	**52**	**32**	**50**	**89**	**41**
MEAN	1.7	1.9	1.5	1.4	1.9	1.3	1.2	1.5	3.0	.9	1.5	3.5	1.7	2.2	2.2

Responses of greater than 10 were excluded from calculation of the mean.

TABLE 14:

[IF Q13 1 OR MORE] Of this/these motors, how many of your HVAC, refrigeration equipment, or appliances use EC Motors? EC Motors refer to an electronically commutated motor that uses electronic controls to vary its speed. They may be known as brushless DC motors.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	53	48	27	74	53	51	59	60	32	75	50	38	43	56	50
1	23	23	45	15	22	26	26	23	19	21	33	21	23	21	27
2	11	14	0	7	10	12	7	13	16	4	8	14	10	7	3
3 or more	13	15	27	4	15	12	7	3	32	0	10	28	23	15	20
SAMPLE SIZE (#)	**104**	**66**	**11**	**27**	**60**	**43**	**27**	**30**	**31**	**24**	**40**	**29**	**30**	**71**	**30**
MEAN	1.1	1.2	1.8	.5	1.2	1.0	.8	.6	2.0	.3	.9	1.9	1.6	1.1	1.4

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 13+14 (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Q13. Approximately, how many motors does your business' HVAC, refrigeration equipment or appliances have?
Q14. [IF Q13 1 OR MORE] Of this/these motors, how many of your HVAC, refrigeration equipment, or appliances use EC Motors? EC Motors refer to an electronically commutated motor that uses electronic controls to vary its speed. They may be known as brushless DC motors.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Proportion using EC motors	43	46	71	23	42	52	42	29	60	19	46	49	55	42	46
SAMPLE SIZE (#)	**103**	**65**	**11**	**27**	**60**	**42**	**27**	**30**	**31**	**24**	**39**	**29**	**30**	**71**	**30**

TABLE 15A/16A (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Linear lighting (e.g. fluorescent or LED tubes) [Proportions are shown as a percentage of total bulbs (LED + non-LED)]

Q15A_1. Number of Non-LED Bulbs
Q15A_2. Number of LED Bulbs
Q16A. [IF Q15A_LED 1 OR MORE] Of these LED light bulbs, how many are connected to the internet (i.e., smart lightbulbs)?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Proportion LED	60	61	68	50	55	68	43	54	78	36	51	79	41	71	63
Proportion Internet connected	8	8	16	1	3	15	2	0	15	8	1	7	2	8	3
SAMPLE SIZE (#)	**86**	**54**	**10**	**22**	**46**	**37**	**20**	**29**	**23**	**17**	**33**	**21**	**27**	**51**	**24**

Responses of greater than 1,000 bulbs were excluded from this table.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 15B/16B (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Pole mounted area lights which is exterior lighting generally used to provide illumination to areas for vehicle and pedestrian use, with light fixtures mounted to poles [Proportions are shown as a percentage of total bulbs (LED + non-LED)]

Q15B_1. Number of Non-LED Bulbs
Q15B_2. Number of LED Bulbs..

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Proportion LED	71	73	71	44	60	77	33	47	82	29	72	74	78	69	54
Proportion Internet connected	17	20	2	4	5	33	8	2	5	7	4	21	8	19	7
SAMPLE SIZE (#)	**51**	**32**	**7**	**12**	**34**	**14**	**11**	**19**	**14**	**7**	**22**	**14**	**15**	**35**	**22**

TABLE 15C/16C (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Track/Mono-point direction lights, which is a lighting system in which the lights are fitted on tracks, allowing variable positioning [Proportions are shown as a percentage of total bulbs (LED + non-LED)]

Q15C_1. Number of Non-LED Bulbs
Q15C_2. Number of LED Bulbs
Q16C. [IF Q15C_LED 1 OR MORE] Of these LED light bulbs, how many are connected to the internet (i.e., smart lightbulbs)?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Proportion LED	86	86	100	92	96	57	97	62	85	86	88	86	74	88	80
Proportion Internet connected	6	4	56	29	4	11	4	31	5	17	12	2	37	5	21
SAMPLE SIZE (#)	**38**	**27**	**4**	**7**	**25**	**12**	**13**	**8**	**15**	**9**	**15**	**11**	**11**	**32**	**11**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 15D/16D (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Downlight luminaire which is a small spotlight set in a ceiling and directed downwards [Proportions are shown as a percentage of total bulbs (LED + non-LED)]

Q15D_1. Number of Non-LED Bulbs
Q15D_2. Number of LED Bulbs
Q16D. [IF Q15D_LED 1 OR MORE] Of these LED light bulbs, how many are connected to the internet (i.e., smart lightbulbs)?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Proportion LED	77	84	91	57	74	77	86	73	84	82	45	91	90	84	34
Proportion Internet connected	5	6	12	0	9	3	10	4	4	15	12	3	6	5	10
SAMPLE SIZE (#)	**39**	**21**	**5**	**13**	**22**	**15**	**11**	**12**	**11**	**8**	**13**	**12**	**10**	**25**	**19**

TABLE 15E/16E (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Flood lights, which areoutdoor fixture mounted on a building, structure, or ground. They are typically used to illuminate or highlight outdoor objects and features). [Proportions are shown as a percentage of total bulbs (LED + non-LED)]

Q15E_1. Number of Non-LED Bulbs
Q15E_2. Number of LED Bulbs
Q16E. [IF Q15E_LED 1 OR MORE] Of these LED light bulbs, how many are connected to the internet (i.e., smart lightbulbs)?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Proportion LED	74	77	88	47	72	78	73	36	81	82	80	76	55	86	84
Proportion Internet connected	15	14	14	18	9	25	6	8	22	10	22	16	26	10	17
SAMPLE SIZE (#)	**59**	**33**	**7**	**19**	**37**	**18**	**14**	**19**	**16**	**12**	**20**	**14**	**19**	**40**	**19**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 15F/16F (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

General service lights (i.e. have a base sized like a normal light bulb and screw into regular light sockets) [Proportions are shown as a percentage of total bulbs (LED + non-LED)]

Q15F_1. Number of Non-LED Bulbs
Q15F_2. Number of LED Bulbs
Q16F. [IF Q15F_LED 1 OR MORE] Of these LED light bulbs, how many are connected to the internet (i.e., smart lightbulbs)?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Proportion LED	70	71	68	64	80	54	58	57	86	66	68	78	39	69	77
Proportion Internet connected	12	13	12	6	4	25	4	17	2	5	15	5	11	11	9
SAMPLE SIZE (#)	**82**	**51**	**9**	**22**	**52**	**29**	**33**	**22**	**17**	**24**	**29**	**14**	**25**	**53**	**25**

Responses of greater than 1,000 bulbs were excluded from this table.

TABLE 15G/16G (Responses shown as a proportion of the total number of specific items, and not of the number of respondents):

Parking garage lights [Proportions are shown as a percentage of total bulbs (LED + non-LED)]

Q15G_1. Number of Non-LED Bulbs
Q15G_2. Number of LED Bulbs
Q16G. [IF Q15G_LED 1 OR MORE] Of these LED light bulbs, how many are connected to the internet (i.e., smart lightbulbs)?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Proportion LED	75	77	53	55	57	85	69	58	76	71	66	79	56	81	56
Proportion Internet connected	4	3	28	7	6	2	2	7	1	4	10	1	11	5	14
SAMPLE SIZE (#)	**52**	**38**	**3**	**11**	**32**	**19**	**13**	**12**	**19**	**11**	**18**	**18**	**14**	**36**	**13**

Responses of greater than 1,000 bulbs were excluded from this table.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 17:

Approximately, how many occupancy sensors does your business' building/facility have? Occupancy sensors are motion detectors that will turn off lights when people are not present.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	71	69	78	73	68	74	82	82	50	78	67	63	76	69	63
1	6	5	0	12	6	7	4	4	8	13	8	3	4	7	12
2	7	4	11	12	11	3	10	10	5	8	12	0	4	9	9
3 or more	15	22	11	4	15	16	4	4	38	3	13	34	17	15	16
SAMPLE SIZE (#)	**170**	**101**	**18**	**51**	**95**	**69**	**51**	**49**	**40**	**40**	**60**	**35**	**54**	**99**	**43**
MEAN	2.2	3.2	1.1	.5	2.4	1.9	.4	.7	5.1	.4	2.0	5.7	1.0	2.3	2.1

Responses of greater than 50 were excluded from calculation of the mean.

TABLE 18:

How many rooms in your business' Nova Scotia location where you work have lighting fixtures that automatically turn off if there is sufficient sunlight coming into the building (i.e., daylighting controls)?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
None (0)	80	73	89	90	78	81	82	89	63	80	80	69	77	76	65
1	3	2	6	4	5	0	6	2	0	10	2	0	2	4	7
2	5	8	0	0	5	4	6	4	3	5	5	3	5	5	7
3 or more	13	17	6	6	12	14	6	6	34	5	13	28	16	14	21
SAMPLE SIZE (#)	**174**	**104**	**18**	**52**	**98**	**69**	**51**	**53**	**38**	**40**	**60**	**36**	**57**	**97**	**43**
MEAN	.8	1.2	.5	.3	1.0	.7	.4	.4	2.5	.4	.6	2.3	1.1	1.1	1.4

Responses of greater than 50 were excluded from calculation of the mean.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 19:

Were any of your lighting systems commissioned? Lighting Commissioning involves a professional installing, calibrating and testing the lighting system controls to ensure they operate correctly.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	21	26	22	9	19	20	10	20	32	3	29	34	21	23	28
No	79	74	78	91	81	80	90	80	68	97	71	66	79	77	72
SAMPLE SIZE (#)	**160**	**95**	**18**	**47**	**93**	**64**	**49**	**44**	**38**	**39**	**58**	**32**	**52**	**91**	**43**

TABLE 20_1:

Before today, how familiar were you with:

IT load optimization strategy (Server refresh and virtualization) (A way of reducing the number of physical computer servers by running multiple, independent operating systems on a single server)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	4	6	0	0	6	0	0	9	0	14	0	0	13	0	14
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	4	0	0	10	6	0	0	0	0	0	11	0	0	6	0
6	4	6	0	0	6	0	0	0	17	0	0	14	0	6	14
5	7	13	0	0	6	11	0	0	17	0	0	29	0	12	14
4	4	0	0	10	0	11	0	9	0	0	0	0	13	6	0
3	4	0	0	10	6	0	0	0	0	14	0	0	0	6	14
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	4	6	0	0	6	0	0	0	17	0	11	0	0	6	0
0 - Completely unfamiliar	70	69	100	70	67	78	100	82	50	71	78	57	75	59	43
SAMPLE SIZE (#)	**27**	**16**	**1**	**10**	**18**	**9**	**6**	**11**	**6**	**7**	**9**	**7**	**8**	**17**	**7**
TOP 3 (8-10)	4	6	0	0	6	0	0	9	0	14	0	0	13	0	14
MID 4 (4-7)	19	19	0	20	17	22	0	9	33	0	11	43	13	29	29
BOTTOM 4 (0-3)	78	75	100	80	78	78	100	82	67	86	89	57	75	71	57
MEAN	1.5	1.6	.0	1.4	1.7	1.0	.0	1.2	2.0	1.7	.9	2.3	1.6	1.8	3.3

This question was randomly posed to approximately one in seven respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 20_2:

Before today, how familiar were you with:

Heat pump water heater

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	15	29	0	0	25	8	14	29	0	0	43	0	33	14	25
7	4	7	0	0	8	0	0	14	0	0	14	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	15	14	20	13	8	17	29	0	0	13	0	25	17	21	0
4	4	0	20	0	0	8	0	14	0	0	14	0	0	7	0
3	7	7	20	0	0	17	0	0	0	0	0	25	0	14	0
2	7	0	0	25	0	17	0	14	0	25	0	0	17	14	0
1	7	7	20	0	8	0	14	0	0	13	0	0	0	7	25
0 - Completely unfamiliar	41	36	20	63	50	33	43	29	100	50	29	50	33	21	50
SAMPLE SIZE (#)	**27**	**14**	**5**	**8**	**12**	**12**	**7**	**7**	**3**	**8**	**7**	**4**	**6**	**14**	**4**
TOP 3 (8-10)	15	29	0	0	25	8	14	29	0	0	43	0	33	14	25
MID 4 (4-7)	22	21	40	13	17	25	29	29	0	13	29	25	17	29	0
BOTTOM 4 (0-3)	63	50	60	88	58	67	57	43	100	88	29	75	50	57	75
MEAN	2.8	3.8	2.6	1.1	3.1	2.7	2.7	4.1	.0	1.3	5.0	2.0	3.8	3.3	2.3

This question was randomly posed to approximately one in seven respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 20_3:

Before today, how familiar were you with:

Open to closed cooler conversion (doors or covers on coolers)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	3	5	0	0	5	0	0	0	11	0	0	14	9	5	11
9	3	5	0	0	5	0	0	0	0	0	0	0	9	0	0
8	10	14	0	0	5	20	0	0	22	14	25	0	9	15	22
7	10	14	0	0	15	0	0	25	11	14	13	14	0	10	22
6	3	5	0	0	0	10	0	0	11	0	13	0	0	5	0
5	6	5	0	13	10	0	0	0	0	14	0	0	18	5	11
4	6	5	0	13	5	10	17	0	0	0	13	0	9	5	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	6	0	50	13	5	10	17	25	0	14	13	0	0	5	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0 - Completely unfamiliar	52	48	50	63	50	50	67	50	44	43	25	71	45	50	33
SAMPLE SIZE (#)	**31**	**21**	**2**	**8**	**20**	**10**	**6**	**4**	**9**	**7**	**8**	**7**	**11**	**20**	**9**
TOP 3 (8-10)	16	24	0	0	15	20	0	0	33	14	25	14	27	20	33
MID 4 (4-7)	26	29	0	25	30	20	17	25	22	29	38	14	27	25	33
BOTTOM 4 (0-3)	58	48	100	75	55	60	83	75	44	57	38	71	45	55	33
MEAN	3.0	3.8	1.0	1.4	3.2	2.8	1.0	2.3	4.3	3.1	4.4	2.4	3.7	3.3	5.0

This question was randomly posed to approximately one in seven respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 20_4:

Before today, how familiar were you with:

Door heater control (These are electric resistance heaters that are installed in the frames and doors of refrigerated cases to reduce condensation and prevent fogging.)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	4	0	33	0	0	10	17	0	0	33	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	9	17	0	0	17	0	0	0	17	0	17	20	0	18	40
5	9	8	0	13	17	0	17	0	17	0	17	20	11	18	0
4	4	8	0	0	0	10	0	17	0	0	0	20	0	9	0
3	4	8	0	0	0	0	0	0	0	0	0	0	0	0	0
2	13	8	33	13	8	20	17	17	17	0	33	0	0	18	20
1	4	8	0	0	0	10	0	0	17	0	0	20	0	9	0
0 - Completely unfamiliar	52	42	33	75	58	50	50	67	33	67	33	20	89	27	40
SAMPLE SIZE (#)	**23**	**12**	**3**	**8**	**12**	**10**	**6**	**6**	**6**	**3**	**6**	**5**	**9**	**11**	**5**
TOP 3 (8-10)	4	0	33	0	0	10	17	0	0	33	0	0	0	0	0
MID 4 (4-7)	22	33	0	13	33	10	17	17	33	0	33	60	11	45	40
BOTTOM 4 (0-3)	74	67	67	88	67	80	67	83	67	67	67	40	89	55	60
MEAN	1.9	2.3	3.3	.9	2.0	1.7	2.5	1.0	2.3	2.7	2.5	3.2	.6	2.8	2.8

This question was randomly posed to approximately one in seven respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 20_5:

Before today, how familiar were you with:

Packaged Terminal heat pump (A PTHP provides heating and cooling room by room often for applications such as hotels, motels, apartment buildings, offices, among others)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	8	7	0	11	7	13	11	20	0	17	14	0	0	8	33
9	4	0	50	0	7	0	11	0	0	0	0	20	13	0	0
8	8	7	50	0	7	13	0	0	17	0	14	20	13	17	17
7	4	7	0	0	0	13	0	0	17	0	14	0	0	8	0
6	8	7	0	11	0	25	22	0	0	17	0	0	25	8	0
5	4	7	0	0	7	0	0	0	17	0	14	0	0	8	0
4	4	7	0	0	7	0	0	0	0	0	0	0	0	0	0
3	8	14	0	0	13	0	11	0	17	17	0	20	0	8	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	4	0	0	11	7	0	11	0	0	17	0	0	13	0	0
0 - Completely unfamiliar	48	43	0	67	47	38	33	80	33	33	43	40	38	42	50
SAMPLE SIZE (#)	**25**	**14**	**2**	**9**	**15**	**8**	**9**	**5**	**6**	**6**	**7**	**5**	**8**	**12**	**6**
TOP 3 (8-10)	20	14	100	11	20	25	22	20	17	17	29	40	25	25	50
MID 4 (4-7)	20	29	0	11	13	38	22	0	33	17	29	0	25	25	0
BOTTOM 4 (0-3)	60	57	0	78	67	38	56	80	50	67	43	60	50	50	50
MEAN	3.2	3.3	8.5	1.9	2.9	4.6	3.9	2.0	3.8	3.3	4.3	4.0	3.8	3.9	4.7

This question was randomly posed to approximately one in seven respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 20_6:

Before today, how familiar were you with:

EC Motor for Refrigeration applications (An electronically commutated motor (EC Motor) is a motor that uses electronic controls to vary its speed. There are three types of EC motors: constant cfm, constant rpm, and constant torque)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	8	17	0	0	20	0	25	0	25	0	8	20	17	8	13
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	8	0	25	11	10	0	0	8	0	0	8	0	0	8	13
5	8	17	0	0	0	17	0	8	25	0	8	20	0	8	13
4	4	0	25	0	10	0	25	0	0	33	0	0	0	8	0
3	4	0	25	0	0	8	0	8	0	0	8	0	17	8	0
2	16	17	0	22	20	17	0	33	0	0	33	0	17	15	13
1	4	8	0	0	0	8	0	0	25	0	0	20	0	8	0
0 - Completely unfamiliar	48	42	25	67	40	50	50	42	25	67	33	40	50	38	50
SAMPLE SIZE (#)	**25**	**12**	**4**	**9**	**10**	**12**	**4**	**12**	**4**	**3**	**12**	**5**	**6**	**13**	**8**
TOP 3 (8-10)	8	17	0	0	20	0	25	0	25	0	8	20	17	8	13
MID 4 (4-7)	20	17	50	11	20	17	25	17	25	33	17	20	0	23	25
BOTTOM 4 (0-3)	72	67	50	89	60	83	50	83	50	67	75	60	83	69	63
MEAN	2.3	2.9	3.3	1.1	3.4	1.5	3.5	1.8	4.0	1.3	2.7	3.2	2.5	2.5	2.9

This question was randomly posed to approximately one in seven respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 20_7:

Before today, how familiar were you with:

Strategic energy management program (This involves processes that empower an organization to implement energy management actions and consistently achieve energy performance improvements)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	3	3	0	0	5	0	7	0	0	9	0	0	0	4	17
8	5	7	0	0	10	0	7	0	9	9	0	14	7	4	0
7	13	10	50	0	14	13	7	25	9	18	7	29	20	8	33
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	18	17	0	40	14	25	20	0	36	18	7	29	20	17	0
4	8	10	0	0	5	13	7	13	0	0	21	0	13	13	17
3	3	3	0	0	0	6	7	0	0	0	7	0	0	4	17
2	5	7	0	0	5	6	0	0	18	0	14	0	0	8	0
1	10	10	0	20	5	6	0	13	9	0	7	14	7	8	0
0 - Completely unfamiliar	36	33	50	40	43	31	47	50	18	45	36	14	33	33	17
SAMPLE SIZE (#)	**39**	**30**	**4**	**5**	**21**	**16**	**15**	**8**	**11**	**11**	**14**	**7**	**15**	**24**	**6**
TOP 3 (8-10)	8	10	0	0	14	0	13	0	9	18	0	14	7	8	17
MID 4 (4-7)	38	37	50	40	33	50	33	38	45	36	36	57	53	37	50
BOTTOM 4 (0-3)	54	53	50	60	52	50	53	63	45	45	64	29	40	54	33
MEAN	3.0	3.1	3.5	2.2	3.2	3.0	3.1	2.4	3.6	3.7	2.3	4.7	3.5	3.0	5.0

This question was randomly posed to approximately one in seven respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 23A:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing or implementing a(n) [ITEM SEEN IN Q20].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $100,000 if the project saved $[5,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	20	24	21	9	15	24	17	9	37	12	21	34	17	22	20
No	80	76	79	91	85	76	83	91	63	88	79	66	83	78	80
SAMPLE SIZE (#)	**162**	**99**	**19**	**44**	**97**	**63**	**47**	**44**	**38**	**43**	**57**	**32**	**53**	**96**	**41**

TABLE 23B:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing or implementing a(n) [ITEM SEEN IN Q20].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $100,000 if the project saved $[20,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	30	34	26	20	26	33	30	20	45	23	30	47	23	33	32
No	70	66	74	80	74	67	70	80	55	77	70	53	77	67	68
SAMPLE SIZE (#)	**162**	**99**	**19**	**44**	**97**	**63**	**47**	**44**	**38**	**43**	**57**	**32**	**53**	**96**	**41**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 23C:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing or implementing a(n) [ITEM SEEN IN Q20].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $100,000 if the project saved $[35,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	37	41	37	27	33	41	34	34	50	33	39	53	32	41	34
No	63	59	63	73	67	59	66	66	50	67	61	47	68	59	66
SAMPLE SIZE (#)	**162**	**99**	**19**	**44**	**97**	**63**	**47**	**44**	**38**	**43**	**57**	**32**	**53**	**96**	**41**

TABLE 23D:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing or implementing a(n) [ITEM SEEN IN Q20].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $100,000 if the project saved $[50,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	49	52	53	41	45	52	40	55	61	42	51	63	49	53	51
No	51	48	47	59	55	48	60	45	39	58	49	38	51	47	49
SAMPLE SIZE (#)	**162**	**99**	**19**	**44**	**97**	**63**	**47**	**44**	**38**	**43**	**57**	**32**	**53**	**96**	**41**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 23E:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing or implementing a(n) [ITEM SEEN IN Q20].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $100,000 if the project saved $[65,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	54	55	53	52	52	56	47	57	66	49	56	66	51	60	59
No	46	45	47	48	48	44	53	43	34	51	44	34	49	40	41
SAMPLE SIZE (#)	**162**	**99**	**19**	**44**	**97**	**63**	**47**	**44**	**38**	**43**	**57**	**32**	**53**	**96**	**41**

TABLE 23F:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing or implementing a(n) [ITEM SEEN IN Q20].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $100,000 if the project saved $[80,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	58	61	58	52	58	57	47	59	74	49	61	75	53	66	68
No	42	39	42	48	42	43	53	41	26	51	39	25	47	34	32
SAMPLE SIZE (#)	**162**	**99**	**19**	**44**	**97**	**63**	**47**	**44**	**38**	**43**	**57**	**32**	**53**	**96**	**41**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 23G:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing or implementing a(n) [ITEM SEEN IN Q20].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $100,000 if the project saved $[95,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	66	67	68	64	68	62	55	64	87	58	68	84	57	75	78
No	34	33	32	36	32	38	45	36	13	42	32	16	43	25	22
SAMPLE SIZE (#)	**162**	**99**	**19**	**44**	**97**	**63**	**47**	**44**	**38**	**43**	**57**	**32**	**53**	**96**	**41**

TABLE 23H:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing or implementing a(n) [ITEM SEEN IN Q20].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $100,000 if the project saved $[110,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	71	72	68	70	73	67	64	70	89	58	81	88	64	79	88
No	29	28	32	30	27	33	36	30	11	42	19	13	36	21	12
SAMPLE SIZE (#)	**162**	**99**	**19**	**44**	**97**	**63**	**47**	**44**	**38**	**43**	**57**	**32**	**53**	**96**	**41**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 23I:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed and MAY result in some inconvenience (for example, obtaining project estimates, selecting and overseeing a contractor for the installation). An example might be installing or implementing a(n) [ITEM SEEN IN Q20].

Would you generally pursue an energy efficiency project where the cost to you after utility rebates is $100,000 if the project saved $[125,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	73	73	79	73	75	70	66	75	92	63	84	88	70	83	90
No	27	27	21	27	25	30	34	25	8	37	16	13	30	17	10
SAMPLE SIZE (#)	**162**	**99**	**19**	**44**	**97**	**63**	**47**	**44**	**38**	**43**	**57**	**32**	**53**	**96**	**41**

TABLE 21_1:

Before today, how familiar were you with:

Networked/Connected lighting system

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
7	24	27	33	0	27	25	33	0	33	33	50	0	13	25	33
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	7	0	0	0	13	0	0	11	0	0	13	13	0	0
4	10	0	33	33	9	13	33	20	0	33	13	0	13	8	0
3	5	7	0	0	0	13	0	20	0	0	0	13	0	8	0
2	5	7	0	0	0	13	0	0	11	0	0	13	0	8	0
1	24	20	33	33	27	13	33	20	0	33	13	13	25	33	67
0 - Completely unfamiliar	24	27	0	33	36	0	0	40	33	0	25	38	25	8	0
SAMPLE SIZE (#)	**21**	**15**	**3**	**3**	**11**	**8**	**3**	**5**	**9**	**3**	**8**	**8**	**8**	**12**	**3**
TOP 3 (8-10)	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
MID 4 (4-7)	38	33	67	33	36	50	67	20	44	67	63	13	38	33	33
BOTTOM 4 (0-3)	57	60	33	67	64	38	33	80	44	33	38	75	50	58	67
MEAN	3.1	3.3	4.0	1.7	2.5	4.6	4.0	1.6	4.0	4.0	4.1	2.4	3.3	3.5	3.0

This question was randomly posed to approximately one in ten respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 21_2:

Before today, how familiar were you with:

LED linear replacement lamp (i.e., LED tube lamps)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
7	24	27	33	0	27	25	33	0	33	33	50	0	13	25	33
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	7	0	0	0	13	0	0	11	0	0	13	13	0	0
4	10	0	33	33	9	13	33	20	0	33	13	0	13	8	0
3	5	7	0	0	0	13	0	20	0	0	0	13	0	8	0
2	5	7	0	0	0	13	0	0	11	0	0	13	0	8	0
1	24	20	33	33	27	13	33	20	0	33	13	13	25	33	67
0 - Completely unfamiliar	24	27	0	33	36	0	0	40	33	0	25	38	25	8	0
SAMPLE SIZE (#)	**21**	**15**	**3**	**3**	**11**	**8**	**3**	**5**	**9**	**3**	**8**	**8**	**8**	**12**	**3**
TOP 3 (8-10)	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
MID 4 (4-7)	38	33	67	33	36	50	67	20	44	67	63	13	38	33	33
BOTTOM 4 (0-3)	57	60	33	67	64	38	33	80	44	33	38	75	50	58	67
MEAN	3.1	3.3	4.0	1.7	2.5	4.6	4.0	1.6	4.0	4.0	4.1	2.4	3.3	3.5	3.0

This question was randomly posed to approximately one in ten respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 21_3:

Before today, how familiar were you with:

Smart power bar (power bar that can be controlled via smart phone or computer or turn off automatically when you leave the room)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
7	24	27	33	0	27	25	33	0	33	33	50	0	13	25	33
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	7	0	0	0	13	0	0	11	0	0	13	13	0	0
4	10	0	33	33	9	13	33	20	0	33	13	0	13	8	0
3	5	7	0	0	0	13	0	20	0	0	0	13	0	8	0
2	5	7	0	0	0	13	0	0	11	0	0	13	0	8	0
1	24	20	33	33	27	13	33	20	0	33	13	13	25	33	67
0 - Completely unfamiliar	24	27	0	33	36	0	0	40	33	0	25	38	25	8	0
SAMPLE SIZE (#)	**21**	**15**	**3**	**3**	**11**	**8**	**3**	**5**	**9**	**3**	**8**	**8**	**8**	**12**	**3**
TOP 3 (8-10)	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
MID 4 (4-7)	38	33	67	33	36	50	67	20	44	67	63	13	38	33	33
BOTTOM 4 (0-3)	57	60	33	67	64	38	33	80	44	33	38	75	50	58	67
MEAN	3.1	3.3	4.0	1.7	2.5	4.6	4.0	1.6	4.0	4.0	4.1	2.4	3.3	3.5	3.0

This question was randomly posed to approximately one in ten respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 21_4:

Before today, how familiar were you with:

LED Pole/Arm-mounted luminaire (Exterior lighting generally used to provide illumination to areas for vehicle and pedestrian use, with light fixtures mounted to poles)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
7	24	27	33	0	27	25	33	0	33	33	50	0	13	25	33
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	7	0	0	0	13	0	0	11	0	0	13	13	0	0
4	10	0	33	33	9	13	33	20	0	33	13	0	13	8	0
3	5	7	0	0	0	13	0	20	0	0	0	13	0	8	0
2	5	7	0	0	0	13	0	0	11	0	0	13	0	8	0
1	24	20	33	33	27	13	33	20	0	33	13	13	25	33	67
0 - Completely unfamiliar	24	27	0	33	36	0	0	40	33	0	25	38	25	8	0
SAMPLE SIZE (#)	**21**	**15**	**3**	**3**	**11**	**8**	**3**	**5**	**9**	**3**	**8**	**8**	**8**	**12**	**3**
TOP 3 (8-10)	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
MID 4 (4-7)	38	33	67	33	36	50	67	20	44	67	63	13	38	33	33
BOTTOM 4 (0-3)	57	60	33	67	64	38	33	80	44	33	38	75	50	58	67
MEAN	3.1	3.3	4.0	1.7	2.5	4.6	4.0	1.6	4.0	4.0	4.1	2.4	3.3	3.5	3.0

This question was randomly posed to approximately one in ten respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 21_5:

Before today, how familiar were you with:

LED parking garage light

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
7	24	27	33	0	27	25	33	0	33	33	50	0	13	25	33
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	7	0	0	0	13	0	0	11	0	0	13	13	0	0
4	10	0	33	33	9	13	33	20	0	33	13	0	13	8	0
3	5	7	0	0	0	13	0	20	0	0	0	13	0	8	0
2	5	7	0	0	0	13	0	0	11	0	0	13	0	8	0
1	24	20	33	33	27	13	33	20	0	33	13	13	25	33	67
0 - Completely unfamiliar	24	27	0	33	36	0	0	40	33	0	25	38	25	8	0
SAMPLE SIZE (#)	**21**	**15**	**3**	**3**	**11**	**8**	**3**	**5**	**9**	**3**	**8**	**8**	**8**	**12**	**3**
TOP 3 (8-10)	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
MID 4 (4-7)	38	33	67	33	36	50	67	20	44	67	63	13	38	33	33
BOTTOM 4 (0-3)	57	60	33	67	64	38	33	80	44	33	38	75	50	58	67
MEAN	3.1	3.3	4.0	1.7	2.5	4.6	4.0	1.6	4.0	4.0	4.1	2.4	3.3	3.5	3.0

This question was randomly posed to approximately one in ten respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 21_6:

Before today, how familiar were you with:

Daylight dimming control

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
7	24	27	33	0	27	25	33	0	33	33	50	0	13	25	33
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	7	0	0	0	13	0	0	11	0	0	13	13	0	0
4	10	0	33	33	9	13	33	20	0	33	13	0	13	8	0
3	5	7	0	0	0	13	0	20	0	0	0	13	0	8	0
2	5	7	0	0	0	13	0	0	11	0	0	13	0	8	0
1	24	20	33	33	27	13	33	20	0	33	13	13	25	33	67
0 - Completely unfamiliar	24	27	0	33	36	0	0	40	33	0	25	38	25	8	0
SAMPLE SIZE (#)	**21**	**15**	**3**	**3**	**11**	**8**	**3**	**5**	**9**	**3**	**8**	**8**	**8**	**12**	**3**
TOP 3 (8-10)	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
MID 4 (4-7)	38	33	67	33	36	50	67	20	44	67	63	13	38	33	33
BOTTOM 4 (0-3)	57	60	33	67	64	38	33	80	44	33	38	75	50	58	67
MEAN	3.1	3.3	4.0	1.7	2.5	4.6	4.0	1.6	4.0	4.0	4.1	2.4	3.3	3.5	3.0

This question was randomly posed to approximately one in ten respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 21_7:

Before today, how familiar were you with:

LED track light (A lighting system in which the lights are fitted on tracks, allowing variable positioning)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
7	24	27	33	0	27	25	33	0	33	33	50	0	13	25	33
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	7	0	0	0	13	0	0	11	0	0	13	13	0	0
4	10	0	33	33	9	13	33	20	0	33	13	0	13	8	0
3	5	7	0	0	0	13	0	20	0	0	0	13	0	8	0
2	5	7	0	0	0	13	0	0	11	0	0	13	0	8	0
1	24	20	33	33	27	13	33	20	0	33	13	13	25	33	67
0 - Completely unfamiliar	24	27	0	33	36	0	0	40	33	0	25	38	25	8	0
SAMPLE SIZE (#)	**21**	**15**	**3**	**3**	**11**	**8**	**3**	**5**	**9**	**3**	**8**	**8**	**8**	**12**	**3**
TOP 3 (8-10)	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
MID 4 (4-7)	38	33	67	33	36	50	67	20	44	67	63	13	38	33	33
BOTTOM 4 (0-3)	57	60	33	67	64	38	33	80	44	33	38	75	50	58	67
MEAN	3.1	3.3	4.0	1.7	2.5	4.6	4.0	1.6	4.0	4.0	4.1	2.4	3.3	3.5	3.0

This question was randomly posed to approximately one in ten respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 21_8:

Before today, how familiar were you with:

Solid State (LED) recessed downlight (Small spotlight set in a ceiling and directed downwards)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
7	24	27	33	0	27	25	33	0	33	33	50	0	13	25	33
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	7	0	0	0	13	0	0	11	0	0	13	13	0	0
4	10	0	33	33	9	13	33	20	0	33	13	0	13	8	0
3	5	7	0	0	0	13	0	20	0	0	0	13	0	8	0
2	5	7	0	0	0	13	0	0	11	0	0	13	0	8	0
1	24	20	33	33	27	13	33	20	0	33	13	13	25	33	67
0 - Completely unfamiliar	24	27	0	33	36	0	0	40	33	0	25	38	25	8	0
SAMPLE SIZE (#)	**21**	**15**	**3**	**3**	**11**	**8**	**3**	**5**	**9**	**3**	**8**	**8**	**8**	**12**	**3**
TOP 3 (8-10)	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
MID 4 (4-7)	38	33	67	33	36	50	67	20	44	67	63	13	38	33	33
BOTTOM 4 (0-3)	57	60	33	67	64	38	33	80	44	33	38	75	50	58	67
MEAN	3.1	3.3	4.0	1.7	2.5	4.6	4.0	1.6	4.0	4.0	4.1	2.4	3.3	3.5	3.0

This question was randomly posed to approximately one in ten respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 21_9:

Before today, how familiar were you with:

LED flood light (which are downward lights with non-LED bulbs)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
7	24	27	33	0	27	25	33	0	33	33	50	0	13	25	33
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	7	0	0	0	13	0	0	11	0	0	13	13	0	0
4	10	0	33	33	9	13	33	20	0	33	13	0	13	8	0
3	5	7	0	0	0	13	0	20	0	0	0	13	0	8	0
2	5	7	0	0	0	13	0	0	11	0	0	13	0	8	0
1	24	20	33	33	27	13	33	20	0	33	13	13	25	33	67
0 - Completely unfamiliar	24	27	0	33	36	0	0	40	33	0	25	38	25	8	0
SAMPLE SIZE (#)	**21**	**15**	**3**	**3**	**11**	**8**	**3**	**5**	**9**	**3**	**8**	**8**	**8**	**12**	**3**
TOP 3 (8-10)	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
MID 4 (4-7)	38	33	67	33	36	50	67	20	44	67	63	13	38	33	33
BOTTOM 4 (0-3)	57	60	33	67	64	38	33	80	44	33	38	75	50	58	67
MEAN	3.1	3.3	4.0	1.7	2.5	4.6	4.0	1.6	4.0	4.0	4.1	2.4	3.3	3.5	3.0

This question was randomly posed to approximately one in ten respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 21_10:

Before today, how familiar were you with:

General service light (have a base sized like a normal light bulb and screw into regular light sockets)

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
10 - Completely familiar	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
7	24	27	33	0	27	25	33	0	33	33	50	0	13	25	33
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	5	7	0	0	0	13	0	0	11	0	0	13	13	0	0
4	10	0	33	33	9	13	33	20	0	33	13	0	13	8	0
3	5	7	0	0	0	13	0	20	0	0	0	13	0	8	0
2	5	7	0	0	0	13	0	0	11	0	0	13	0	8	0
1	24	20	33	33	27	13	33	20	0	33	13	13	25	33	67
0 - Completely unfamiliar	24	27	0	33	36	0	0	40	33	0	25	38	25	8	0
SAMPLE SIZE (#)	**21**	**15**	**3**	**3**	**11**	**8**	**3**	**5**	**9**	**3**	**8**	**8**	**8**	**12**	**3**
TOP 3 (8-10)	5	7	0	0	0	13	0	0	11	0	0	13	13	8	0
MID 4 (4-7)	38	33	67	33	36	50	67	20	44	67	63	13	38	33	33
BOTTOM 4 (0-3)	57	60	33	67	64	38	33	80	44	33	38	75	50	58	67
MEAN	3.1	3.3	4.0	1.7	2.5	4.6	4.0	1.6	4.0	4.0	4.1	2.4	3.3	3.5	3.0

This question was randomly posed to approximately one in ten respondents.

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 22A:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed. An example might be installing or implementing a(n) [ITEM SEEN IN Q21].

Would you generally pursue an energy efficiency project where the cost to your business after utility rebates is $7,500 if the project saved $[500] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	21	27	20	11	18	25	13	16	36	10	25	26	25	22	24
No	79	73	80	89	82	75	88	84	64	90	75	74	75	78	76
SAMPLE SIZE (#)	**164**	**97**	**20**	**47**	**98**	**63**	**48**	**43**	**39**	**41**	**55**	**35**	**52**	**98**	**42**

TABLE 22B:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed. An example might be installing or implementing a(n) [ITEM SEEN IN Q21].

Would you generally pursue an energy efficiency project where the cost to your business after utility rebates is $7,500 if the project saved $[2,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	36	41	40	23	33	40	23	37	51	24	38	46	29	39	38
No	64	59	60	77	67	60	77	63	49	76	62	54	71	61	62
SAMPLE SIZE (#)	**164**	**97**	**20**	**47**	**98**	**63**	**48**	**43**	**39**	**41**	**55**	**35**	**52**	**98**	**42**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 22C:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed. An example might be installing or implementing a(n) [ITEM SEEN IN Q21].

Would you generally pursue an energy efficiency project where the cost to your business after utility rebates is $7,500 if the project saved $[3,500] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	51	56	50	43	50	52	38	51	69	41	55	57	40	59	57
No	49	44	50	57	50	48	63	49	31	59	45	43	60	41	43
SAMPLE SIZE (#)	**164**	**97**	**20**	**47**	**98**	**63**	**48**	**43**	**39**	**41**	**55**	**35**	**52**	**98**	**42**

TABLE 22D:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed. An example might be installing or implementing a(n) [ITEM SEEN IN Q21].

Would you generally pursue an energy efficiency project where the cost to your business after utility rebates is $7,500 if the project saved $[5,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	62	63	60	60	62	60	52	60	79	46	69	69	50	69	71
No	38	37	40	40	38	40	48	40	21	54	31	31	50	31	29
SAMPLE SIZE (#)	**164**	**97**	**20**	**47**	**98**	**63**	**48**	**43**	**39**	**41**	**55**	**35**	**52**	**98**	**42**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 22E:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed. An example might be installing or implementing a(n) [ITEM SEEN IN Q21].

Would you generally pursue an energy efficiency project where the cost to your business after utility rebates is $7,500 if the project saved $[6,500] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	67	68	60	68	69	63	58	65	82	54	78	71	54	74	83
No	33	32	40	32	31	37	42	35	18	46	22	29	46	26	17
SAMPLE SIZE (#)	**164**	**97**	**20**	**47**	**98**	**63**	**48**	**43**	**39**	**41**	**55**	**35**	**52**	**98**	**42**

TABLE 22F:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed. An example might be installing or implementing a(n) [ITEM SEEN IN Q21].

Would you generally pursue an energy efficiency project where the cost to your business after utility rebates is $7,500 if the project saved $[8,000] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	72	71	70	74	74	68	69	70	85	61	87	71	62	80	88
No	28	29	30	26	26	32	31	30	15	39	13	29	38	20	12
SAMPLE SIZE (#)	**164**	**97**	**20**	**47**	**98**	**63**	**48**	**43**	**39**	**41**	**55**	**35**	**52**	**98**	**42**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 22G:

Suppose an energy efficiency project has NO impact on the QUALITY of lighting, heating, and cooling in your business, but changes the amount of energy consumed. An example might be installing or implementing a(n) [ITEM SEEN IN Q21].

Would you generally pursue an energy efficiency project where the cost to your business after utility rebates is $7,500 if the project saved $[9,500] per year?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes	75	76	75	74	78	72	71	73	90	66	88	80	69	84	90
No	25	24	25	26	22	28	29	27	10	34	13	20	31	16	10
SAMPLE SIZE (#)	**166**	**99**	**20**	**47**	**99**	**64**	**48**	**44**	**40**	**41**	**56**	**35**	**52**	**100**	**42**

TABLE 24:

How many full-time equivalent employees, including yourself, are currently working at your business location within Nova Scotia?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
1	13	12	18	11	16	10	36	0	0	32	5	3	12	13	11
2-5	15	12	24	18	13	19	43	0	0	35	7	6	19	16	8
6-15	22	17	6	38	23	19	21	42	0	8	36	9	27	21	38
16-75	27	26	35	27	23	32	0	58	22	16	33	35	27	24	24
More than 75	23	33	18	7	25	19	0	0	78	8	18	47	15	26	19
SAMPLE SIZE (#)	**151**	**89**	**17**	**45**	**83**	**62**	**53**	**53**	**45**	**37**	**55**	**34**	**52**	**90**	**37**
MEAN	155	187	54	131	147	90	3	19	508	20	162	192	142	110	51
MEDIAN	14	25	18	8	12	18	2	18	125	2	17	70	10	13	10

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 25:

Approximately, what is the square footage of your company's business property at the location where you work? Would you say…?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
1,000 square feet or less	18	15	12	28	16	22	45	2	3	60	0	0	24	16	8
More than 1,000 square feet up to 2,000 square feet	12	8	29	15	13	12	16	14	5	40	0	0	20	14	13
More than 2,000 square feet up to 5,000 square feet	21	20	24	23	22	21	16	42	5	0	49	0	22	20	25
More than 5,000 square feet, up to 10,000 square feet	22	25	6	21	22	21	14	23	31	0	51	0	8	23	35
More than 10,000 square feet, up to 25,000 square feet	14	15	18	8	12	16	5	12	23	0	0	50	12	13	13
More than 25,000 square feet	14	17	12	5	15	9	5	7	33	0	0	50	12	14	8
SAMPLE SIZE (#)	**148**	**92**	**17**	**39**	**86**	**58**	**44**	**43**	**39**	**45**	**63**	**40**	**49**	**93**	**40**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 26:

Does your company pay for its own electricity at your business' Nova Scotia location where you work, or does someone else, such as a landlord pay for it?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Yes, pay for own	67	64	60	76	76	56	71	71	61	77	65	58	74	69	73
Head office or other department pays	23	28	25	12	20	23	12	20	34	5	25	36	19	25	20
No, landlord pays	10	8	15	10	4	20	18	6	5	16	10	6	7	7	7
Other	1	0	0	2	0	2	0	2	0	2	0	0	0	0	0
SAMPLE SIZE (#)	**168**	**98**	**20**	**50**	**101**	**61**	**51**	**49**	**38**	**44**	**60**	**36**	**58**	**102**	**44**

TABLE 26A:

[IF CODES 1 OR 2 IN Q26] Please select the electric utility provider that provides electricity at your business' Nova Scotia location where you work.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Nova Scotia Power Incorporated	97	98	100	93	96	98	93	96	100	94	96	97	96	96	95
Antigonish Electric Utility	2	2	0	2	2	2	2	4	0	3	2	3	4	2	5
Berwick Electric Light Commission	1	0	0	2	1	0	2	0	0	0	2	0	0	1	0
Lunenburg Electric Utility	1	0	0	2	1	0	2	0	0	3	0	0	0	1	0
SAMPLE SIZE (#)	**149**	**89**	**17**	**43**	**96**	**48**	**42**	**45**	**35**	**36**	**54**	**33**	**54**	**94**	**41**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 27:

[IF Q26A 'Nova Scotia Power Incorporated'] Please select your business' rate code from the drop-down selection below. Your rate code can be found on your Nova Scotia Power bill.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
2	9	10	13	5	9	9	22	2	3	30	4	0	14	11	6
3	5	6	7	3	2	11	3	2	3	13	4	3	10	5	0
4M	7	5	13	11	8	7	6	7	9	10	12	3	4	11	6
4B	6	6	7	5	5	9	0	12	3	3	8	6	8	7	3
5	5	4	13	5	2	9	3	10	6	3	6	10	8	6	6
6	1	2	0	0	1	2	3	2	0	0	2	0	2	1	3
10M	7	7	13	3	6	9	6	5	9	0	4	16	4	5	11
10B	4	5	0	3	6	0	8	0	6	7	6	0	0	6	6
11M	2	2	0	3	2	2	3	2	3	3	2	3	0	2	0
11B	1	1	0	0	1	0	0	0	3	0	2	0	0	0	0
12M	1	0	7	0	1	0	0	2	0	0	2	0	0	0	3
12MTO	1	1	0	0	1	0	0	0	0	0	2	0	0	1	3
21M	1	2	0	0	2	0	0	0	6	0	0	3	2	2	3
22M	1	0	0	3	0	0	0	0	3	0	0	0	2	0	0
23M	1	1	0	0	1	0	0	0	3	0	0	3	2	1	0
999	1	0	0	3	0	2	0	2	0	0	2	0	0	1	3
Don't know/Not sure	47	46	27	58	51	39	47	52	41	30	43	52	44	40	50
SAMPLE SIZE (#)	**135**	**82**	**15**	**38**	**86**	**44**	**36**	**42**	**32**	**30**	**49**	**31**	**50**	**83**	**36**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 27_2:

[IF Q26A NOT 'Nova Scotia Power Incorporated'] Please select your business' rate code from the drop-down selection below. Your rate code can be commonly found on your electricity bill.

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
General	67	100	0	0	67	0	50	100	0	50	0	100	100	50	100
Residential	33	0	0	100	33	0	50	0	0	50	0	0	0	50	0
SAMPLE SIZE (#)	**3**	**2**	**0**	**1**	**3**	**0**	**2**	**1**	**0**	**2**	**0**	**1**	**2**	**2**	**2**

TABLE 28:

[IF Q27 'Don't know/Not sure'] Approximately, how much does your business spend on electricity each month?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
$1 - $500	13	16	0	9	9	24	41	0	8	44	10	0	14	15	11
$501 - $1,000	6	8	0	5	7	6	12	9	0	22	5	0	5	6	6
$1,001 - $10,000	5	5	0	5	7	0	12	5	0	11	5	6	5	3	0
$10,000 or more	3	3	0	5	5	0	0	0	15	0	0	13	5	6	0
Don't know/Not sure	73	68	100	77	73	71	35	86	77	22	81	81	73	70	83
SAMPLE SIZE (#)	**64**	**38**	**4**	**22**	**44**	**17**	**17**	**22**	**13**	**9**	**21**	**16**	**22**	**33**	**18**
MEAN	$3,907.94	$2,540.42	.	$7,190.00	$5,425.00	$267.00	$1,309.55	$1,566.67	$15,776.67	$1,775.00	$1,045.00	$16,333.33	$6,050.83	$5,166.00	$393.33

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 29:

[IF Q28 'Don't know/Not sure'] Would you classify your business as….

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Large business	28	38	50	7	25	30	17	13	50	0	6	75	0	35	15
Small business	28	25	50	29	32	20	67	31	20	50	53	0	40	20	38
Large commercial	8	13	0	0	11	0	0	0	20	0	6	8	7	10	0
Small Commercial	3	4	0	0	0	10	0	6	0	0	6	0	0	0	8
Industrial	18	8	0	36	18	20	17	13	0	0	6	8	27	20	23
Institutional	18	13	0	29	14	20	0	38	10	50	24	8	27	15	15
SAMPLE SIZE (#)	**40**	**24**	**2**	**14**	**28**	**10**	**6**	**16**	**10**	**2**	**17**	**12**	**15**	**20**	**13**

TABLE 30:

What is the main source of energy used to heat your business' Nova Scotia location where you work?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Electricity	50	57	47	35	47	56	52	40	54	41	53	56	25	74	36
Oil	24	15	37	38	23	23	28	27	18	39	12	18	63	10	4
Heat pump/Mini-split heat pump	10	9	11	13	15	3	8	17	5	15	14	6	6	7	38
Natural gas	8	12	0	2	7	10	4	6	15	2	10	15	0	5	9
Propane	5	4	5	8	4	8	2	8	8	0	8	6	2	4	11
Wood/pellets/chips	2	2	0	4	4	0	6	2	0	2	3	0	3	1	2
SAMPLE SIZE (#)	**165**	**98**	**19**	**48**	**96**	**62**	**50**	**48**	**39**	**41**	**59**	**34**	**63**	**111**	**45**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 31:

What other types of heating, if any, do you currently have for your business' Nova Scotia location where you work?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Electricity	19	17	18	25	22	16	17	20	21	29	16	18	23	28	30
Heat pump/Mini-split heat pump	19	19	24	16	21	16	17	20	18	5	29	18	9	20	64
Oil	15	17	12	14	16	16	13	15	15	16	15	18	40	17	16
Propane	8	7	6	11	9	5	9	7	9	5	7	18	5	10	11
Natural gas	6	9	6	0	10	0	2	4	12	3	9	9	7	7	9
Wood/pellets/chips	5	5	0	7	8	0	11	0	3	8	4	6	4	7	9
Solar	3	5	0	0	3	2	0	0	9	0	2	9	2	3	5
Other	1	1	0	0	0	2	0	0	3	0	2	0	0	1	0
None - no other type of heating is used	42	43	41	39	34	51	48	39	44	39	33	47	37	31	7
SAMPLE SIZE (#)	**149**	**88**	**17**	**44**	**90**	**55**	**46**	**46**	**34**	**38**	**55**	**34**	**57**	**103**	**44**

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 30+31:

What other types of heating, if any, do you currently have for your business' Nova Scotia location where you work?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Electricity	67	72	63	58	68	71	68	58	72	68	68	74	46	100	64
Oil	38	31	47	50	38	37	40	42	31	54	25	35	100	26	20
Heat pump/Mini-split heat pump	27	27	32	27	34	18	24	35	21	20	41	24	14	26	100
Natural gas	13	20	5	2	17	10	6	10	26	5	19	24	6	11	18
Propane	13	10	11	19	13	13	10	15	15	5	15	24	6	13	22
Wood/pellets/chips	7	6	0	10	11	0	16	2	3	10	7	6	6	7	11
Solar	2	4	0	0	3	2	0	0	8	0	2	9	2	3	4
Other	1	1	0	0	0	2	0	0	3	0	2	0	0	1	0
SAMPLE SIZE (#)	**165**	**98**	**19**	**48**	**96**	**62**	**50**	**48**	**39**	**41**	**59**	**34**	**63**	**111**	**45**

TABLE 32:

[IF Q30 OR Q31 'Electricity'] What type of electric heating does your business' location use?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Electric Baseboards (e.g., small electric heaters, places throughout your building, typically under windows)	60	54	80	67	62	58	59	69	78	67	53	65	63	60	48
Central Air-Source Heat Pump (i.e., a central heat pump system that heats all or most of the building, through distributed hot water or hot air)	11	11	10	11	10	14	3	15	17	4	15	17	7	11	22
Electric Resistance Furnace (i.e., a central furnace which uses an electric heating element and distributes heat through forced-air)	10	11	0	11	7	14	9	0	4	7	9	9	11	10	4
Ductless/Mini-Split Heat Pump (i.e., a heat pump system that has an indoor unit placed on a wall, that typically only heats a small area of the building)	8	8	10	7	10	6	16	4	0	11	12	4	4	8	15

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 32:

[IF Q30 OR Q31 'Electricity'] What type of electric heating does your business' location use?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Electric Resistance Boiler (i.e., a central furnace which uses an electric heating element and distributes heat through hot water, to your floor or radiators)	6	8	0	4	8	3	3	8	0	0	12	4	7	6	11
Other	4	7	0	0	3	6	9	4	0	11	0	0	7	4	0
SAMPLE SIZE (#)	**98**	**61**	**10**	**27**	**60**	**36**	**32**	**26**	**23**	**27**	**34**	**23**	**27**	**98**	**27**

TABLE 33:

In what specific business sector or industry is your organization currently involved as its primary activity?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Health care and social assistance	11	8	20	14	6	17	14	10	2	20	8	5	8	10	5
Retail trade	9	7	20	10	7	13	10	10	11	5	8	13	10	9	2
Construction	9	12	0	6	12	6	16	6	4	14	8	5	12	10	7
Other services (except public administration)	8	6	5	12	6	10	8	8	2	5	7	5	5	6	5
Educational services	8	6	10	10	7	8	10	10	4	7	15	0	10	4	14
Professional, scientific and technical services	6	7	5	4	5	8	8	4	7	14	5	5	5	6	12
Public administration	5	6	5	4	7	1	0	2	16	2	2	13	8	5	2
Accommodation and food services	5	4	10	8	10	0	6	6	4	2	3	13	7	6	7
Manufacturing	5	5	0	8	6	6	4	4	7	2	3	5	3	6	7
Finance and insurance	5	5	5	4	5	4	4	6	4	5	7	3	5	7	2
Administrative and support, waste management and remediation services	4	4	0	4	4	4	4	4	2	7	2	3	5	5	2
Information and cultural industries	4	5	5	0	3	6	2	0	7	0	5	8	3	5	0
Wholesale trade	4	4	10	2	5	3	2	2	7	5	7	3	2	3	7
Arts, entertainment and recreation	3	4	0	2	2	4	2	4	4	0	5	3	2	4	5
Transportation and warehousing	3	2	5	4	3	3	2	4	2	0	3	3	2	3	5
Agriculture, forestry, fishing and hunting	2	1	0	6	4	0	6	2	0	2	3	3	2	2	2
Real estate and rental and leasing	2	3	0	0	2	1	0	4	0	2	3	0	0	1	2

NAVIGANT

2019 Electricity Usage Surveys - Business

TABLE 33:

In what specific business sector or industry is your organization currently involved as its primary activity?

	OVERALL %	REGION			BUSINESS PREMISES		FT EMPLOYEES			SQUARE FOOTAGE			HEATING TYPE(S)		
		HRM	Cape Breton	Other mainland NS	Own	Lease/Rent	1-7	8-40	41+	Up to 2,000	2,001 - 10,000	More than 10,000	Oil	Electricity	Heat pump
Utilities	2	3	0	0	3	0	0	2	4	2	0	5	2	1	5
Management of companies and enterprises	1	1	0	2	2	0	2	2	0	5	0	0	3	2	0
Mining, quarrying, and oil and gas extraction	1	2	0	0	1	1	0	0	4	0	2	3	2	2	0
Other	4	5	0	2	4	4	2	6	7	2	5	3	3	4	7
SAMPLE SIZE (#)	**183**	**112**	**20**	**51**	**104**	**71**	**51**	**48**	**45**	**44**	**61**	**38**	**59**	**108**	**42**

Appendix C: Demand Response Model Inputs

Filed Electronically

This page is intentionally left blank

Appendix D: Demand Response Model Outputs

Filed Electronically

This page is intentionally left blank

Appendix E: Energy Efficiency Model Inputs

Filed Electronically

This page is intentionally left blank

Appendix F: Energy Efficiency Model Outputs

Filed Electronically

This page is intentionally left blank

Appendix G: EE Base Case Achievable 8760 Loadshape Disaggregation

Filed Electronically

This page is intentionally left blank