



Énergie NB Power

DSM Plan 2018/19-2020/21

Energy Efficiency and
Demand Response Initiatives

DSM PLAN 2018/19-2020/21

Energy Efficiency and Demand Response Initiatives

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DSM PLAN DEVELOPMENT:

The 2018/19-2020/21 DSM Plan was developed by NB Power with the support of Dunsky Energy Consulting; a mission-driven firm specialized in sustainable energy strategies. Dunsky supports North American governments, utilities, private firms and non-profits in their efforts to build a more sustainable future. They do so by assessing market-wide energy efficiency, renewable energy and sustainable mobility opportunities; by designing programs, policies and strategies to accelerate their adoption; and by evaluating (and improving) their performance..

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1 PLAN OVERVIEW

1.1 Introduction

Demand side management (DSM) is a cornerstone of NB Power's commitment to a vision of sustainable electricity and to being our customers' partner of choice. Although the primary goal of these programs is to promote the efficient use of energy in our customer's homes and businesses they also help improve comfort, create jobs, reduce greenhouse gas emissions, stimulate the economy, and keep rates low and stable.

Customers¹ who participate in NB Power's programs are expected to save over \$162 million² on their energy bills during the lifetime³ of the measures that will be purchased and installed over the period of this Plan.

- \$77 million for residential customers;
- \$50 million for commercial customers;
- \$35 million for industrial customers;

They will also help the utility avoid approximately 129,000 tonnes of CO₂e emissions; equivalent to taking approximately 27,000 cars off of the road.

DSM is one of the three interrelated elements of the Energy Smart New Brunswick plan, which strives not only to empower customers to lower their bills but to keep rates low and stable by offsetting fuel and purchased power costs, and future generating capacity costs. Over the course of the Plan, NB Power will target a reduction in In-Province Energy (Energy) of 259 GWh (928,800 GJ) and a reduction in Annual Peak Hour Demand (Demand) of 72 MW resulting in approximately \$142 million in avoided costs⁴.

The 2018/19-2020/21 DSM Plan is NB Power's second triennial submission of demand side management activities to the New Brunswick Energy and Utilities Board. The energy and demand savings attributed to this Plan are a key contributor to the 2017 Integrated Resource Plan's 25 year targets.

This report outlines NB Power's DSM Plan for the 2018/19 through 2020/21 fiscal years and includes activities related to incentive based programs, behavioral programs, market transformation, as well as evaluation, measurement, and verification (EM&V).

¹ Residential, Commercial and Industrial customers that are served by New Brunswick's municipal utilities (Edmundston Energy, Perth-Andover Light Commission, and Saint John Energy) are eligible to participate in NB Power's DSM programs.

² All dollars savings are expressed as Net Present Value (NPV) over the Effective Useful Life (EUL) of the efficiency measures discounted to 2018 dollars

³ The estimated Effective Useful Life (EUL) for individual efficiency measures are documented in the Technical Reference Manual

⁴ All avoided cost savings are expressed as NPV discounted to 2018 dollars

The DSM Plan is structured as follows:

SECTION 2 – 2016-2018 DSM ACHIEVEMENTS

This section presents an overview of achievements from the 2016-2018 DSM Plan plus lessons learned from evaluation, measurement, and verification activities.

SECTION 3 – RESIDENTIAL STRATEGY

This section presents a description of the residential strategy, including a description of each of the six programs including key features, energy and demand savings, cost effectiveness, and investments.

SECTION 4 – COMMERCIAL & INDUSTRIAL STRATEGY

This section presents a description of the commercial and industrial strategy, including a description of each of the six programs including key features, energy and demand savings, cost effectiveness, and investments.

SECTION 5 – ENABLING STRATEGY

This section presents a description of the enabling strategy including a description of associated activities and investments.

SECTION 6 – COST-EFFECTIVENESS ANALYSIS

This section outlines NB Power’s approach to applying industry standard cost effectiveness tests to compare the relative costs and benefits of each program in the Plan.

Appendices are also provided at the end of the document:

APPENDIX A – EM&V PLAN

This section defines NB Power’s evaluation, measurement, and verification methods and activities associated with the DSM Plan.

APPENDIX B – COST EFFECTIVENESS ANALYSIS

This section provides an overview of the cost effectiveness methodology employed in the Plan.

1.2 Plan Highlights

This section offers an overview of the incentive and behavioral based programs and activities planned for the 2018/19 -2020/21 period and the policy considerations that determined the makeup of the portfolio. A more detailed description along with energy and demand savings, cost-effectiveness, and costs for each program is available in Sections 3 through 6 and the Appendices.

1.2.1 Key Features

The goal of the Plan is to offer a portfolio of programs that cover a wide cross section of NB Power’s customers (direct customers and those served by New Brunswick’s municipal utilities) that are tailored to their objectives and needs. The utility currently has programs in the residential, commercial and industrial sectors and is delivering programs in specific sub-sectors such as low income residential and small business to even further increase the accessibility of programs to traditionally underserved markets.

Building on the success of these initiatives, NB Power will launch programs for new construction in the residential and commercial sectors and continue its exploration of demand response programs that leverage the Smart Grid and Smart Solution elements of Energy Smart NB.

To ensure that customers and the utility are getting the best value for their investment in DSM, NB Power will pursue measures that are cost effective or trending towards cost effectiveness. To ensure transparency and credibility of the claims made in the Plan, the utility has implemented the following measures:

- Technical Reference Manual (TRM):** The TRM documents the methodologies used to determine the energy and demand savings generated from energy efficiency measures in the Plan. The output from the document supports the development of program savings and cost forecasts, provides key inputs for conducting cost-effectiveness analysis, enables results tracking, and facilitates the evaluation of program impact.
- Independent Third Party Evaluation:** An Independent third party evaluator is contracted to evaluate the gross and net savings attributed to the programs, determine the influence of the programs on the market, and identify opportunities for improving program effectiveness.
- Annual Reporting:** An annual report on DSM expenditures and savings resulting from the most recently completed fiscal year’s activities is provided to the New Brunswick Energy and Utilities Board as part of NB Power’s General Rate Application.

The measures above, along with other internal evaluation techniques will allow the utility to exit saturated markets and to seize new opportunities as they arise. Overall the Plan’s success requires a flexible approach to implementation allowing NB Power to adjust program design, add or remove measures, or reallocate budget within the Plan to ensure that targets are met.

1.2.2 DSM Plan OM&A

The three-year planned spending for the DSM Plan is presented in Table 1 below. Budgets include all costs associated with achieving program results such as administration, staff, design, marketing, and incentives.

Table 1: Overview of Planned Spending by Strategy, \$ Millions

STRATEGY	2018/19	2019/20	2020/21	3-YR Total
Residential*	13.5	15.3	15.9	44.7
Commercial & Industrial	8.1	10.4	13.5	31.9
Enabling	1.6	1.9	2.2	5.7
TOTAL*	23.2	27.5	31.6	82.3

* Includes the Low-Income program, which is funded by the NB Government for \$2.0 Million per year for each year of the Plan, with additional funds provided by NB Power 2018/19: \$2.0 M, 2019/20: \$2.0 M, and 2020/21: \$1.0 M.
 Note: totals may not reflect sum of individual line items due to rounding.

1.2.3 Energy and Demand Savings

The portfolio of energy efficiency and demand response programs is expected to yield the following energy savings and demand reductions across the province of New Brunswick.

Table 2: Overview of DSM Energy and Demand Savings

INITIATIVE	Type	Status	Energy Savings by 2020/21 (GWh/Yr*)	Peak Reduction by 2020/21 (MW*)
RESIDENTIAL INITIATIVES			108.1	37.1
Energy Efficient Product Rebates	EE	Existing	32.0	6.3
Residential Home Retrofit + Direct Install	EE	Existing	19.4	5.2
Home Energy Report	EE	Existing	38.3	5.2
Low Income Energy Savings Program	EE	Existing	6.1	2.1
Residential New Construction Program	EE	New	11.2	3.3
Residential Demand Response	DR	New	1.2	15.0
COMMERCIAL & INDUSTRIAL INITIATIVES			150.6	34.9
Commercial				
Commercial Building Retrofit Program	EE	Existing	31.2	4.7
Small Business Lighting Program	EE	Existing	27.4	3.9
Commercial New Construction Program	EE	New	0.9	0.1
Industrial				
Small/Medium Industrial Program	EE	Existing	8.1	1.9
Large Industrial Program	EE	Existing	81.9	9.4
Commercial / Industrial Demand Response	DR	New	1.2	15.0
TOTAL PORTFOLIO			258.6	72.0
<i>Energy efficiency</i>	<i>EE</i>	<i>New, Existing</i>	<i>256.3</i>	<i>42.1</i>
<i>Demand response</i>	<i>DR</i>	<i>New</i>	<i>2.3</i>	<i>29.9</i>

* GWh and MW at generator (i.e. line losses are included).

Note: totals may not reflect sum of individual line items due to rounding.

1.2.4 Benefits

The DSM Plan will result in significant economic, social, and environmental benefits, notably:

- Total In-Province Energy savings of 259 GWh (928,800 GJ) over 2018/19 – 2020/21, equivalent to the average annual consumption of more than 15,000 New Brunswick households
- Total Annual Peak Hour Demand (Peak) reduction of 72 MW by 2020/21
- A benefit to cost ratio of 2.8 for participants, and 2.0 for NB Power
- Support the sustained development of the province’s DSM products and services industry
- Over 129,000 tonnes of CO₂e emissions avoided over 2018/19 – 2020/21, equivalent to removing approximately 27,000 cars from the road for one year
- Create the equivalent of over 1,800 Job Years⁵ from 2018/19 – 2020/21

⁵ Environment Northeast - *Energy Efficiency: Engine of Economic Growth in New Brunswick, Results from a Macroeconomic Modeling and Tax Impact Assessment*, May 2012

1.2.5 Cost-effectiveness

NB Power used two industry standard economic tests: the Program Administrator Cost Test (PACT), and the Participant Cost Test (PCT) to screen potential DSM programs. While the former reflects the perspective of NB Power (by comparing avoided costs to NB Power’s investment in DSM), the latter reflects the perspective of program participants (primarily their investments versus bill savings). Table 3 provides results for each sector.

Table 3: Cost-Effectiveness by Sector

SECTOR	PACT				PCT			
	Benefits	Costs	B/C	B/C	Benefits	Costs	B/C	B/C
	(\$M)	(\$M)	(\$M)	(ratio)	(\$M)	(\$M)	(\$M)	(ratio)
Residential	66.6	42.1	24.5	1.6	77.6	29.0	48.6	2.7
Commercial & Industrial	75.9	29.9	46.0	2.5	85.1	28.9	56.2	2.9

Note: all dollar figures were discounted to the year 2018.

The portfolio of programs for both sectors is cost-effective, with positive benefit/cost ratios for both participants and NB Power. Section 6.4 outlines the cost-effectiveness methodology employed, and presents the PACT, PCT, as well as other industry standard cost-effectiveness tests such as Total Resource Cost Test (TRC) and Rate Impact Measure (RIM) test ratios for each program. An overview of the cost effectiveness methodology employed in the Plan is available in Appendix B.

1.2.6 Demand Response Strategy

The DSM Plan includes \$8 million to pursue initiatives that allow customers to reduce their expected consumption in response to utility price and/or reliability signals. NB Power’s current demand response strategy focuses on programs that encourage customers to reduce or shift consumption to offset Annual Peak Hour Demand. As the utility implements new technology and business process improvements associated with Smart Grid, new opportunities will emerge allowing NB Power to leverage these loads not only for peak load management but to potentially offset ancillary service costs or take advantage of wholesale market opportunities.

Over the past 3 years, NB Power has gained some experience with demand response initiatives. These pilots have been used to test new processes, technologies, and value propositions for NB Power customers to ensure that these opportunities can be delivered cost-effectively before rolling them out to the broader market. Flexibility in the implementation of the demand response strategy is needed since alignment with NB Power’s Smart Grid initiative is critical to a successful deployment. Smart Grid technologies such as Advanced Metering Infrastructure (AMI) and the Integrated Load Management (ILM) system are foundational to forecasting and evaluating the impact of these programs and achieving their ultimate value.

Therefore, NB Power has not allocated the budget above to a specific program or pilot, but to achieving an overall 30 MW reduction in Annual Peak Hour Demand from 2018/19 – 2020/21. Expenditures and savings related to demand response programs will be reported as part of the annual reporting process.

1.2.7 Policy Considerations

In building its portfolio of DSM investments, NB Power has taken into account the following key policy considerations:

- **Accessibility:** The Plan includes a portfolio of programs that cover a wide cross section of the utilities’ customers with programs tailored to the specific needs of each. Homes and businesses that are served by New Brunswick’s municipal utilities are also eligible to participate in NB Power’s DSM programs.
- **Market Transformation:** While recognizing the importance of initiatives that could lead to important short-term program savings and success, NB Power will invest in long-term market transformation or enabling strategies, such as education and awareness initiatives, to create lasting and permanent behavioural change in customers and market participants, build capacity in province’s DSM energy efficiency products and services industry, and to accelerate the adoption of energy efficient products and services as a matter of standard practice.
- **Capacity Building:** NB Power will support increased trade proficiencies in energy efficiency through increased demand, and also through dedicated training opportunities and sponsored communication forums for businesses involved in energy efficiency in the province.
- **Existing Infrastructure:** In implementing its DSM Plan, the utility will leverage to the extent possible the infrastructure associated with NB Power’s Smart Grid initiatives.
- **Funding from Provincial Government:** NB Power has partnered with the Government of New Brunswick to fund a \$4 million Low Income Energy Savings program for 2018/19 and 2019/20 and \$3 million for 2020/21. Each partner will contribute \$2 million annually for 2018/19 and 2019/20, with NB Power contributing \$1 million in 2020/21.

1.2.8 Multi-Fuel Strategy

Although the Plan contains only investments and savings related to electricity savings, NB Power is well positioned to act as the primary organization for the promotion and delivery of energy efficiency, energy conservation, and demand side management across all-fuel types in the province of New Brunswick.

Over the past 3 years, the utility has developed strong organizational capabilities to help households and businesses achieve sustained electrical energy savings and reduce greenhouse gas emissions. Leveraging this infrastructure to reduce consumption for non-electric fuels would increase the savings impact of DSM programs, help reduce program costs, and enhance customer satisfaction by providing a ‘one stop shop’ for New Brunswickers, regardless of how they heat their homes or operate their businesses.

NB Power has not conducted a detailed analysis of the available cost-effective energy efficiency potential for non-electric DSM programs, nor the investment required to procure those savings. Table 4 provides a high-level estimate of energy efficiency potential and estimated cost based on information from jurisdictions that implement multi-fuel programs.

Table 4: Estimated Energy Efficiency Potential and Investments for Multi Fuel*

FUEL SOURCE	Annual Potential EE (% of Sales)	Unit Cost (\$/GJ – Lifetime)**	Emissions Factor (KgCO2/GJ)
Natural Gas	0.7-1.2%	1.5 - 4	51
Fuel Oil	0.5-1.2%	5.5 -6.5	75

* These are high-level estimates that should not be used for program target or budget setting purposes

** Based on a societal discount rate of 2.5%

By expanding its current portfolio of DSM programs to non-electric fuels, NB Power can quickly provide a robust, efficient gateway to energy efficiency for all New Brunswick households and businesses, thus reducing barriers to participation and providing greater value to customers. The utility is currently in discussion with other multi-fuel DSM providers to gain insight into the types of programs that could be offered to New Brunswickers.

For the 2018/19-2020/21 period, 8 current programs are prime candidates for a multi-fuel approach, either by expanding eligibility to include non-electric fuels, and/or by adding non-electric efficiency measures.

Table 5: Existing Program with Multi-Fuel Potential

DSM PROGRAM	Eligibility Criteria	Multi-Fuel Measures
Residential		
Low-Income Energy Savings Program	Already multi-fuel	Already multi-fuel
Residential Direct Install Program	✓	✓
Residential Retrofit Program	✓	✓
Residential New Construction Program	✓	✓
Commercial & Industrial		
Commercial Building Retrofit Program	✓	✓
Commercial New Construction Program	✓	✓
Small/Medium Industrial Program	✓	✓
Large Industrial Program	✓	✓

It should be noted that funding for non-electric DSM programs requires a third-party funding mechanism since non-electric savings should not be funded through NB Power’s electricity customers. NB Power management is currently working with the Government of New Brunswick on potential funding models. A multi-fuel mandate will also require a robust cost-allocation mechanism to ensure costs are attributed to the appropriate funding sources. NB Power will work in partnership with the Government of New Brunswick to develop this mechanism.

1.2.9 Climate Change

The Government of New Brunswick has set a clear path to combat climate change and reduce GHG emissions. NB Power is a member of the Federal and Aboriginal Relations Priority Development Unit (FAR-PDU), which is the governance body that oversees the progress of the government’s actions related to energy efficiency goals stated in the Climate Change Action Plan. As a crown corporation and the main electricity distributor in the province, NB Power holds a unique position to assist the province in the achievement of these targets. As the primary DSM delivery agent, NB Power can support several initiatives to reduce greenhouse gas emissions in the province, examples include:

- Education and Awareness**
 NB Power can leverage Energy Smart NB and its multiple communication channels to support government communication strategies on climate change. Also, the utility can leverage its relationships with trade allies who already help customers achieve conservation and efficiency goals through its portfolio of programs.
- Energy Efficiency Programs**
 With electricity generation accounting for approximately 30% of the province’s GHG emissions, reducing electricity consumption through energy efficiency initiatives represents a significant opportunity. The DSM Plan will directly avoid 129,000 tonnes of annual CO₂e emissions

(electricity savings only), with significant additional potential reductions if a funding mechanism is approved to enable multi-fuel programs.

- **Renewables**

NB Power can help accelerate the adoption of renewable energy in the province by integrating renewable options into its program offerings. As the proportion of renewables increases, the carbon intensity of the energy supplied to the grid will decrease. The utility can support this goal by including initiatives to incentivize renewable fuel heating systems or energy storage as well as offering a 'renewable ready' tier to new construction programs.

- **Transportation**

With approximately 25% of provincial GHG emissions, the transportation sector is the second highest contributor to GHG emissions in New Brunswick. NB Power is leading the development of a public electric vehicle charging infrastructure and supporting the expansion of private charging facilities across the Province through its Smart Solution initiative. The utility will also contribute to educational campaigns to support a wider adoption of electric vehicles and alternative fuels for commercial fleets.

In addition, NB Power's energy efficiency program delivery infrastructure could be leveraged to accelerate the introduction of new programs to achieve the provincial targets for electric vehicles. For example, this may include programs to encourage off-peak charging, for personal transportation, buses, and industrial fleets.

NB Power is currently working on many of the initiatives mentioned above and is well positioned to execute on others.

2 2016-2018 DSM PLAN ACHIEVEMENTS

2.1 Overview

Through the first two years of the 2016-2018 DSM Plan NB Power has made strides towards its energy and demand targets. The utility has achieved 75% of its energy savings and 81% of its demand reduction goals through the end of 2016/17, and has built a solid foundation from which it can enhance existing programs and enter new markets to meet future goals.

Although there have been delays in the implementation of some programs from the 2016-2018 DSM Plan, by the end of 2017/18 NB Power will have launched multiple energy efficiency programs across the residential, commercial and industrial sectors. Also, the utility will continue to pursue its demand response strategy by leveraging Smart Grid initiatives and demand response technical pilot results.

The results from 2015/16 and 2016/17 DSM activities are provided in Table 6.

Table 6: 2015/16 - 2016/17 Actual DSM Costs and Savings

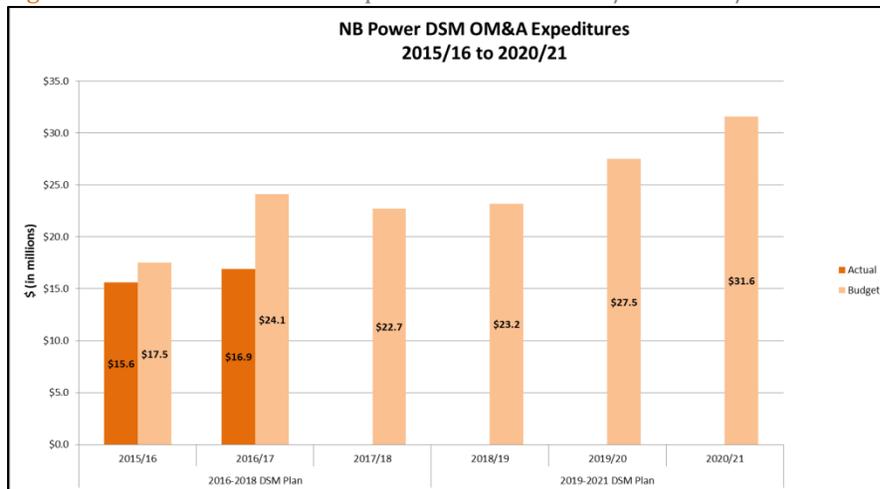
2016/17 Program Results *	GWh Savings	MW Savings	Participant Costs	Lifetime Participant Benefit	Participant Benefit-Cost Ratio (PCT)	NB Power Costs	Lifetime NB Power Benefit	NB Power Benefit-Cost Ratio (PACT)
Commercial Building Retrofit	8.4	1.1	\$5.4	\$7.4	1.4	\$2.1	\$6.4	3.0
Ductless Heat Pumps	16.0	12.7	\$7.4	\$16.7	2.3	\$7.8	\$16.7	2.1
Home Energy Report	4.1	0.9	\$0.0	\$0.4	N/A	\$1.6	\$0.2	0.1
LED Streetlights**	10.9	0.6	\$0.0	\$4.2	N/A	\$2.7	\$8.0	2.9
Residential Retrofit + DI	2.3	0.6	\$2.3	\$3.7	1.6	\$3.2	\$3.0	0.9
Energy Efficient Product Rebate	21.6	5.1	\$7.5	\$34.6	4.6	\$5.3	\$16.3	3.1
Enabling	N/A	N/A	N/A	N/A	N/A	\$1.1	N/A	N/A
Total	63.2	21.1	\$22.6	\$67.0	3.0	\$23.8	\$50.7	2.1

* Values in Table 6 will not align with values reported in prior fiscal years due to updates in actuals based on third party evaluation reports

** Commercial and industrial budget expenditures do not equal costs since only the incremental costs and maintenance savings are included from the LED Street Light program

NB Power's total investment in DSM for the 2018/19-2020/21 period will increase by 30% over the 2016 – 2018 DSM Plan. Spending in the residential sector will increase by 40% and spending in the commercial and industrial sector will increase by 20%.

Figure 1: Annual DSM OM&A Expenditures from 2015/16 - 2020/21



The energy target for the 2018/19-2020/21 Plan will increase by over 70% from the 2016-2018 DSM Plan.

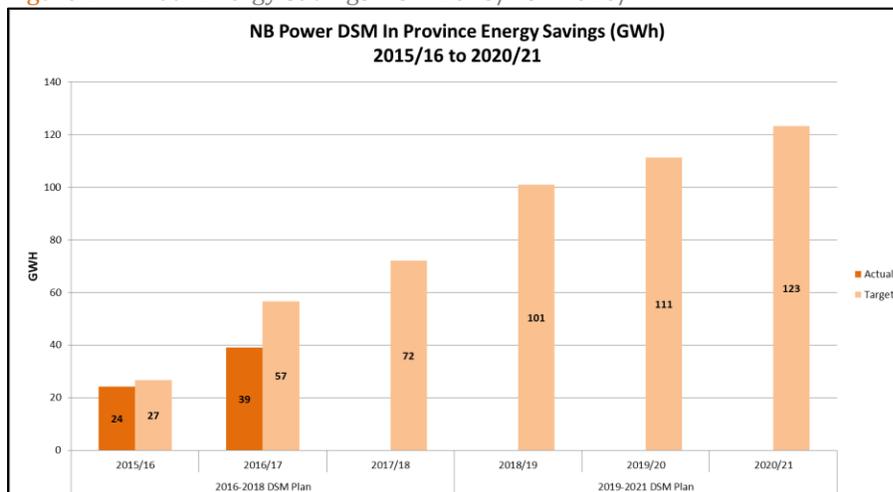
The residential sector energy target will increase by approximately 30% mainly due to the following factors:

- All residential energy efficiency programs will be striving for higher participant uptake over the period of the Plan.
- Third party evaluations of the current in-market programs have increased the energy savings impact of the residential portfolio.

The commercial and Industrial sector energy target will increase by over 125%, mainly due to the following factors:

- Commercial and industrial energy efficiency programs will be available to customers for the entire 3 Year period.
- The LED Streetlight program ended in 2017/18 and will be replaced by uptake in the commercial and industrial sector which tends to have a higher energy savings impact per dollar spent.

Figure 2: Annual Energy Savings from 2015/16 - 2020/21



The demand target for the 2018/19-2020/21 Plan will increase by over 20% from the 2016-2018 DSM Plan.

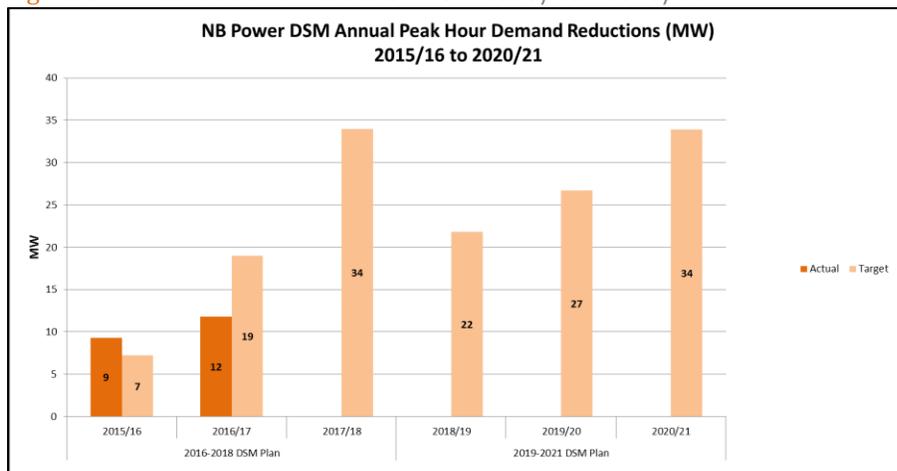
The residential sector demand target will increase by approximately 2% mainly due to the following factors:

- Demand targets related to demand response initiatives will not increase over the 2016-2018 DSM Plan.
- All residential energy efficiency programs will be striving for higher participant uptake over the period of the Plan.
- Third party evaluations of the current in-market programs have decreased the demand reduction impact of the residential portfolio.

The commercial and Industrial sector energy target will increase by approximately 50%, mainly due to the following factors:

- Demand targets related to demand response initiatives will not increase over the 2016-2018 DSM Plan.
- Commercial and industrial programs will be available to customers for the entire 3 Year period.
- The LED Streetlight program ended in 2017/18 and will be replaced by uptake in the commercial and industrial sector which tends to have a higher demand reduction impact per dollar spent.

Figure 3: Annual Demand Reduction from 2015/16 - 2020/21



The utility is currently working with an independent third-party evaluator that has performed evaluations on the programs listed in Table 7. The results from the evaluation activities conducted to date have been applied to the DSM forecast and recommendations from the Evaluator have been considered for enhancements and modifications to the programs. Details on specific enhancements for each program are presented in Section 3 and 4. The executive summaries for the evaluations conducted in 2015/16 and 2016/17 are available in Appendix AE – DSM Program Evaluations 2015/16 and Appendix AF - DSM Program Evaluations 2016/17.

Table 7: 2016-2018 DSM Program Evaluation Schedule

Program	2015/16 (Complete)	2016/17 (Complete)	2017/18 (Scheduled)
Commercial Building Retrofit	Impact	Impact	Impact
Ductless Heat Pumps		Impact	
LED Streetlights	Impact		
Low Income Energy Savings		Process, Market and Impact	
Residential Retrofit + Direct Install		Process, Market and Impact	
Energy Efficient Product Rebate	Process, Market and Impact		Market
Home Energy Report			Impact

3 RESIDENTIAL STRATEGY

3.1 Overview

NB Power’s residential energy efficiency programs seek to promote the efficient use of energy in customer’s homes. The utility will invest approximately \$45 million from 2018/19 – 2020/21 on programs that support New Brunswickers in making energy efficient choices to reduce their bills and improve comfort. Residential customers will save over \$77 million during the lifetime of the measures that will be purchased and installed over the lifetime of this Plan.

These initiatives also help NB Power reduce the cost of service by avoiding fuel and purchased power expenses and deferring future capital expenses for new generation, transmission and distribution assets. For every dollar NB Power invests on residential programs, it receives \$1.60 in benefits.

The utility will build on its experience over the last 3 years in the residential sector to achieve its energy and demand targets. Lesson learned from internal and third-party evaluation, measurement and verification initiatives have led to streamlined or enhanced program offerings, including:

- Changing the Residential Home Retrofit program to include measures beyond air sealing and insulation and take a more holistic approach to the market
- Ensuring additional heating systems are eligible for incentives (including Ductless Heat Pumps) and integrating this into the new Whole Home Residential Retrofit program
- Expanding the Residential Direct Install program to include multi-unit residential buildings, not for profit organizations and academic institutions
- The addition of a New Construction program beginning in 2018/19

The table below lists each program, its planned expenditure, and the expected energy savings and demand reductions for the 2018/19 – 2020/21 period.

Table 8: Overview of Residential DSM Initiatives

INITIATIVE	Type	Status	Total Budget over 3 Year Plan (\$M)	Annual Cumulative Energy Savings over 3 Year Plan (GWh*)	Annual Cumulative Peak Savings over 3 Year Plan (MW*)
Energy Efficient Product Rebates	EE	Existing	4.5	32.0	6.3
Residential Home Retrofit + DI Program	EE	Existing	12.6	19.4	5.2
Home Energy Report	EE	Existing	7.0	38.3	5.2
Low Income Energy Savings Program	EE	Existing	11.0	6.1	2.1
Residential New Construction Program	EE	New	5.7	11.2	3.3
Residential Demand Response	DR	New	4.0	1.2	15.0
TOTAL RESIDENTIAL INITIATIVES			44.7	108.1	37.1
<i>Energy efficiency</i>	<i>EE</i>	<i>New, Existing</i>	<i>40.7</i>	<i>106.9</i>	<i>22.1</i>
<i>Demand response</i>	<i>DR</i>	<i>New</i>	<i>4.0</i>	<i>1.2</i>	<i>15.0</i>

* GWh and MW at generator (i.e. line losses are included).

Note: totals may not reflect sum of individual line items due to rounding.

3.2 Energy Efficient Product Rebates

The Energy Efficient Product Rebate program is a point-of-sale energy efficient product rebate program that leverages a network of over 150 retailers.

KEY FEATURES & BENEFITS

The program consists of the following key features:

- Point-of-sale discounts for a suite of energy efficient residential products, notably:
 - Light emitting diode (LED) lamps;
 - Programmable thermostats;
 - Smart strip power bars;
 - Water efficient showerheads; and
 - Faucet aerators
- Incentives will be promoted in targeted campaigns in the fall and spring through both traditional and social media.

The program leverages a close partnership between NB Power and retailers across the province, to both raise awareness and engage customers to take action. In order to sustain savings and increase the availability of efficient products in retail stores across the province, NB Power will consider alternative products and/or program strategies, including mid-stream or upstream approaches in the future.

SAVINGS AND INVESTMENTS

The table below presents the energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 9: Savings and Investments for Energy Efficient Product Rebate Program

METRIC	UNITS	2018/19	2019/20	2020/21
Energy savings				
Annual incremental energy savings	GWh*	10.6	10.6	10.7
Annual cumulative energy savings	GWh*	10.6	21.3	32.0
Peak capacity savings				
Annual incremental winter peak savings	MW*	2.1	2.1	2.1
Annual cumulative winter peak savings	MW*	2.1	4.2	6.3
Program budget	\$M	1.9	1.5	1.1

* GWh and MW at generator (i.e. line losses are included).

Note: totals may not reflect sum of individual line items due to rounding.

3.3 Residential Whole Home Retrofit + Direct Install Program

NB Power will enhance its current residential retrofit offering to include measures beyond insulation and air sealing. The next iteration will be launched in 2018/19 and provide a more holistic approach to reducing energy consumption in the residential market. The program will continue to offer financial support to homeowners for the evaluation, planning, and execution of energy efficiency retrofit projects.

KEY FEATURES & BENEFITS

The program consists of the following key features:

- **Retrofit evaluation and planning:** homeowner receives a report detailing the energy saving opportunities suitable for their home.
- **Retrofit Implementation Incentives:** incentives are provided for approved retrofit measures, which include high efficiency heating systems; windows and doors; basement, attic and wall insulation as well as reduced infiltration.
- **Direct installation:** during the pre-upgrade evaluation, cost-effective energy efficient products will be installed free of charge. Products installed include water efficient showerheads, LED lights, faucet aerators, and pipe wrap.
- **Participation:** the program will target approximately 4,100 whole home upgrades over the 3 year Plan.

NB Power will also expand the current Residential Direct Install program to include more households, as well as develop strategies to engage multi-unit residential buildings, not for profit organizations and academic institutions. The program will continue to provide energy efficient products free of charge to customers.

SAVINGS AND INVESTMENTS

The table below presents the energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 10: Savings and Investments for Residential Retrofit + Direct Install

METRIC	UNITS	2018/19	2019/20	2020/21
Energy savings				
Annual incremental energy savings	GWh*	5.4	6.3	7.7
Annual cumulative energy savings	GWh*	5.4	11.7	19.4
Peak capacity savings				
Annual incremental winter peak savings	MW*	1.4	1.7	2.1
Annual cumulative winter peak savings	MW*	1.4	3.1	5.2
Program budget	\$M	3.3	4.0	5.2

Note: totals may not reflect sum of individual line items due to rounding.

* GWh and MW at generator (i.e. line losses are included).

3.4 Residential New Construction Program

NB Power plans to launch a residential new construction program in 2018/19. The program will be designed to encourage home builders to construct energy efficient homes in New Brunswick

KEY FEATURES & BENEFITS

The program consists of the following key features:

- **Building Labelling:** Incentives and benchmarks around a building labelling system such as the Natural Resources Canada EnerGuide Rating System.
- **Capacity Building:** Training and education will take place for builders and contractors to introduce the program and the benefits of building with energy efficiency in mind.
- **Participation:** the program will target approximately 2,000 new homes over the 3 year Plan.

SAVINGS AND INVESTMENTS

The table below presents the energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 11: Savings and Investments for Residential New Construction Program

METRIC	UNITS	2018/19	2019/20	2020/21
Energy savings				
Annual incremental energy savings	GWh*	2.4	4.3	4.5
Annual cumulative energy savings	GWh*	2.4	6.6	11.2
Peak capacity savings				
Annual incremental winter peak savings	MW*	0.7	1.3	1.3
Annual cumulative winter peak savings	MW*	0.7	2.0	3.3
Program budget	\$M	1.2	2.1	2.4

Note: totals may not reflect sum of individual line items due to rounding.

* GWh and MW at generator (i.e. line losses are included).

3.5 Home Energy Report Program

The Home Energy Report program offers a customized energy consumption report to a select group of customers to inform and empower them to adopt energy-conserving behaviors and measures.

KEY FEATURES & BENEFITS

The program consists of the following key features:

- **Participation:** NB Power offers 4 customized home energy reports annually to approximately 170,000 households (increased from 2017/18 participation level of 125,000). The reports compare household energy consumption to peers based on similar characteristics.
- **Web Portal:** All residential NB Power customers, even those not participating in the program, have access to the Home Energy Report portal where they can further explore their energy information and conduct a simple interactive home energy audit.
- **Savings:** Programs savings are evaluated using randomized control trials whereby the participants in the program are compared to a randomly assigned control group.

SAVINGS AND INVESTMENTS

The table below presents the energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 12: Savings and Investments for Home Energy Report Program

METRIC	UNITS	2018/19	2019/20	2020/21
Energy savings				
Annual incremental energy savings	GWh*	38.3	38.3	38.3
Annual cumulative energy savings	GWh*	38.3	38.3	38.3
Peak capacity savings				
Annual incremental winter peak savings	MW*	5.2	5.2	5.2
Annual cumulative winter peak savings	MW*	5.2	5.2	5.2
Program budget	\$M	2.3	2.3	2.3

Note: totals may not reflect sum of individual line items due to rounding.

* GWh and MW at generator (i.e. line losses are included).

3.6 Low Income Energy Savings Program

The Low-Income Energy Savings program is a multi-fuel energy efficiency program which offers fully-funded home retrofits for low-income homeowners. The program is funded in partnership with the Government of New Brunswick.

This program was specifically designed to address the particular needs of low income homeowners. The program offers fully funded and facilitated retrofits for energy efficiency. It targets homes in need of major efficiency upgrades, especially air sealing, insulation and heating systems, resulting in significant energy savings and increased comfort for homeowners.

KEY FEATURES & BENEFITS

The program consists of the following key features:

- **Fully funded and facilitated:** the program facilitates the entire retrofit process by auditing the home, purchasing energy efficient equipment and materials, and retrofitting the home, at no charge to the customer.
- **Focus on high-saving measures:** the program targets homes in need of major efficiency upgrades, most notably in terms of air sealing, insulation and heating systems. Such measures aim to help lower energy bills for low income customers.
- **Participation:** approximately 985 homes are expected to be retrofitted over the 2018/19 to 2020/21 timeframe.

SAVINGS AND INVESTMENTS

The table below presents the electrical energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 13: Savings and Investments for Low Income Energy Savings Program

METRIC	UNITS	FY18/19	FY19/20	FY20/21
Energy savings				
Annual incremental energy savings	GWh*	2.2	2.2	1.7
Annual cumulative energy savings	GWh*	2.2	4.4	6.1
Peak capacity savings				
Annual incremental winter peak savings	MW*	0.8	0.8	0.6
Annual cumulative winter peak savings	MW*	0.8	1.6	2.1
Program budget	\$M	4.0	4.0	3.0

* GWh and MW at generator (i.e. line losses are included).

Note: totals may not reflect sum of individual line items due to rounding.

Participants experience additional energy benefits beyond those shown in Table 13 since this program is a multi-fuel energy efficiency program.

3.7 Residential Demand Response

Throughout 2015/16 and 2016/17, NB Power conducted a series of technical pilots aimed at testing demand response technology and measures in the New Brunswick market. These pilots represent an integral part of NB Power’s approach to DSM and seek to balance the ability to achieve short-term demand reduction with the development of forward-looking opportunities that support our long-term vision. These pilots were used to test new processes, technologies and value propositions for NB Power customers and to ensure that these opportunities can be delivered cost-effectively before rolling them out to the broader market.

The 2018/19 to 2020/21 DSM Plan, will leverage these pilots and new capabilities delivered through the Smart Grid initiatives to develop Residential Demand Response pilots and programs. They will be developed to coincide with the Smart Grid implementation schedule in order to maximize benefits for NB Power and its customers, and effectively utilize AMI and ILM infrastructure.

KEY FEATURES & BENEFITS

The program consists of the following key features:

- **Infrastructure:** NB Power will monitor new control technologies and controllable devices to identify and pilot load shifting opportunities.
- **Load Strategies:** Multiple load strategies will be tested to identify benefits associated with shifting or curtailing winter peak, daily economic optimization, and ancillary services.
- **Technology:** Lessons learned in the Smart Thermostat and Smart Water Heater technical pilots conducted by NB Power’s Product and Service Development Team will be leveraged for program development.

SAVINGS AND INVESTMENTS

Although NB Power has not committed to investment for a specific market segment or technology, the utility is committed to meeting its demand response goals. The table below presents the energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 14: Savings and Investments for Residential Demand Program

METRIC	UNITS	FY18/19	FY19/20	FY20/21
Energy savings				
Annual incremental energy savings	GWh*	0.2	0.3	0.7
Annual cumulative energy savings	GWh*	0.2	0.5	1.2
Peak capacity savings				
Annual incremental winter peak savings	MW*	3.1	4.6	7.4
Annual cumulative winter peak savings	MW*	3.1	7.6	15.0
Program budget	\$M	0.8	1.3	1.9

Note: totals may not reflect sum of individual line items due to rounding.

* GWh and MW at generator (i.e. line losses are included).

4 COMMERCIAL & INDUSTRIAL STRATEGY

4.1 Overview

NB Power's commercial and industrial energy efficiency programs seek to promote conservation in addition to the efficient use of energy in customer's businesses and industries. The utility will invest approximately \$32 million from 2018/19 – 2020/21 on programs that support New Brunswick businesses in making energy efficient choices to reduce their consumption and demand, thus their associated energy bills. Commercial and industrial customers will save more than \$85 million during the lifetime of the measures that will be purchased and installed over the period of the Plan.

These initiatives also help NB Power reduce the cost of service by avoiding fuel and purchased power expenses and deferring future capital expenses for new generation, transmission, and distribution assets. For every dollar NB Power invests in commercial and industrial programs, it receives \$2.50 in benefits.

The utility will build on its experience over the last 3 years in the commercial and industrial sector to achieve its energy and demand targets. Lessons learned from internal and third-party evaluation, measurement and verification initiatives have led to streamlined or enhanced program offerings, including:

- Enhancing the Commercial Building Retrofit processes and documentation to ensure energy efficiency measures are properly implemented
- Implementing new demand management and demand response components into the Commercial Buildings Retrofit program to increase demand savings and to identify load shifting opportunities
- The addition of a Commercial Building New Construction program beginning in 2019/20

The table below lists each program, its planned expenditure, and the expected energy savings and demand reductions for the 2018/19 – 2020/21 period.

Table 15: Overview of Commercial & Industrial DSM Initiatives

INITIATIVES	Type	Status	Total Budget 3 Year Plan (\$M)	Cumulative Energy Savings over 3 Year Plan (GWh*)	Cumulative Savings over 3 Year Plan (MW*)
Commercial					
Commercial Building Retrofit Program	EE	Existing	7.4	31.2	4.7
Small Business Lighting Program	EE	Existing	6.9	27.4	3.9
Commercial New Construction Program	EE	New	0.4	0.9	0.1
Industrial					
Small/Medium Industrial Program	EE	Existing	1.5	8.1	1.9
Large Industrial Program	EE	Existing	11.7	81.9	9.4
Commercial/Industrial Demand Response	DR	New	4.0	1.2	15.0
TOTAL C&I INITIATIVES			31.9	150.6	34.9
<i>Energy efficiency</i>	<i>EE</i>	<i>Existing, New</i>	<i>27.9</i>	<i>149.4</i>	<i>20.0</i>
<i>Demand response</i>	<i>DR</i>	<i>New</i>	<i>4.0</i>	<i>1.2</i>	<i>15.0</i>

Note: totals may not reflect sum of individual line items due to rounding.

* GWh and MW at generator (i.e. line losses are included).

4.2 Commercial Buildings Retrofit Program

The Commercial Buildings Retrofit program provides up to \$3,300 for a comprehensive audit to determine potential energy efficiency upgrades and up to \$75,000 towards the implementation of eligible measures identified in the audit. Program participants have 18 months (36 months for municipal buildings) to complete their projects and will rely on a network of qualified Energy Management Service Providers to perform the comprehensive energy audit in addition to the planning, design, and implementation of their projects.

KEY FEATURES & BENEFITS

The program consists of the following key features:

- **Financial incentives:** incentives are offered to help offset the costs of an energy audit and implemented eligible upgrades.
- **Energy Audits:** audits are performed by qualified Energy Management Service Providers.
- **Demand Management:** audits also identify customers with potential for demand reductions or demand response programs.
- **Participation:** the program will target approximately 300 commercial building upgrades over the 3 year Plan.

SAVINGS AND INVESTMENTS

The table below presents the energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 16: Savings and Investments for Commercial Building Retrofit Program

METRIC	UNITS	2018/19	2019/20	2020/21
Energy savings				
Annual incremental energy savings	GWh*	7.8	10.2	13.2
Annual cumulative energy savings	GWh*	7.8	18.0	31.2
Peak capacity savings				
Annual incremental winter peak savings	MW*	1.2	1.5	2.0
Annual cumulative winter peak savings	MW*	1.2	2.7	4.7
Program budget	\$M	1.9	2.4	3.1

Note: totals may not reflect sum of individual line items due to rounding.

* GWh and MW at generator (i.e. line losses are included).

4.3 Commercial New Construction Program

The primary objective of the Commercial New Construction program is to assist building owners, designers and contractors in designing sustainable, high-efficiency commercial buildings in order to reduce energy consumption, increase competitiveness, and produce a healthier and more comfortable workspace. The program provides design assistance and financial incentives to building owners who exceed the energy efficiency standards of the National Energy Code of Canada for Buildings (NECB).

KEY FEATURES & BENEFITS

The program consists of the following key features:

- **Incentives:** The program provides financial incentives to offset the costs associated with designing sustainable, high-efficiency buildings that use less energy, have lower operating and maintenance costs, provide a better working environment and contribute significantly to greenhouse gas reductions. The eligible incentive will be based on the building’s annual energy savings as compared to the NECB.
- **Benchmarks:** The program references the NECB to determine the estimated annual energy cost avoidance and the achievement of exceeding the minimum performance target requirements.
- **Capacity Building:** The program serves to increase industry professionals’ knowledge in the relevant physical sciences; understanding of building technologies; and, proficiency and capability in applying building energy modeling software and/or prescriptive measures to achieve higher energy efficiency designs of commercial buildings.
- **Participation:** the program will target approximately 18 new commercial buildings over the 3 year Plan.

SAVINGS AND INVESTMENTS

The table below presents the energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 17: Savings and Investments for Commercial New Construction Program

METRIC	UNITS	2018/19	2019/20	2020/21
Energy savings				
Annual incremental energy savings	GWh*	0.0	0.1	0.8
Annual cumulative energy savings	GWh*	0.0	0.1	0.9
Peak capacity savings				
Annual incremental winter peak savings	MW*	0.0	0.0	0.1
Annual cumulative winter peak savings	MW*	0.0	0.0	0.1
Program budget	\$M	0.0	0.1	0.3

Note: totals may not reflect sum of individual line items due to rounding.

* GWh and MW at generator (i.e. line losses are included).

4.4 Small Business Lighting Program

The primary objective of the Small Business Lighting (SBL) Program is to assist small business owners and operators of commercial buildings in reducing electricity consumption by implementing low-cost, energy efficient lighting retrofit projects. The Small Business Lighting program offers financial incentives to offset capital costs of eligible lighting systems and controls retrofits.

KEY FEATURES & BENEFITS

The program consists of the following key features:

- **Incentives:** The program provides financial incentives based on energy saved stemming from the implementation of eligible upgrades to lighting systems and lighting controls. The incentive is only available for upgrades not yet started and is meant to expand the number of efficiency measures undertaken through a project.
- **Fast Turnaround:** Once a project's Statement of Work has been approved by NB Power, program participants have 120 days to complete their projects. The program relies on a network of qualified Lighting Service Providers to perform the lighting audit and the design of recommended lighting systems and controls for the projects.
- **Participation:** the program will target approximately 3000 small business lighting upgrade projects over the 3 year Plan.

SAVINGS AND INVESTMENTS

The table below presents the energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 18: Savings and Investments for Small Business Lighting Program

METRIC	UNITS	2018/19	2019/20	2020/21
Energy savings				
Annual incremental energy savings	GWh*	7.6	9.1	10.6
Annual cumulative energy savings	GWh*	7.6	16.7	27.4
Peak capacity savings				
Annual incremental winter peak savings	MW*	1.1	1.3	1.5
Annual cumulative winter peak savings	MW*	1.1	2.4	3.9
Program budget	\$M	1.9	2.3	2.7

Note: totals may not reflect sum of individual line items due to rounding.

* GWh and MW at generator (i.e. line losses are included).

4.5 Small and Medium Industrial Program

The goal of the Small and Medium (SMB) Industrial program is to provide financial incentives and support to improve energy efficiency and productivity; lower energy consumption and bills; enhance social responsibility goals; and, contribute to greenhouse gas emissions reductions. Specifically, this program is available to all industrial customers with a rate schedule lower than 750 kW of contracted demand. The program’s design includes prescriptive and custom tracks enabling projects to be tailored to meet the unique needs of the participants; industrial customers are diverse in nature with unique complexities requiring different approaches.

KEY FEATURES & BENEFITS

The program consists of the following key features:

- **Tailored Approach:** Through the Prescriptive Measures Track and Custom Track, the program will allow energy saving strategies for participants to be tailored to the participant’s circumstances.
- **Incentives:** Prescriptive measures track offers eligible industry customers access to a prescriptive list of products that are eligible for financial support to encourage the purchase and installation of high-efficiency products for quick and simple one-to-one retrofits and/or new installs. Alternately, the Custom measures track offers eligible industrial customers technical and financial support for scoping and feasibility studies, and to implement changes at their facilities to meet a wide range of requirements and initiatives.
- **Training and Awareness:** Long term training and education can help build energy efficiency industry capacity, improve practices, and builds relationships across the province.
- **Participation:** the program will target approximately 190 projects over the 3 year Plan.

SAVINGS AND INVESTMENTS

The table below presents the energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 19: Savings and Investments for Small and Medium Industrial Program

METRIC	UNITS	2018/19	2019/20	2020/21
Energy savings				
Annual incremental energy savings	GWh*	2.4	2.7	3.0
Annual cumulative energy savings	GWh*	2.4	5.1	8.1
Peak capacity savings				
Annual incremental winter peak savings	MW*	0.6	0.6	0.7
Annual cumulative winter peak savings	MW*	0.6	1.2	1.9
Program budget	\$M	0.4	0.5	0.6

Note: totals may not reflect sum of individual line items due to rounding.

* GWh and MW at generator (i.e. line losses are included).

4.6 Large Industrial Program

The Large Industrial program aims to provide financial incentives and support to all industries to improve their energy efficiency and productivity; lower their energy consumption and bills; enhance social responsibility goals; and, contribute to greenhouse gas emissions reductions. Specifically, this program is available to all industrial customers with a rate schedule of 750 kW of contracted demand or more. The program’s design includes Custom and Energy Management Information System (EMIS) tracks enabling projects to be tailored to meet the unique needs of the participants; industrial customers are diverse in nature with unique complexities requiring different approaches.

KEY FEATURES & BENEFITS

The program consists of the following key features:

- Tailored Approach:** The Custom track offers eligible large industrial customers a custom approach, whereby NB Power will provide technical and financial support for scoping and feasibility studies, and for implementation of technical changes at the customer’s facilities that addresses the wide range of customer requirements and energy efficiency initiatives. The EMIS track offers financial support to eligible large industrial customers that have an average monthly demand of 2 MW or more, to assess and implement new EMIS systems or to optimize existing EMIS systems.
- Training and Awareness:** Long term training and education can help build energy efficiency industry capacity, improve practices, and builds relationships across the province

SAVINGS AND INVESTMENTS

The table below presents the energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 20: Savings and Investments for Large Industrial Program

METRIC	UNITS	2018/19	2019/20	2020/21
Energy savings				
Annual incremental energy savings	GWh*	23.8	26.8	31.3
Annual cumulative energy savings	GWh*	23.8	50.5	81.9
Peak capacity savings				
Annual incremental winter peak savings	MW*	2.7	3.1	3.6
Annual cumulative winter peak savings	MW*	2.7	5.7	9.4
Program budget	\$M	3.1	3.8	4.8

Note: totals may not reflect sum of individual line items due to rounding.

* GWh and MW at generator (i.e. line losses are included).

4.7 Commercial and Industrial Demand Response

Throughout 2015/16 and 2016/17, NB Power conducted a series of technical pilots aimed at testing demand response technology and measures in the New Brunswick market. These pilots represent an integral part of NB Power’s approach to DSM and seek to balance the ability to achieve short-term demand reduction with the development of forward-looking opportunities that support our long-term vision. These pilots were used to test new processes, technologies and value propositions for NB Power customers and to ensure that these opportunities can be delivered cost-effectively before rolling them out to the broader market.

The 2018/19 to 2020/21 DSM Plan, will leverage these pilots and new capabilities delivered through the Smart Grid initiatives to develop Commercial and Industrial Demand Response pilots and programs. They will be developed to coincide with the Smart Grid implementation schedule in order to maximize benefits for NB Power and its customers, and effectively utilize AMI and ILM infrastructure.

KEY FEATURES & BENEFITS

The program consists of the following key features:

- **Infrastructure:** NB Power will monitor new control technologies and controllable devices to identify and pilot load shifting opportunities.
- **Load Strategies:** Multiple load strategies will be tested to identify benefits associated with shifting or curtailing winter peak demand, daily economic optimization, and ancillary services.
- **Technology:** Lessons learned in the Commercial Direct Load Control pilot conducted by NB Power’s Product and Service Development Team will be leveraged for program development.

SAVINGS AND INVESTMENTS

Although NB Power has not committed to investment for a specific market segment or technology, the utility is committed to meeting its demand response goals. The table below presents the energy savings and demand reductions for this program over the 2018/19 – 2020/21 timeframe, along with associated investments:

Table 21: Savings and Investments for Commercial and Industrial Demand Response Program

METRIC	UNITS	2018/19	2019/20	2020/21
Energy savings				
Annual incremental energy savings	GWh*	0.2	0.3	0.7
Annual cumulative energy savings	GWh*	0.2	0.5	1.2
Peak capacity savings				
Annual incremental winter peak savings	MW*	3.1	4.6	7.4
Annual cumulative winter peak savings	MW*	3.1	7.6	15.0
Program budget	\$M	0.8	1.3	1.9

Note: totals may not reflect sum of individual line items due to rounding.

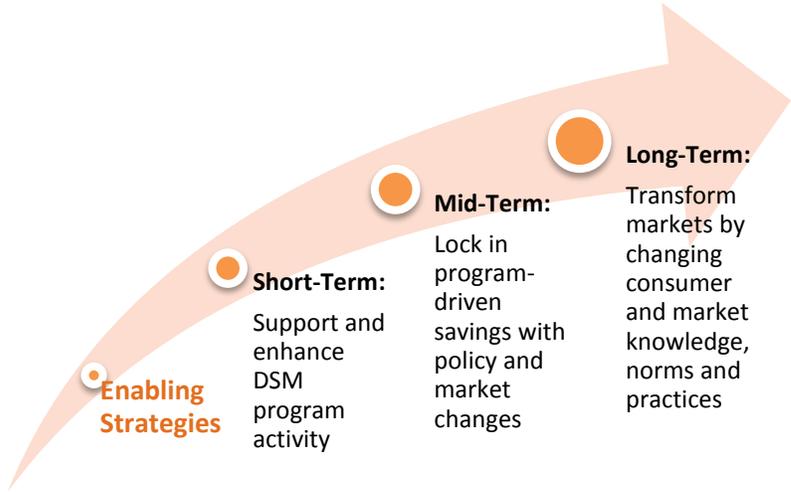
* GWh and MW at generator (i.e. line losses are included).

5 ENABLING STRATEGIES

5.1 Overview

NB Power will enhance portfolio-wide outcomes through both program support and market transformation initiatives. Support initiatives include gathering market intelligence, program design and planning, as well as evaluation, measurement, and verification (EM&V) activities. Market transformation initiatives include overarching education and awareness efforts, innovative financing, building labeling policies, government engagement, and trade ally partnership development.

Figure 4: Impact Overview of Enabling Strategies



As part of its DSM Plan, NB Power has allocated a budget, totalling \$5.7 million over the 2018/19 – 2020/21 period, for three types of enabling activities:

- **Planning:** planning for and designing the portfolio of programs, working through the regulatory process, crafting policies and addressing issues, assessing savings potential, etc.
- **Evaluation:** evaluation, measurement, and verification of the programs and their impacts.
- **Market Transformation:** cross-cutting activities such as education and awareness, market research, and trade ally training.

The following table lists the budgets for each category:

Table 22: Enabling Strategy Budgets

STRATEGY	BUDGET (\$M)		
	2018/19	2019/20	2020/21
Planning & Regulatory	0.9	0.4	0.4
Market Transformation	0.3	1.0	1.2
Evaluation	0.4	0.5	0.6
TOTAL ENABLING	1.6	1.9	2.2

Note: totals may not reflect sum of individual line items due to rounding.

5.2 Planning

NB Power has allocated funds for planning activities. Specifically:

- **Market Intelligence:** the assessment of potential savings opportunities, in support of the planning function.
- **Planning & design:** the development of the plan and design of its associated programs, along with other enabling activities.
- **Policy development:** the development of policy positions pertaining to the DSM Plan and its activities, such as cost-effectiveness screening, multi-fuel opportunities, and other critical issues.
- **Regulatory process:** funds required to support the regulatory process, including regulatory hearing planning and support as well as stakeholder engagement activities.

In 2018/19 NB Power will conduct a DSM Potential Study to assess the achievable DSM opportunities specific to the province of New Brunswick for the residential, commercial, and industrial sectors. This Study is a continuation of the development work started by a partnership of utility and government stakeholders within New Brunswick and conducted in 2008 (*Energy, Efficiency, Conservation, and Demand Management Study (DSM)*). In addition to assessing the potential for achievable, cost-effective energy savings across all fuels, the Study will also address electrical demand response (load shifting) opportunities. The study will provide detailed, measure- and program-level estimates in the short-term (e.g. 5 years) in order to inform the next DSM plan and program designs, as well as higher-level, total potential estimates over a 25 year period to aid in longer-term power and greenhouse gas emissions reduction planning.

A total of \$1.7 million was allocated for planning activities over the 2018/19 – 2020/21 timeframe.

5.3 Evaluation, Measurement & Verification (EM&V)

The utility allocated funds for the development and implementation of the 2019 -2021 EM&V Plan. While details of the Plan can be found in Appendix B, highlights are provided below:

- **EM&V Plan:** This plan lays out all EM&V activities to be conducted over the 2018/19 to 2020/21 period. The bulk of financial resources will be directed towards impact and process evaluations, as well as to the market assessment of existing energy efficiency programs (i.e. Home Retrofit, Low-Income, Mass-Market Products, and Commercial Retrofit). To ensure transparency and independence in program evaluation, many evaluation activities will be conducted by third-party evaluators.

A total of \$1.5 million was allocated for EM&V over the 2018/19 – 2020/21 timeframe.

5.4 Market Transformation

NB Power has allocated funds for cross-cutting enabling activities that provide broad support to programs, while also enhancing our ability to transform markets, in the long-term, toward sustained energy efficiency:

- **Education & Awareness:** The development of marketing and outreach campaigns in order to foster an Energy Efficiency/Demand Response-oriented relationship with customers.
- **Information & Tips:** NB Power will continue to provide its residential customers with energy savings tips and information on our programs.
- **Partnerships:** NB Power will maintain and foster partnerships with a wide range of market participants, such as retailers, contractors, distributors, and engineering firms, with the goals of supporting deployment of DSM programs within the DSM Plan and enhancing the province's home-grown DSM service industry.
- **Enabling Tool and Strategies:** NB Power has allocated some funds to study other tools to support Energy Efficiency/Demand Response programs, such as potential innovative financing mechanism and to review the viability of a commercial building labeling program.

A total of \$2.5 million was allocated for Market Transformation activities over the 2018/19 – 2020/21 timeframe.

6 COST-EFFECTIVENESS ANALYSIS

6.1 Methodology

In order to assess the DSM Plan's cost-effectiveness, NB Power considered a variety of industry standard tests, including the three most common ones used by utilities for primary screening: the Program Administrator Cost Test (PACT), the Total Resource Cost (TRC) test, and the Societal Cost Test (SCT).

While each test can offer value, NB Power chose the PACT for its primary screening test. The PACT reflects the utility's least-cost planning perspective, by comparing the lifetime benefits NB Power will derive from its DSM plan (e.g. avoided fuel and purchased power costs) against the investment it must make to implement the plan (the total budget). By using the PACT, NB Power and its stakeholders are provided with a clear measure of cost-effectiveness; one that is directly comparable with supply-side options and consistent with the least-cost planning exercise undertaken through its Integrated Resource Plan.

NB Power chose not to use the TRC and SCT tests, primarily due to two factors:

1. Both the TRC and SCT suffer from fundamental accuracy challenges, notably in the quantification of key costs and benefits⁶.
2. Second, in part because of those challenges, certain benefits are often neglected (while corresponding costs are accounted for), leading to charges of systemic bias.

In addition to the PACT, NB Power also computes the Participant Cost Test (PCT), in order to provide an indication of the value of programs to participating customers.

To ensure that NB Power can deliver programs to a wide cross section of its customers, the PACT is used as a decision-making screen primarily at the sector level. This will allow the utility to serve customers such as low income residential, multi-family residents, and small business owners with programs that tend to have higher cost and therefore a lower PACT score. For informational purposes the PACT results for each program are available in Section 6.4.

⁶ Both the TRC and SCT ought to include the value of participant non-energy benefits, or NEBs. These benefits can be extremely difficult to quantify with reasonable accuracy, and which can lend them to protracted regulatory debate. The SCT further requires quantification of societal benefits such as air quality improvements or climate change mitigation, which can be difficult to quantify, especially in the absence of clear policy direction.

6.2 Test Variables

The key variables used for computing both PACT and PCT for each program are presented in more detail in the table below:

Table 23: Variables for Cost-Effectiveness Analysis

	PACT (NB Power's Perspective)	PCT (Participants' Perspective)
Benefits	<ul style="list-style-type: none"> • Net annual energy and capacity savings • Electric interactive effects for electric DSM measures • Energy and peak avoided costs • Peak period shifting values* • Transmission and distribution losses 	<ul style="list-style-type: none"> • Net annual energy and capacity savings • Electric interactive effects for electric DSM measures • Electric energy and capacity rates
Costs	<ul style="list-style-type: none"> • Incentive costs • Non-incentive costs (e.g. administration, marketing, technical support) 	<ul style="list-style-type: none"> • Net DSM measure costs (i.e. incremental measure costs minus incentives) • Non-electric interactive effects from electric DSM measures • Non-electric energy prices
Others	<ul style="list-style-type: none"> • Discount rate • Effective useful life of DSM measure savings 	<ul style="list-style-type: none"> • Discount rate • Effective useful life of DSM measure savings

* Shifting values are based on moving energy from the peak period to the off-peak period.

6.3 Key Inputs

Key inputs for calculating program cost effectiveness are discussed briefly below:

- **Net annual program energy and capacity savings:** Net savings are the portion of program savings that can be attributed to the program. This means removing the portion of the initial “gross” savings estimates that were not caused directly by the program because customers would have taken action even in the absence of the program (“free riders (FR)”), and adding savings from customers who, inversely, were influenced by the program but did not participate (“spillover (SO)”). The net-to-gross (NTG) ratio (i.e. the relation between gross and net savings) can be expressed as follows: $NTG = 1 - FR + SO$.
- **Electric and non-electric interactive effects for electric DSM measures:** Assumptions are based largely on work conducted by Hydro-Quebec on heating and cooling interactive effects of energy-efficient lighting, appliances and pipe insulation.
- **Electricity rates:** Current energy and capacity electricity rates in New Brunswick were assumed to increase by 2.0% per year.
- **Measure savings (energy, peak), costs and effective useful lives:** Inputs are based on recent program results and recent third party evaluations, if available, or are based on research of similar programs

- **Nominal discount rate:** NB Power’s weighted average cost of capital (WACC) of 5.90% was used.
- **Transmission and distribution losses:** A T&D loss rate of 8.0% was assumed for distribution connected customers and 3% for transmission connected customers.
- **Avoided costs:** NB Power’s avoided energy and capacity costs are presented in Table 24 below:

Table 24: Avoided Costs and Peak Period Shifting Values

Year	Energy Avoided	Energy Avoided Costs	Capacity Avoided
	Costs (\$/kWh) - Baseload -	(\$/kWh) - Peak -	
2018/19	0.0480	0.0650	28.9720
2019/20	0.0503	0.0681	30.6813
2020/21	0.0526	0.0713	32.4915
2021/22	0.0551	0.0746	34.4085
2022/23	0.0577	0.0781	36.4386
2023/24	0.0604	0.0818	38.5885
2024/25	0.0632	0.0856	40.8652
2025/26	0.0662	0.0896	43.2762
2026/27	0.0693	0.0939	45.8295
2027/28	0.0726	0.0983	48.5335
2028/29	0.0760	0.1029	51.3970
2029/30	0.0796	0.1077	54.4294
2030/31	0.0833	0.1128	57.6407
2031/32	0.0872	0.1181	61.0415
2032/33	0.0913	0.1236	64.6430
2033/34	0.0956	0.1295	68.4569
2034/35	0.1001	0.1355	72.4958
2035/36	0.1048	0.1419	76.7731
2036/37	0.1097	0.1486	81.3027
2037/38	0.1149	0.1556	86.0996
2038/39	0.1203	0.1629	144.9675
2039/40	0.1259	0.1705	150.1863
2040/41	0.1318	0.1785	155.5930
2041/42	0.1380	0.1869	161.1944
2042/43	0.1445	0.1957	166.9974
2043/44	0.1474	0.1996	170.3373
2044/45	0.1504	0.2036	173.7441
2045/46	0.1534	0.2077	177.2189
2046/47	0.1564	0.2119	180.7633
2047/48	0.1596	0.2161	184.3786

Note: All values NPV discounted to 2018

6.4 Results

The Program Administrator Cost Test (PACT) results are presented in the table below:

Table 25: Cost-effectiveness Analysis: the Utility & Ratepayers Perspective (PACT)

INITIATIVES	PRESENT VALUE			RATIO
	BENEFITS	COSTS	NPV	PACT
	(\$M)	(\$M)	(\$M)	Ben./Cost Ratio
RESIDENTIAL	66.6	42.1	24.5	1.6
Energy Efficiency				
Mass-Market Energy Efficient Products	7.1	4.2	2.9	1.7
Residential Home Retrofit + Direct Install	23.2	11.7	11.5	2.0
Home Energy Report	6.1	6.6	-0.5	0.9
Low Income Energy Savings Program	9.1	10.5	-1.3	0.9
New Homes	20.2	5.4	14.9	3.8
Demand Response				
Residential Demand Response	0.8	3.7	-3.0	0.2
COMMERCIAL & INDUSTRIAL	75.9	29.9	46.0	2.5
Energy Efficiency				
Commercial Retrofit	20.8	6.9	13.8	3.0
Small Business Lighting Program	12.8	6.5	6.3	2.0
Commercial New Construction	1.4	0.4	1.1	4.1
SMB Industrial Prescriptive / Custom	4.8	1.4	3.4	3.4
Large Industrial Custom / EMIS	35.4	11.0	24.4	3.2
Demand Response				
Commercial/Industrial Demand Response	0.8	3.7	-3.0	0.2
TOTAL	142.4	71.9	70.5	2.0
<i>Total EE</i>	<i>140.9</i>	<i>64.5</i>	<i>76.5</i>	<i>2.2</i>
<i>Total DR</i>	<i>1.5</i>	<i>7.4</i>	<i>-5.9</i>	<i>0.2</i>

Note: totals may not reflect sum of individual line items due to rounding.

Overall both Residential and Commercial & Industrial program portfolios are cost-effective as a whole, yielding a PACT ratio of 1.6 for the residential sector and 2.5 for the commercial & industrial sectors. These results indicate that NB Power (and through it, ratepayers as a whole) stand to benefit from cost savings that are worth approximately twice the investment, over the lifetime of the measures, on a present value basis. Achieving cost-effectiveness at the sector level was a key priority for NB Power, in order to achieve positive benefits but also to allow new programs and pilots to enter the market.

For information purposes, the Participant Cost Test (PCT) results are presented in the table below:

Table 26: Cost-effectiveness Analysis: the Participants' Perspective (PCT)

INITIATIVE	PRESENT VALUE			RATIO
	BENEFITS (\$M)	COSTS (\$M)	NPV (\$M)	PCT Ben./Costs Ratio
RESIDENTIAL	77.6	29.0	48.6	2.7
Energy Efficiency				
Mass-Market Energy Efficient Products	12.6	7.9	4.7	1.6
Residential Home Retrofit + Direct Install	24.5	13.8	10.7	1.8
Home Energy Report	11.1	0.0	11.1	N/A
Low Income Energy Savings Program	9.7	0.0	9.7	N/A
New Homes	19.5	7.4	12.2	2.7
Demand Response				
Residential Demand Response	0.2	0.0	0.2	N/A
COMMERCIAL & INDUSTRIAL	85.1	28.9	56.2	2.9
Energy Efficiency				
Commercial Retrofit	27.2	12.3	14.9	2.2
Small Business Lighting Program	20.8	5.8	15.0	3.6
Commercial New Construction	1.5	0.2	1.3	7.9
SMB Industrial Prescriptive / Custom	3.9	0.5	3.4	8.0
Large Industrial Custom / EMIS	31.3	10.2	21.1	3.1
Demand Response				
Commercial/Industrial Demand Response	0.4	0.0	0.4	N/A
TOTAL	162.7	57.9	104.8	2.8
<i>Total EE</i>	<i>162.2</i>	<i>57.9</i>	<i>104.2</i>	<i>2.8</i>
<i>Total DR</i>	<i>0.6</i>	<i>0.0</i>	<i>0.6</i>	<i>N/A</i>

Definition: "N/A" was added in cases where the participant bears no cost, and the benefit/cost ratio cannot be computed (cannot divide by zero).

Note: totals may not reflect sum of individual line items due to rounding.

NB Power's DSM offering is clearly cost-effective for participants. This is critical, as significant net cost savings are needed to overcome multiple and pervasive market barriers in all market sectors.

For information purposes, the Total Resource Cost Test (TRC) results are presented in the table below:

Table 27: Cost-effectiveness Analysis: the Total Resource Cost Test (TRC)

INITIATIVE	PRESENT VALUE			RATIO
	BENEFITS	COSTS	NPV	TRC
	(\$M)	(\$M)	(\$M)	Ben./Costs Ratio
RESIDENTIAL	66.6	66.7	-0.1	1.0
Energy Efficiency				
Mass-Market Energy Efficient Products	7.1	11.1	-4.0	0.6
Residential Home Retrofit + Direct Install	23.2	22.9	0.3	1.0
Home Energy Report	6.1	6.6	-0.5	0.9
Low Income Energy Savings Program	9.1	10.5	-1.3	0.9
New Homes	20.2	11.8	8.4	1.7
Demand Response				
Residential Demand Response	0.8	3.7	-3.0	0.2
COMMERCIAL & INDUSTRIAL	75.9	55.9	20.0	1.4
Energy Efficiency				
Commercial Retrofit	20.8	18.1	2.6	1.1
Small Business Lighting Program	12.8	11.5	1.3	1.1
Commercial New Construction	1.4	0.5	1.0	3.0
SMB Industrial Prescriptive / Custom	4.8	1.8	2.9	2.6
Large Industrial Custom / EMIS	35.4	20.3	15.1	1.7
Demand Response				
Commercial/Industrial Demand Response	0.8	3.7	-3.0	0.2
TOTAL	142.4	122.6	19.9	1.2
<i>Total EE</i>	<i>140.9</i>	<i>115.1</i>	<i>25.8</i>	<i>1.2</i>
<i>Total DR</i>	<i>1.5</i>	<i>7.4</i>	<i>-5.9</i>	<i>0.2</i>

** No capital costs are associated with behaviour-based measures.

Note: totals may not reflect sum of individual line items due to rounding.

For information purposes, the Rate Impact Measure (RIM) results are presented in the table below:

Table 28: Cost-effectiveness Analysis: the Rate Impact Measure (RIM)

INITIATIVE	PRESENT VALUE			RATIO
	BENEFITS (\$M)	COSTS (\$M)	NPV (\$M)	RIM Ben./Costs Ratio
RESIDENTIAL	66.6	122.3	-55.8	0.5
Energy Efficiency				
Mass-Market Energy Efficient Products	7.1	17.0	-9.9	0.4
Residential Home Retrofit + Direct Install	23.2	37.0	-13.8	0.6
Home Energy Report	6.1	18.1	-12.0	0.3
Low Income Energy Savings Program	9.1	20.7	-11.6	0.4
New Homes	20.2	25.3	-5.1	0.8
Demand Response				
Residential Demand Response	0.8	4.2	-3.4	0.2
COMMERCIAL & INDUSTRIAL	75.9	117.0	-41.1	0.6
Energy Efficiency				
Commercial Retrofit	20.8	34.6	-13.9	0.6
Small Business Lighting Program	12.8	27.7	-15.0	0.5
Commercial New Construction	1.4	1.9	-0.5	0.8
SMB Industrial Prescriptive / Custom	4.8	5.4	-0.6	0.9
Large Industrial Custom / EMIS	35.4	43.0	-7.6	0.8
Demand Response				
Commercial/Industrial Demand Response	0.8	4.4	-3.6	0.2
TOTAL	142.4	239.4	-96.9	0.6
<i>Total EE</i>	<i>140.9</i>	<i>230.8</i>	<i>-89.9</i>	<i>0.6</i>
<i>Total DR</i>	<i>1.5</i>	<i>8.6</i>	<i>-7.1</i>	<i>0.2</i>

** No capital costs are associated with behaviour-based measures.

Note: totals may not reflect sum of individual line items due to rounding.

APPENDIX A: EM&V PLAN

See attached Appendix AB – DSM EMV Plan 2019-2021.

APPENDIX B: COST EFFECTIVENESS METHODOLOGY

This section presents the cost-effectiveness tests used in the DSM Plan. This document is not meant to present the fundamental aspects of cost-effectiveness testing and details of all the calculations included in the cost-effectiveness analysis, but to provide an overview of the algorithms, notably with respect to the components included in the analysis, and the application of net-to-gross ratios to individual components of the tests.

For a more detailed description of the cost-effectiveness tests and metrics that can be used to express the results of those tests, please consult *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practice, Technical Methods, and Emerging Issues for Policy Makers* from the U.S. Environmental Protection Agency⁷. The descriptions of each test in this section are derived from this document.

General Metrics

The cost-effectiveness tests applied by NB Power are based on recognized industry standards defined in the California Standard Practice Manual⁸. Cost-effectiveness testing is meant to represent the net present value of program impacts over the lifecycle of those impacts. It compares the present value (PV) of benefits and costs.

All tests use the same general approach to discount the stream of benefits and costs to present value using the utility discount rate. In all cases, the present value is calculated using the following equations:

$$B = \sum_{t=1}^N \frac{B_t}{(1+d)^{t-1}}$$

$$C = \sum_{t=1}^N \frac{C_t}{(1+d)^{t-1}}$$

Where:

B = PV of benefits

C = PV of costs

d = Discount rate

t = Year where benefits or costs materialize

It should be noted that the discounting methodology presented above applies to all benefits and costs presented hereafter.

⁷ Available online at : <https://www.epa.gov/sites/production/files/2015-08/documents/cost-effectiveness.pdf>

⁸ Available online at: [http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy - Electricity_and_Natural_Gas/CPUC_STANDARD_PRACTICE_MANUAL.pdf](http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/CPUC_STANDARD_PRACTICE_MANUAL.pdf)

Net to Gross Ratio

Since the outputs of the tests are meant to represent net program impact, an adjustment factor is used to assess benefits and costs attributable to DSM. This adjustment factor is called the Net to Gross Ratio and is comprised of two distinct components; free ridership and spillover.

- **Free-Ridership:** the free-ridership (FR) rate is an adjustment that takes into consideration what participants would have done irrespective of NB Power's program.
- **Spillover:** the spillover rate (SO) represents additional impacts external to the measures incited by the program.

The free-ridership and spillover rates are aggregated in a single metric, the Net-to-Gross Ratio (NTG).

$$NTG = (1 - FR) + SO$$

The NTG factor is applied differently to the cost and benefits of programs depending on the nature of the components included in the cost-effectiveness tests.

Primary Tests

NB Power uses two primary tests to assess the cost-effectiveness of its DSM initiatives: the Program Administrator Cost Test (PACT), and the Participant Cost Test (PCT). Provided for each test is a general description, identification of the benefits and costs included in the test, and finally an algorithm for the calculation of the test results.

Program Administrator Cost Test (PACT)

The PACT examines the costs and benefits of the program from the perspective of the entity implementing the program (utility, government agency, non-profit, or other third party). The costs included in the PACT include program administration and incentive costs. Incentive costs are payments made to the customers to offset purchase or installations costs. The benefits from the utility perspective are the savings derived from not delivering the energy to customers. Depending on the jurisdiction and type of utility, the "avoided costs" can include reduced wholesale electricity or natural gas purchases, generation costs, power plant construction, transmission and distribution facilities, ancillary service and system operating costs, and other components.

Benefits:

AC_{elec} = Avoided cost of electricity

Costs:

IC = Incentive paid to customers

PRC = Program administration costs

Algorithms:

$$PACT_{npv} = NTG * AC_{elec} - (IC + PRC)$$

$$PACT_{ratio} = \frac{NTG * AC_{elec}}{(IC + PRC)}$$

Participant Cost Test (PCT)

The PCT examines the costs and benefits from the perspective of the customer installing the measure (homeowner, business, etc.). Costs include the incremental costs of purchasing and installing efficient and/or connected equipment, above the cost of standard equipment, that are borne by the customer, net of any incentives. The benefits include incentives as applicable and/or bill savings realized to the customer through reduced energy consumption and in the case of commercial customers, savings associated with demand reduction. In some cases the PV of incremental operations and maintenance costs (or savings) may also be included.

Benefits:

BS = Bill savings

Costs:

PTC = Participant costs

IC = Incentive costs

Algorithms:

$$PCT_{npv} = NTG * BS - NTG * (PTC - IC)$$

$$PCT_{ratio} = \frac{NTG * BS}{NTG * (PTC - IC)}$$

Secondary Tests

In addition to the primary tests used in the cost-benefit analysis, NB Power calculates the result of two others, the Total Resource Cost (TRC) test, and the Rate Impact Measure (RIM) test. The results of these tests are provided at the request of the New Brunswick Energy and Utilities Board. Similarly as for the primary tests, a general description of the test is provided along with the identification of the benefits and costs included in the test and the algorithm for the calculation of the test results.

Total Resource Cost (TRC) Test

The TRC measures the net benefits of the program for the region as a whole. Costs included in the TRC are costs to purchase and install the measure and overhead costs of running the program. The benefits included are the avoided costs of energy.

Benefits:

AC_{elec} = Avoided cost of electricity

NEB = Non-Energy Benefits (NB Power does not currently estimate a value for NEBs)

Costs:

PTC = Participant Costs

PRC = Program administration costs

Algorithms:

$$TRC_{npv} = NTG * AC_{elec} + NTG * NEB - (NTG * (PTC) + PRC)$$

$$TRC_{ratio} = \frac{NTG * AC_{elec} + NTG * NEB}{(NTG * (PTC) + PRC)}$$

Rate Impact Measure (RIM)

The RIM examines the impact of energy efficiency programs on utility rates. Unlike typical supply-side investments, energy efficiency programs reduce energy sales. Reduced energy sales can lower revenues and put upward pressure on retail rates as the remaining fixed costs are spread over fewer kWh. The costs included in the RIM are program overhead and incentive payments and the cost of lost revenues due to reduced sales. The benefits included in the RIM are the avoided costs of energy saved through the efficiency measure.

Benefits:

AC_{elec} = Avoided cost of energy impacts

Costs:

IC = Incentive paid to customers

PRC = Program administration costs

LR = Lost revenue due to electric impacts

Algorithms:

$$RIM_{npv} = NTG * AC_{elec} - (IC + PRC + NTG * LR)$$

$$RIM_{ratio} = \frac{NTG * AC_{elec}}{(IC + PRC + NTG * LR)}$$

The material contained in this appendix reflects the current application of the cost-effectiveness tests by NB Power. As discussed, the emphasis of the cost-effectiveness methodology is on the primary tests used for the analysis of the DSM Plan: the PACT and PCT. As such, the current application of the TRC as presented in this document follows industry's standard practices, but NB Power does not currently spend increased resources towards increasing accuracy of the TRC to address typical shortcomings.



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