

1 Q. Further to the response to PUB-Nalcor-058, please provide copies of any 2018
2 reports filed with the Board in relation to the Conservation and Demand
3 Management Plan, whenever such reports might be available, if not already
4 provided.

5

6

7 A. [] Please refer to the PUB-Nalcor-106, Attachment 1, for a copy of the 2018
8 Conservation and Demand Management Report, that was filed with the Board on
9 April 2, 2019.

2018 Conservation and Demand Management Report

April 1, 2019

A Report to the Board of Commissioners of Public Utilities

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Appendix A: CDM Program Descriptions

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Attachment 1: Five-Year Conservation Plan: 2016 – 2020

1 **1.0 Introduction**

2 Conservation and Demand Management (“CDM”) activities undertaken by Newfoundland and
3 Labrador Hydro (“Hydro”) include joint utility programs offered by Hydro and Newfoundland
4 Power (the “Utilities”) through the takeCHARGE partnership, and programs specifically targeted
5 to Hydro’s customers. This report focuses primarily on the costs and initiatives implemented by
6 Hydro, including Hydro’s portion of costs for the joint initiatives for 2018.

7
8 Hydro’s programs achieved 2,608 MWh of annual incremental energy savings in 2018, and,
9 since 2009, have accumulated energy savings of 43,581 MWh. This is primarily a reflection of
10 the continued growth and enhancement of takeCHARGE initiatives.

11

12 **2.0 Coordination and Context**

13 **2.1 Utility Planning**

14 Starting with the initial CDM plan in 2008, Hydro and Newfoundland Power have designed and
15 implemented a joint utility portfolio of programs for electricity customers in Newfoundland and
16 Labrador.¹ Currently, programs offered through the joint utility model are available for
17 residential, commercial, and industrial customers and provide rebate options to address energy
18 savings for electricity customers.

19

20 Hydro has also been developing programs outside the joint utility process to provide customers
21 with additional opportunities to conserve and to provide feedback for expanded offerings of
22 joint utility programs. For example, Hydro’s retailer coupon program offered in 2010-2011 was
23 the impetus for the Instant Rebate Program launched provincially in 2014. In 2018 this program
24 provided point-of-purchase rebates for a range of technologies, including LED lighting and draft
25 proofing.

¹ The “Five Year Energy Conservation Plan: 2008-2012” was filed with the Board on June 27, 2008. The “Five Year Energy Conservation Plan: 2012-2016” was filed with the Board on September 14, 2012, and is provided as Attachment 1 to this report.

1 Other CDM activities for 2018 include the continuation of the residential and commercial
2 rebate programs, the Energy Efficiency Loan Program with the Government of Newfoundland
3 and Labrador,² the Isolated Systems Community Energy Efficiency Program, the custom
4 industrial program, and expansion of existing commercial rebates. The description of the
5 programs offered during 2018, both through the joint utility partnership and those specific to
6 Hydro’s customers, is provided as Appendix A to this report.

7
8 The Utilities continuously evaluate the customer conservation programs and periodically
9 undertake third party program evaluations to refine program design and support future
10 planning.

11

12 **2.2 Government Engagement**

13 In 2018, Hydro worked closely with the Provincial Government on the Low Carbon Economy
14 Leadership Funding to explore the potential of expanding the insulation and thermostat rebates
15 to oil-heated customers on a full cost recovery basis.³

16

17 Hydro continues to have a positive working relationship with the Provincial Government, and
18 remains engaged in dialogue on potential programming, policy, and partnership opportunities.

19

20 **3.0 2018 Conservation and Demand Management Programs Costs and Energy** 21 **Savings**

22 **3.1 Portfolio Level Program Costs and Energy Savings**

23 Table 1 and Table 2 describe Hydro’s total CDM program expenses and energy savings from
24 2009 to 2018 across all of Hydro’s systems. Further detail and a breakdown of the costs that will

² In 2017, Hydro and Newfoundland Power introduced a new Energy Efficiency Loan Program to help residential customers reduce their home energy consumption. This program is funded by the Provincial Government.

³ This program was launched in March 2019.

- 1 be recovered through the CDM Deferral Account⁴ and the associated energy reductions is
 2 provided in Section 6, Regulated Program Energy Savings and Program Costs.

Table 1: Hydro’s CDM Portfolio Spending (\$000)⁵

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Windows	44	48	80	117	169	38	2	-	-	-
Insulation	40	60	140	126	157	92	70	61	102	88
Thermostats	13	19	31	47	51	35	20	22	55	44
Residential Benchmarking	-	-	-	-	-	-	-	49	45	23
Coupon Program	-	140	135	-	-	-	-	-	-	-
Commercial Lighting	13	12	59	20	29	15	18	-	-	-
Industrial	57	221	103	173	89	1,244	(102)	28	41	20
Block Heater Timer	-	-	-	31	8	8	-	-	-	-
Isolated Systems Community	-	-	-	858	871	615	530	451	936	981
ISBEP ⁵	-	-	-	-	115	96	7	45	41	99
Heat Recovery Ventilator	-	-	-	-	11	7	6	6	7	10
Instant Rebate	-	-	-	-	1	252	239	247	159	169
Business Efficiency (Prescriptive)	-	-	-	-	-	-	-	22	28	17
Business Efficiency (Custom)	-	-	-	-	45	101	152	183	127	137
Appliance Retirement Pilot	-	-	-	-	-	-	56	(12)	-	-
Isolated Load Control Pilot	-	-	-	-	-	-	6	158	17	5
Total	167	500	548	1,372	1,546	2,503	1,004	1,260	1,559	1,593

Table 2: Hydro’s CDM Portfolio Annual Energy Savings (MWh)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Life to Date
Windows	13	37	61	136	99	85	10	-	-	-	441
Insulation	35	126	404	382	795	142	105	72	155	139	2,356
Thermostats	9	35	30	53	24	38	34	44	59	62	389
Residential Benchmarking	-	-	-	-	-	-	-	-	131	234	365
Coupon Program	-	64	256	-	-	-	-	-	-	-	320
Commercial Lighting	3	10	227	95	99	79	124	-	-	-	637
Industrial	-	-	165	3,172	-	22,258	-	177	-	162	25,934
Block Heater Timer	-	-	-	-	288	-	-	-	-	-	288
Isolated Systems Community	-	-	-	1,676	1,096	1,357	1,426	512	1,141	1,064	8,272
ISBEP	-	-	-	3	26	111	67	241	24	205	677
Heat Recovery Ventilator	-	-	-	-	-	6	5	5	4	12	32
Instant Rebate	-	-	-	-	-	148	164	191	90	300	894
Business Efficiency Program (Prescriptive)	-	-	-	-	-	-	22	147	676	248	1,092
Business Efficiency Program (Custom)	-	-	-	-	-	107	775	588	232	182	1,884
Total	60	272	1,143	5,517	2,427	24,331	2,734	1,977	2,513	2,608	43,581

3 3.2 Residential Programs

- 4 Hydro’s residential portfolio included five programs; insulation, thermostats, heat recovery
 5 ventilators (“HRV”), instant rebate and the Residential Benchmarking Program offered jointly by
 6 the Utilities, and two offered solely by Hydro: the Isolated Systems Community Energy
 7 Efficiency Program and Isolated Systems Business Efficiency Program. In addition, the Energy

⁴ The CDM Cost Deferral Account is meant to defer Hydro’s program costs (excludes program costs for the Labrador Interconnected System).

⁵ Credits are due to an overstated accrual in the preceding year.

1 Efficiency Loan Program, launched in 2017, continued in 2018. Throughout 2018, Hydro
2 continued to promote the takeCHARGE programs and technologies. Local advertising and
3 building strong partnerships with retailers remains a priority and is an integral factor in the
4 promotion of customer rebate programs.

5
6 The Kids in Charge school program was also continued in 2018. This is an interactive
7 presentation on saving energy designed for students from kindergarten to grade 6. Trained
8 representatives visited nine schools and delivered presentations to a total of 310 students in
9 isolated communities.

10

11 **3.3 Commercial Programs**

12 Hydro's Business Efficiency Program, which includes prescriptive product rebates for heating
13 and lighting controls and a custom program for individual customer facilities, continued to be
14 delivered to business customers in the company's interconnected and isolated areas in 2018.

15 These programs provide technical support to identify economical energy efficiency
16 opportunities and provide financial support for capital upgrades. The total energy savings
17 achieved as a result of Hydro's prescriptive and custom business programs in 2018 was 635
18 MWh.

19

20 Hydro continues to engage with lighting distributors to promote the sale of high performance
21 lighting products. Hydro enhanced its Business Efficiency Program in 2018 by expanding the list
22 of energy efficient products eligible for mail-in rebate to include 4 foot LED tubes to replace
23 fluorescent lighting.

24

25 Commercial facility audits continue to be utilized to engage customers in the Isolated Systems
26 Business Efficiency Program and the Business Efficiency Program. The intent of the audits is to
27 facilitate opportunity identification, technical analysis and support, and project completion.⁶ In

⁶ Approximately 95 audits have been conducted in total since 2012.

1 2018, four commercial facility audits were completed in the interconnected system and 58
2 facility audits were completed in the isolated systems to inform customers of opportunities for
3 incentives. Further, 18 customers completed projects involving upgrades and improvements in
4 lighting, heating systems, insulation, and thermostats in Hydro's isolated and interconnected
5 service areas.

6

7 **3.4 Isolated System Community Program**

8 The Isolated Systems Community Energy Efficiency Program is specifically targeted to
9 residential and commercial customers in Hydro's Isolated Diesel systems. The objective of the
10 program is to provide outreach, education, and energy efficient products and installation free
11 of charge to residential and business customers in the diesel system⁷ communities within
12 Newfoundland and Labrador. From 2012 to 2018, the program installed 106,397 energy
13 efficient products, saved a total of approximately 8.2 GWh of electricity, and also provided
14 employment for over 55 residents of these communities.

15

16 The Isolated Systems Community Energy Efficiency Program includes residential and
17 commercial direct installations and focuses on building knowledge and capacity in the
18 communities by hiring and training local representatives. These representatives work within
19 their own communities to promote the program, provide useful information on energy use, and
20 provide direct installation of energy efficient products, including low flow showerheads, faucet
21 aerators, LED lamps, specialty size light bulbs, smart power strips, and hot water tank and pipe
22 insulation.

23

24 In 2018, 727 residential and business customers received direct installation of 12,147 products
25 consisting of water saving technologies and LED specialty bulbs for lighting needs. While this
26 work was ongoing, information was collected about the type of lighting, heating, and
27 appliances in the homes and businesses, which will be used for future program planning.

⁷ From 2012 to 2017 the program operated in 21 diesel systems. As a result of the community relocation of Williams Harbour in 2017, the program now operates in 20 diesel systems.

1 **3.5 Industrial Program**

2 Since 2010, Hydro has delivered the Industrial Energy Efficiency Program, which offers support
3 and financial incentives for Hydro’s industrial customers based on projects for lighting retrofits,
4 process improvements, equipment changes, loss prevention (e. g. , heat, steam energy), and
5 funding for energy audit consultant reports. Participation in the Industrial Energy Efficiency
6 Program has been variable as there are few industrial customers in the province. Promotion of
7 the Industrial Energy Efficiency Program is now included under Hydro’s Key Account
8 Management framework to support improved project planning, scheduling, and execution.
9 Within the Key Account Management framework, the industrial customers are directly engaged
10 with their Key Account Manager to assist with the Industrial Energy Efficiency Program. This
11 also permits Hydro to better understand the customers’ facilities, processes, plans and
12 schedules for potential efficiency improvement projects. In 2018, one industrial customer
13 initiated a lighting retrofit project, which was supported by approximately \$20,000 in program
14 funding. This investment will generate approximately 162 MWh of energy savings annually.

15
16 **4.0 Planning and Evaluation**

17 During 2018, several external evaluations and surveys were completed to measure customer
18 awareness, interest, and uptake in current programs:

- 19
20 • Socket saturation survey - to determine usage of LEDs in lighting sockets in customers’
21 homes, as a means of informing future program planning;
22
23 • Annual marketing survey - to assess home energy use and energy saving practices, as
24 well as awareness of, and participation in, the takeCHARGE programs;
25
26 • Hydro’s home energy use benchmarking program - evaluated to assess program
27 effectiveness, participation uplift, satisfaction and net energy and demand savings
28 versus targeted energy and demand savings. This program allows participating

1 households to compare their net energy usage with similar homes in their
2 neighborhood;

- 3
- 4 • Instant Rebate program: evaluations involved conducting: (i) a review of the program
5 documentation and databases, (ii) surveys with participants and the general population,
6 (iii) in-depth interviews with participating retailers, (iv) a savings review, and (v) a
7 cost-effectiveness analysis. The program was designed to offer instant cash rebates to
8 customers who purchase eligible energy-efficient products such as LED lamps, ENERGY
9 STAR® light fixtures, high-performance showerheads and weather-stripping; and

 - 10
 - 11 • Business Efficiency Program: an external review was initiated in 2017 and completed in
12 2018, the purpose of which was to validate the energy and demand savings achieved
13 through the programs, and provide recommendations for improving program delivery.
14 The survey established the savings claimed by Hydro were in line with that determined
15 to be correct and appropriate through the external evaluation for both the custom and
16 product rebate streams.

17

18 In 2019, the Utilities will complete a new Conservation Potential Study to determine the
19 achievable and economic energy efficiency and demand response potential in the Province.
20 After completion of this study, the Utilities will begin to develop their next multi-year plan for
21 conservation and demand management. With anticipated changes in marginal costs on the
22 electricity system reducing the value of energy saving benefits, some programs may become
23 challenged to pass economic screening, and measures that reduce peak demand will likely
24 become more prominent.

25

26 **5.0 Outreach and Support**

27 During 2018, Hydro continued to partner with Newfoundland Power to deliver the takeCHARGE
28 program which offers customer education and conservation awareness activities, primarily
29 through promotion of its takeCHARGE rebate programs and outreach activities. Residential and

1 Business programs are promoted through activities including mass media marketing, targeted
2 promotions, community outreach, school programming, trade ally development, partnerships,
3 and events.

4
5 The advertising campaign includes newspaper, radio, online and social media advertisements.
6 Campaigns run throughout the year for insulation, thermostats, HRVs, instant rebates, heat
7 pump education and the Business Efficiency Program. The media is chosen based on the time of
8 year that programs are in market and consumer purchasing behaviours.

9
10 The takeCHARGE team is also active in social media through a joint utility Facebook page,
11 YouTube channel, Twitter account, and website. Since 2015, approximately 14,000 Facebook
12 users have “liked” the takeCHARGE Facebook fan page, and YouTube views are continuing to
13 increase through direct links to videos from other takeCHARGE social media channels. In
14 addition, takeCHARGE currently has approximately 3,000 Twitter followers and has sent out
15 2,424 tweets. The takeCHARGE website views continue to increase year over year. In 2017,
16 there were 629,447 page views, compared to 701,751 in 2018.

17
18 Hydro engages with retailers, suppliers, students, and other groups through presentations, and
19 interactive booth displays to promote programs, answer questions and promote energy
20 conservation. The takeCHARGE Town Challenge initiative has awarded \$85,000, since 2010, to
21 winning towns. Its purpose is to encourage residents and municipalities to reduce their energy
22 use. Each year, municipalities are invited to submit proposals that will support their efforts to
23 develop or improve energy conservation or energy efficiency projects. Projects have to
24 demonstrate a positive effort to conserve energy that benefits the entire community. The
25 takeCHARGE school contests for kindergarten to grade 6 classes and grade 7 to grade 12 classes
26 were run with a goal to enable students to understand and be able to explain why saving
27 energy is important, and demonstrate what they can do to conserve energy.

1 The tenth annual takeCHARGE Energy Efficiency Week was held from September 24 to 30,
 2 2018. This week is dedicated to providing customers with information to assist them in saving
 3 energy and money. During the week, takeCHARGE teams were visible throughout the province
 4 at special events and on television advertisements, and a full social media plan was executed.

5
 6 Hydro, in partnership with Newfoundland Power, launched its inaugural takeCHARGE Luminary
 7 Awards in 2018. The awards program provides an opportunity to recognize the progressive work
 8 that the Company’s energy efficiency partnerships have achieved, while continuing to build
 9 valuable relationships with like-minded organizations. Individuals, organizations and communities
 10 from all across Newfoundland and Labrador were recognized for their commitments to energy
 11 efficiency.

12
 13 Table 3 provides Hydro’s costs to provide education, outreach, support, and planning for its
 14 CDM programs from 2009 to 2018.

Table 3: Hydro’s Support Costs (\$000)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Education	262	106	212	200	135	158	154	138	111	63
Support	53	48	43	53	27	52	68	42	40	47
Planning	176	180	304	127	152	224	442	250	251	128
Total	491	334	559	380	314	434	664	429	401	238

15 **6.0 Regulated Program Energy Savings and Program Costs**

16 Table 4 provides the estimated annual energy savings from Hydro customers in relation to
 17 programming associated with the annual regulated deferral request.

Table 4:

Table 4: Energy Savings from Island Interconnected and Isolated Systems CDM Program Activities⁸ (MWh)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Life to date
Windows	8	14	38	50	43	40	4	-	-	-	197
Insulation	29	63	229	126	123	100	52	40	111	76	949
Thermostats	2	16	16	28	14	16	23	33	43	46	239
Residential Benchmarking	-	-	-	-	-	-	-	-	131	234	365
Coupon Program	-	47	166	-	-	-	-	-	-	-	213
Commercial Lighting	3	-	92	25	19	22	46	-	-	-	207
Industrial	-	-	165	3,172	-	22,258	-	177	-	162	25,934
Block Heater Timer	-	-	-	-	-	-	-	-	-	-	0
Isolated Systems Community	-	-	-	1,676	1,096	1,357	1,426	512	1,141	1,064	8,272
ISBEP	-	-	-	3	26	111	67	241	24	205	677
Heat Recovery Ventilator	-	-	-	-	1	1	-	1	-	1	3
Instant Rebate	-	-	-	-	-	80	71	21	9	86	267
Business Efficiency Program (Prescriptive)	-	-	-	-	-	-	21	131	503	135	790
Business Efficiency Program (Custom)	-	-	-	-	-	73	773	588	98	160	1,692
Total	42	140	706	5,080	1,322	24,058	2,484	1,744	2,060	2,170	39,806

- 1 The costs associated with the delivery of the CDM program portfolio provided in Table 4 include
- 2 direct costs for advertising, salaries, rebates and other expenses directly associated with a
- 3 specific program. These costs are recovered from customers through the CDM Cost Recovery
- 4 Adjustment and vary depending on the uptake of the program and the number of programs
- 5 offered.
- 6
- 7 Table 5 provides a breakdown of annual CDM program costs included in the CDM Deferral
- 8 Account.

⁸ Hydro's CDM Cost Deferral Account does not capture spending associated with CDM programs offered to customers on the Labrador Interconnected system, therefore Table 4 does not reflect energy savings associated with these programs.

Table 5: CDM Program Costs Included in the CDM Deferral Account⁹ (\$000s)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Windows	44	41	69	102	150	31	1	-	-	-
Insulation	40	53	116	108	112	87	62	57	93	80
Thermostats	13	18	25	43	47	32	19	21	53	43
Residential Benchmarking	-	-	-	-	-	-	-	49	45	23
Coupon Program	-	113	123	-	-	-	-	-	-	-
Commercial Lighting	13	-	43	10	17	10	11	-	-	-
Industrial	57	190	98	170	88	1,243	(115)	27	41	20
Block Heater Timer	-	-	-	-	-	-	-	-	-	-
Isolated Systems Community	-	-	-	858	871	615	530	451	936	981
ISBEP	-	-	-	93	115	96	7	45	41	99
Heat Recovery Ventilator	-	-	-	-	8	3	4	4	5	5
Instant Rebate	-	-	-	-	1	219	186	143	104	130
Business Efficiency (Prescriptive)	-	-	-	-	-	-	-	14	12	7
Business Efficiency (Custom)	-	-	-	-	40	92	134	193	126	134
Isolated Load Control Pilot	-	-	-	-	-	-	6	158	17	5
Appliance Retirement Pilot	-	-	-	-	-	-	56	(12)	-	-
Total	167	415	474	1,384	1,449	2,428	902	1,152	1,474	1,528

1 7.0 Program Participation and Savings

2 Table 6 provides statistics on participation for each of Hydro’s programs. The transaction units
 3 are specific to each program. The Residential Energy Star Window, Insulation, Thermostat and
 4 HRV Programs reflect approved rebates. The Coupon Program reflects numbers of coupons
 5 redeemed. The Commercial Lighting and Instant Rebate Programs each reflect the number of
 6 products rebated through the programs. The Block Heater Timer Program reflects the number
 7 of timers determined to be installed through post-giveaway surveys or coupon redemption. The
 8 Isolated Systems Business Efficiency Program, Business Efficiency Program, and Industrial
 9 Efficiency Programs reflect the number of completed retrofit projects. The Isolated Systems
 10 Program denotes the number of residential and commercial customer premises that received
 11 direct installations. Finally, the Residential Benchmarking Program indicates the number of
 12 customers included in the treatment group and the Business Efficiency Program (prescriptive) is
 13 the number of product rebates.

14

⁹ Credits are due to an overstated accrual in the preceding year.

Table 6: Life-to-Date Program Participation

Program	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
Windows	11	19	41	61	48	24	7	-	-	-	211
Insulation	14	24	104	50	53	22	35	31	39	42	414
Thermostats	4	28	32	45	23	20	15	63	56	66	352
Residential Benchmarking	-	-	-	-	-	-	-	1,000	1,000	1,000	3,000
Coupon Program	-	3,178	5,832	-	-	-	-	-	-	-	9,010
Commercial Lighting	27	74	470	320	339	377	323	-	-	-	1,930
Industrial	-	-	1	1	-	3	-	1	-	1	7
Block Heater Timers	-	-	-	-	629	-	-	-	-	-	629
Isolated Systems Community	-	-	-	1,355	1,153	1,181	965	345	1,007	727	6,733
ISBEP	-	-	-	1	1	4	1	5	3	10	25
Heat Recovery Ventilator	-	-	-	-	1	11	9	8	7	21	57
Instant Rebate	-	-	-	-	-	6,920	4,551	26,601	9,764	19,285	67,121
Business Efficiency Program (Prescriptive)	-	-	-	-	-	-	4	173	2,309	460	2,946
Business Efficiency Program (Custom)	-	-	-	-	-	4	3	10	7	8	32
Total	56	3,323	6,480	1,833	2,247	8,566	5,913	28,237	14,192	21,620	92,467

1 **8.0 Levelized Utility Costs**

2 Levelized Utility Cost (“LUC”) is a method used to compare costs associated with conservation
3 programs to the value of energy saved. The LUC represents the economic cost to the utility (¢
4 per kWh) to generate energy savings. It is an industry metric which is calculated by discounting
5 future energy savings resulting from conservation programs to a present value. Table 7
6 provides the LUC for Hydro’s 2018 programs. The energy savings represent the annual savings
7 resulting from the individual program participation during 2018.

Table 7: Hydro Program Participation, Savings, and Levelized Utility Cost 2018

Program	Participation	Energy Savings (MWh)	Non-coincident Demand Savings (kW)	Levelized Utility Costs(¢/kWh)	Life to date Levelized Utility Cost(¢/kWh)
Windows	-	-	-	-	15.5
Insulation	42	139	23	6.4	3.9
Thermostats	66	62	-	7.9	9.9
Residential Benchmarking	1,000	234	19	9.9	19.2
Coupon Program	-	-	-	-	-
Industrial	1	162	-	2.8	1.7
Block Heater Timer	-	-	-	-	-
Isolated Systems Community	727	1,064	328	21.0	14.1
ISBEP	10	205	64	6.2	10.4
Heat Recovery Ventilator	21	12	4	9.6	18.5
Business Efficiency Program(Custom and Prescriptive)	468	429	328	5.6	4.3
Instant Rebate	19,285	300	93	9.6	21.0
Total Programs	-	2,608	858	11.5	5.4

1 **9.0 Conclusion**

2 Hydro has continued its efforts to promote energy conservation and demand management
3 throughout 2018, including the continued work with Newfoundland Power to develop and
4 execute programs that are accessible to all customers of the Utilities. The takeCHARGE
5 programs have been successful in providing education and fostering the development of a
6 culture of energy conservation in the province. In addition, Hydro continues to work with its
7 customers to understand needs and drivers of electrical consumption, to ultimately support the
8 achievement of sustainable energy savings through the various programs described in this
9 report. Hydro will continue to work closely with the Provincial Government on various
10 programs and initiatives. In 2019, the Utilities will complete a Conservation Potential Study to
11 determine the achievable and economic energy efficiency and demand response potential in
12 the Province. After completion of this study, the Utilities will begin to develop their next multi-
13 year plan for conservation and demand management. With anticipated changes in marginal
14 costs on the electricity system reducing the value of energy saving benefits, some programs
15 may become challenged to pass economic screening, and measures that reduce peak demand
16 will likely become more prominent. Overall, Hydro’s efforts supported annual incremental
17 energy savings of 2,608 MWh in 2018 and accumulated energy savings of 43,581 MWh since
18 2009.

Appendix A

Conservation and Demand Management Program Descriptions

Residential takeCHARGE Rebate Programs

Program incentives are processed primarily through customer applications. The programs are promoted in partnership with trade allies in the retail, home building and renovation industries.

Insulation Rebate Program

The objective of this program is to provide incentives to increase the insulation R-value in residential basements, crawl spaces and attics, thereby increasing the efficiency of the home's building envelope. Eligibility for the programs is limited to electrically heated homes, determined on the basis of annual energy usage. Home retrofit projects are eligible. Customers can receive an incentive of 75% of basement wall and ceiling insulation materials up to \$1,000, and 50% of attic insulation material costs up to \$1,000.

Thermostat Rebate Program

This program encourages installation of programmable and electronic thermostats to allow customers better control of the temperature in their home and to save energy. These high performance thermostats allow customers to set back the temperature during the night or when they are away. Eligibility for the program is limited to electrically heated homes, determined on the basis of annual energy usage. Home retrofit projects and new home developments are eligible. Incentives of \$10 for each programmable thermostat and \$5 for each electronic high performance thermostat are offered.

HRV Rebate Program

This program encourages customers to purchase a high efficiency HRV to improve the efficiency of their home. Eligible measures in this program include HRV models that have a Sensible Recovery Efficiency of 70% or more. Customers who purchase a high

efficiency HRV can receive a rebate of \$175. All customers are eligible for this program regardless of age of home or heat source.

Isolated System Community Energy Efficiency Program – Hydro Program

This program includes both residential and commercial components targeting customers in Isolated Diesel and L’Anse au Loup Systems. The focus is on residential customers through the direct install of a kit of technologies, at-cash coupons on small technologies and mail-in rebates on energy efficient appliances. Commercial customers also receive a direct install of a kit of technologies. The kit includes items for water savings, draft proofing, lighting and other measures.

Homeowners receive education on energy efficiency and information on the existing takeCHARGE rebate programs. Community events, social media promotions and exchanges held to promote the program and energy efficiency awareness.

Block Heater Timer Program – Hydro Program

This program targeted customers in the Labrador Interconnected System to encourage the purchase of energy saving Block Heater Timers through in-store discounts offered at partnering retailers. The program launched with a giveaway of the technology to create awareness of the product as there was little or no use of the technology before the program. The incentive was offered over two winter seasons (2012-2013 and 2013-2014) and ended in spring 2014.

Small Technologies Program

Instant Rebates

This program promotes a variety of smaller technologies, such as LED lighting, and smart power bars, through instant rebates available at the cash register of participating retailers. All customers are eligible for this program regardless of age of home or heat source.

Appliances and Electronics

This program encourages customers to purchase high efficiency appliances. Participants receive incentives of \$100 for select energy efficient washers, freezers, and \$20 for eligible TVs. All customers are eligible for this program regardless of age of home or heat source. This program ended December 31, 2017.

Residential Benchmarking Program

This program encourages customers to adopt energy efficient behavioural changes. Participants receive Home Energy Reports that provide insight into their home's electricity use. The reports help customers understand changes in their usage over time, as well as how they compare to similar homes. They will also include practical tips on how to save energy moving forward. The program also includes an online component that allows customers to engage even further through weekly challenges and personalized saving plans.

Approximately 1,000 customers were randomly selected as participants in this program. Program participants broadly reflect the composition of Hydro's customer base in heating type and geographical distribution. No financial incentive is offered for this program.

Energy Efficient Loan Program

This is a program offered by the Government of Newfoundland and Labrador and takeCHARGE, making it easier to save energy and money. On-bill financing with a reduced interest rate by 2.5% from standard utility financing rates, is available on insulation, heat pumps and home energy assessments. Through EELP, eligible applicants can receive low-interest financing for up to \$10,000 over a maximum of five years.

Commercial takeCHARGE Rebate Programs

Business Efficiency Program

The objective of this program is to improve electrical energy efficiency in a variety of commercial facilities and equipment types. The program components include financial incentives based on energy savings, and other financial and educational supports to enable commercial facility owners to identify and implement energy efficiency and demand reduction projects.

This program is available for existing commercial facilities that can save energy or reduce demand by installing more efficient equipment and systems. The program includes custom project incentives and prescriptive rebates for specific measures on a per unit basis.

Isolated Systems Business Efficiency Program (ISBEP) – Hydro Program

The ISBEP was launched in 2012 and targets commercial customers in the Isolated Diesel and L'Anse au Loup Systems. The program provides a custom approach to finding energy efficiency solutions and financial assistance for feasibility studies and for retrofit projects. It has the same program design and offerings as the joint utility Business Efficiency Program, but has higher incentive levels for retrofit work because of the higher avoided cost of generation in these systems.

Industrial Energy Efficiency Program (IEEP)

The objective of this program is to improve electrical energy efficiency in a variety of industrial processes. The program components include financial incentives based on energy savings, and other supports to enable industrial facilities to identify and implement efficiency and conservation opportunities. This program is a custom program

to respond to the unique needs of the industrial market, rather than a prescriptive technology approach.

Attachment 1

Five-Year Conservation Plan: 2016–2020

FIVE-YEAR CONSERVATION PLAN: 2016 – 2020



October 2015

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1.0 EXECUTIVE SUMMARY

Newfoundland and Labrador Hydro (“Hydro”) and Newfoundland Power have offered customer energy conservation programs on a joint and coordinated basis under the *takeCHARGE* brand since 2009. These programs provide a range of information and financial supports to help customers manage their energy usage.

The joint *Five-Year Conservation Plan: 2016-2020* (the “2016 Plan”) builds on this experience, and continues to reflect the principles underlying two previous joint, multi-year conservation plans developed by Hydro and Newfoundland Power (the “Utilities”).¹ It reflects refinement of the opportunities identified in a recently updated conservation potential study (the “2015 CPS”) through in-depth local market research and program cost benefit analysis.

The 2016 Plan represents both growth and evolution of the Utilities’ joint customer energy conservation program portfolio. It includes a new behavioural-based program for the residential sector, expansion of existing commercial programs, and the reshaping or discontinuation of several programs. The approach outlined in this plan will remain flexible to address the changing provincial landscape, in terms of customer expectations, market conditions for energy efficient products, and electrical system costs. The 2016 Plan also addresses customer support and education, program planning and evaluation processes, as well as the Utilities’ costs and cost recovery arrangements.

The total estimated energy savings for 2016 through 2020 are 883 GWh.² Total estimated costs through this period are \$41.1 million.

¹ The *Five-Year Energy Conservation Plan: 2008-2013* was filed with the Board on June 27, 2008. The *Five-Year Energy Conservation Plan: 2012-2016* was filed on September 14, 2012.

² The energy savings indicated throughout the *Five-Year Energy Conservation Plan: 2016-2020* represent *gross* energy savings achieved by customers. These savings reflect all technologies installed by participating customers since program implementation. *Net* energy savings would reflect adjustments for: (i) the timing of customer installations giving rise to the energy savings; and (ii) program *free ridership* (an estimate of participants who would have chosen the more efficient product without the program).

2.0 BACKGROUND

2.1 *Planning Context*

Hydro and Newfoundland Power have collaborated on customer energy conservation program planning and delivery for the past 8 years. The programs offered jointly under the takeCHARGE brand have included a variety of information and financial supports which help customers manage their energy usage. The Utilities' provision of energy conservation programming is responsive to customer expectations, supports efforts to be responsible stewards of electrical energy resources and is consistent with provision of least cost, reliable electricity service. Initiatives address conservation opportunities for customers in each sector: residential, commercial and industrial.

The Utilities' practice has been to refresh their joint strategic plans for customer conservation programming every three to four years. This ensures programs achieve long term goals while being responsive to changes in customer expectations, market barriers, technology developments, and economics. Current program offerings are based on the Five Year Energy Conservation Plan: 2012-2016 ("the 2012 Plan").

One of the key inputs into the 2016 Plan was the outcome of the Conservation Potential Study ("CPS"), completed by the Utilities in 2015. The CPS identified cost-effective energy and demand reduction measures, outlined general parameters for program development, and quantified achievable energy savings potential by sector and end-use. The results of the CPS are considered with the Utilities' experience and other factors in the local market to determine potential programs and energy saving targets for the 2016 Plan.

The Utilities' conservation planning is coordinated with overall planning for the electrical system. Significant changes to the Island Interconnected System are anticipated to occur in this planning period. Interconnection of the Muskrat Falls hydroelectric development is forecast for 2018 and will include the Island's first connection to the

North American grid. As a result, there is uncertainty with respect to the marginal cost of energy and capacity on the Island Interconnected System beyond 2017.

Schedule A provides the current forecast marginal cost of energy and capacity for 2015-2035.³ The forecast indicates a decrease in the marginal cost of energy beginning in 2018. This effectively reduces the value of energy savings arising from customer energy conservation programming, and limits the types of programs that can be cost effectively offered.

Costs of electricity supply additions are expected to be incorporated into customer rates starting in 2018, putting upward pressure on customers' rates. This is expected to increase customers' motivation to conserve energy to manage their electricity costs. Also, the recent economic slowdown is anticipated to continue into this planning period and will influence customer behaviour with regards to conservation.

The 2008 and 2012 Five Year Conservation and Demand Management Plans, delivered jointly by the Utilities, had focused primarily on energy conservation. This reflected the relatively high marginal energy costs (predominantly due to fuel costs at Hydro's Holyrood Thermal Generating Station) which justified such a focus. The events of recent winters have since brought to light issues with peak load and generation capacity on the Island Interconnected System which are anticipated to continue into this planning period. The 2016 Plan therefore considers demand management opportunities as well as energy conservation.

The Utilities have been offering some form of customer energy conservation programming since 1991, and have achieved significant energy savings over this time. The current forecast, particularly for insulation, anticipates diminishing returns. For example, the remaining potential for energy savings through insulation upgrades has

³ The marginal costs used to determine cost effectiveness of the customer energy conservation programs are based on the most recent marginal cost forecast as projected by Hydro in February 2015. These estimates are currently under review by Hydro to incorporate the forecast interconnection with the North American grid. Once more current estimates are available, they will be incorporated in the screening process.

been impacted by changes to the National Building Code requiring basement insulation in new homes, as well as barriers to retrofitting many of the eligible existing homes. This is consistent with experience in other North American jurisdictions where utility programming has harvested the “low hanging fruit” and subsequently has moved on to address more challenging and costly opportunities.

Energy conservation programming has also been affected by technology advancements and changes to standards. Lighting product standards changes have effectively eliminated availability of incandescent bulbs for consumers. At the same time, LED technology has advanced and become more affordable and available. The pace of this change has been even faster than anticipated in the 2012 Plan. This is demonstrated by higher than projected uptake in the Utilities’ Instant Rebate component of the Small Technologies program.

The Utilities continue to work with the Provincial Government, through the Office of Climate Change and Energy Efficiency, regarding policy development for energy conservation and efficiency, and particularly potential impacts and approaches to building codes, product standards and broader market transformation objectives.

Many of the influences on the provincial energy conservation market can be seen in other North American jurisdictions. In recent years, many jurisdictions have experienced decreasing marginal costs of energy and increasing program costs due to maturing conservation programs. As a result, utilities and program administrators have revised their approach to economic analysis of energy conservation. The Utilities have conducted research on current economic evaluation practices. A summary of this research is provided in Schedule B. It indicates that Canadian jurisdictions use the Total Resource Cost (“TRC”) test as their primary benefit cost test for program screening, with the Program Administrator Cost test as a secondary test. Only one of the seven Canadian utilities researched used Ratepayer Impact Measure as a primary benefit cost test for program screening. In the United States, most jurisdictions follow

similar practices with over 70% using TRC as the primary benefit cost test and 2% using Ratepayer Impact Measure for program screening.

2.2 Energy Conservation Programs

Based on the 2012 Plan, the Utilities have jointly offered customer energy conservation programs which provide both information and financial incentives to encourage customer installation of energy efficient technologies.⁴ In addition, Hydro has offered programming for its customers, such as incentives for commercial customers in its isolated system service territories, where market conditions and system costs differ.

Table 1 shows, by sector, the portfolio of programs that have been offered under the 2012 Plan.⁵

Table 1 Conservation Programs By Sector		
Residential	Commercial	Industrial
Insulation Thermostat ENERGY STAR Window ⁶ HRV Block Heater Timer Small Technologies Isolated Systems Community Program	Lighting Business Efficiency Program Isolated Business Efficiency Program	Industrial Energy Efficiency Program

⁴ Once installed, these more energy efficient technologies provide energy savings for the customer throughout the life of the product. For example, an HRV has an estimated life of 15 years and will result in energy savings benefits throughout that period.

⁵ The Utilities also engage in demand management activities, including Newfoundland Power's Curtailable Service Rate Option and Hydro's interruptible load arrangements with its Industrial Customers.

⁶ The ENERGY STAR Window Program concluded at the end of 2014.

Schedule D summarizes the energy savings and costs for the customer energy conservation programs offered by the Utilities from 2009 through 2015.

Residential Programs

Table 2 provides a summary of residential customer energy savings achieved through the Utilities' conservation programs from 2009 through 2015(F).⁷

Table 2 Residential Portfolio Energy Savings 2009 through 2015F (GWh)								
	2009	2010	2011	2012	2013	2014	2015F	Total
Energy Savings	2.5	7.1	18.6	28.5	38.4	51.5	65.7	212.3

The takeCHARGE residential programs are expected to result in aggregate energy savings of approximately 212.3 GWh by the end of 2015.⁸

Insulation Program

As a result of the updates to the National Building Code in 2012, several changes were made to the Insulation Program. New homes are no longer eligible and the minimum R-value requirements for existing homes have been increased. As well, the rebate structure was revised to provide a higher, easy-to-calculate rebate. Customers can receive an incentive of 75% of basement wall or ceiling insulation material costs up to \$1,000, and 50% of attic insulation material costs up to \$1,000.

⁷ Energy savings include savings arising from all technologies installed by all participants since program implementation. This reflects the fact that these technologies provide energy savings benefits for the customer throughout the life of the product.

⁸ Since implementation in 2009, there have been approximately 36,650 participants and over 638,000 at-the-cash rebates were provided on energy efficient products in the takeCHARGE residential customer programs.

Thermostat Program

High efficiency programmable and electronic thermostat replacements allow customers to conserve energy at relatively low cost and effort. Eligibility for the programs is limited to electrically heated homes, determined on the basis of annual energy usage.

ENERGY STAR Window Program

This program concluded at the end of 2014. After 5 years, and over 9,200 participating customers, the program had achieved its objective of making more efficient windows the standard in the local market.

Heat Recovery Ventilator Program

This program promotes the installation of high efficiency heat recovery ventilators (“HRVs”). HRVs have been widely used in new home construction in the province since the 1990s, to control humidity and air quality. The HRV program has experienced lower than projected participation since its launch in late 2013.⁹ There has been improvement in 2015, and the Utilities will continue to monitor and evaluate this program in order to find opportunities to increase participation.

Block Heater Timer Program

Hydro provided giveaways and at-the-cash coupons for block heater timers to customers in Hydro’s Labrador Interconnected System from 2012-2014. While vehicle engine block heaters are used extensively in this area, timers are rarely used. Instead of using electricity throughout the night, block heater timers allow vehicle owners to reduce the amount of time that electricity is used to warm the vehicle engine. Due to lack of participation this program was not continued past 2014 but commercial customers can take advantage of this technology through the Business Efficiency Program (“BEP”) or the Isolated Systems Business Efficiency Program (“ISBEP”).

⁹ The Utilities have received feedback regarding low customer knowledge of home ventilation, with many customers being unaware of the purpose of a HRV in their home and how it can save energy. Also, there are complexities in the supply chain for acquiring a high efficiency HRV which can be problematic for potential participants.

Small Technologies

The small technologies program is supported by retail partners and appeals to a broad customer group as it does not involve a major home renovation. The program uses different marketing approaches for two different groups of energy efficient products.

The Instant Rebate component offers relatively small incentives instantly at-the-cash on a variety of low cost, every day energy efficient products for the home.¹⁰ Participation and energy savings results in the first two years of the program have exceeded the forecast in the 2012 plan. The Appliance and Electronics component offers incentives that are relatively higher value and available by mail-in and online application throughout the year.¹¹

Isolated Systems Community Program

Following two pilot programs in 2010 and 2011, Hydro launched a full-scale, energy efficiency direct install program in 2012. The program includes direct installations of energy efficient products at no cost to homes and businesses.¹² The program also focuses on customer education and building capacity in the communities by hiring and training local representatives. These representatives work in their own communities to promote the program, provide information on energy use, and install the products.

¹⁰ Products include LED lighting, motion sensors, timers, dimmer switches, smart power strips and more.

¹¹ Products include energy efficient clothes washers, full-size refrigerators, full-size freezers and TVs.

¹² Products include low-flow showerheads and aerators, CFLs, smart power strips, and hot water tank and pipe insulation.

Commercial Programs

Table 3 provides a summary of commercial customer energy savings achieved through the Utilities' conservation programs from 2009 through 2015(F).

Table 3 Commercial Portfolio Energy Savings 2009 through 2015F (GWh)								
	2009	2010	2011	2012	2013	2014	2015F	Total
Energy Savings	0.2	0.9	2.4	3.3	3.9	6.5	11.4	28.6

The takeCHARGE commercial programs will result in estimated aggregate energy savings of approximately 28.6 GWh by the end of 2015.¹³

Commercial Lighting Program

The Commercial Lighting Program targets reduced energy use through efficient lighting in commercial buildings, including high performance T8 and T5 fluorescent lighting and LED exit signs. This program has primarily been promoted through local lighting distributors by discounting lighting products at time of purchase.

The Business Efficiency Program

The objective of this program is to improve electrical energy efficiency in a variety of commercial facilities and equipment types. The program components include financial incentives based on energy savings from custom projects, and other financial and educational supports to enable commercial facility owners to identify and implement energy efficiency improvement projects. It also includes rebates for specific measures on a per unit basis.

¹³ Since implementation in 2009, there have been over 1,050 participants in the takeCHARGE commercial customer programs.

Isolated Systems Business Efficiency Program

This program is targeted toward commercial customers located in Hydro’s isolated system communities. This custom program provides incentives based on the energy savings from efficiency improvement projects. This allows customers to implement energy efficient technologies that are suitable for their specific buildings, equipment and operations.

Industrial Programs

Table 4 provides a summary of industrial customer energy savings achieved through Utility customer energy conservation programs from 2009 through 2015(F).

Table 4 Industrial Program Energy Savings 2009 through 2015(F) (GWh)								
	2009	2010	2011	2012	2013	2014	2015(F)	Total
Energy Savings	-	-	0.2	3.3	3.3	25.6	25.6	58.0

The takeCHARGE Industrial Energy Efficiency program will result in estimated aggregate energy savings of approximately 58.0 GWh by the end of 2015.¹⁴

The Industrial Energy Efficiency Program is a custom program that responds to the unique needs of Hydro’s transmission level industrial customers. This program provides financial support for engineering feasibility studies of efficiency projects and for project implementation costs. The Industrial program was initially launched as a three-year pilot program in 2009, with the first project applications being submitted in 2011 and the last being submitted in 2013. No projects were completed in 2013 as focus was put on feasibility studies for work to be completed in 2014. The program then underwent an assessment by an external third party in 2014 and was re-launched as a full program in 2015.

¹⁴ Since implementation in 2009, there have been 5 projects completed under the takeCHARGE Industrial Energy Efficiency Program.

2.3 Education & Support

The Utilities continue to provide energy efficiency education and support to customers through a variety of channels, which include a joint website, outreach activities, school presentations and partnerships with other organizations.

Table 5 shows the number of customer-initiated contacts with the Utilities for energy conservation information from 2010 through 2015 YTD.

Table 5 Customer Contacts for Energy Conservation Information						
	2010	2011	2012	2013	2014	2015YTD
Contact Centre Inquiries	11,704	12,624	9,793	9,630	10,830	5,328
Website Visits	52,013	72,996	49,202	76,278	186,003	197,973

The majority of customers chose electronic means of communication with the Utilities to obtain information on energy conservation and rebate programs. This is consistent with promotion of the takeCHARGE website as the primary resource for customer inquiries and information. Customer visits to the takeCHARGE website grew by 144% from 2013 to 2014. Activity in the first eight months of 2015 shows continued growth, with approximately 80% of website visits via a mobile device. This increase is related to increased promotion, changes to existing programs, and addition of new programs.

The Utilities have participated in an average of 214 community outreach events each year since 2012. This included presentations to retailers and suppliers, senior citizens, trade allies and other groups. takeCHARGE information booths were displayed at home shows, trade fairs, and retail stores across the province. The Utilities also offer a number of outreach events, such as the annual takeCHARGE of Your Town Challenge and Energy Efficiency Week. Through these outreach activities, members of the takeCHARGE team assisted customers with their energy efficiency questions, while raising awareness of energy conservation and the takeCHARGE rebate programs.

Over the last three years the takeCHARGE *Kids in Charge* K-I-C Start school program, has provided energy efficiency and conservation education support to students throughout Newfoundland and Labrador. This has included delivering in classroom presentations and an annual contest for primary and elementary students. In 2014, takeCHARGE partnered with the Provincial Office of Climate Change and Energy Efficiency to extend this program through the Hotshots pilot program.¹⁵ As a result, in 2014-15 school year, over 11,000 students in 106 schools throughout the province participated in 448 presentations about energy conservation.

Trade allies play an integral role in helping customers make knowledgeable decisions regarding energy conservation and related home improvements. Retail partners display information about takeCHARGE programs and energy efficiency products in their stores and in flyers, as well as during special promotional events.¹⁶ Similarly, the Utilities are continuing to grow a network of business to business service providers and suppliers that support the commercial and industrial sectors.¹⁷

The Utilities have also developed partnerships with a variety of other organizations that share common goals for the province's conservation market, including the Association of Newfoundland and Labrador Realtors, the Canadian Home Builders Association, Newfoundland and Labrador Housing Corporation, and the Canadian Mortgage and Housing Corporation.

¹⁵ Through the HotShots pilot, the Province provided funding and support for additional in-class presentations, curriculum linked teacher materials, and a contest for high school students.

¹⁶ The Utilities continue to work with over 160 retail store partners, 11 manufacturers/distributors, and approximately 50 HRV installers.

¹⁷ These include lighting equipment manufacturers and distributors, electrical and HVAC contractors, and engineering firms.

Table 6 shows costs for education and support for the period 2009-2015(F).

Table 6 Conservation Education & Support Costs 2009-2015(F) (\$000s)								
	2009	2010	2011	2012	2013	2014	2015(F)	Total
Education	666	486	428	426	501	647	693	3,847
Support	236	206	219	222	186	174	158	1,401
Total	902	692	647	648	687	821	851	5,248

2.4 Planning & Evaluation

Planning

The focus of the Utilities' CDM planning process is to develop a 5-year plan for the implementation of comprehensive customer energy conservation and demand management programs around the technologies that were determined to have conservation potential in the provincial market. The completion of the CPS in 2015 effectively initiated the development of the 2016 Plan.

Programs are developed and revised through consultation with the various market stakeholders, such as government, trade allies and local interest groups, to gather feedback on program delivery strategy.

Table 7 shows costs for conservation planning for the period 2009-2015(F).¹⁸

Table 7 Conservation Planning Costs 2009-2015(F) (\$000s)								
	2009	2010	2011	2012	2013	2014	2015(F)	Total
Planning	401	429	509	404	462	958	1,202	4,365

Variations in annual conservation planning costs primarily reflect the periodic nature of the Utilities’ program planning and research activities.

Research

In 2013, the Utilities completed a joint Commercial Facility Equipment Inventory (“CFEI”) on 54 commercial facilities.¹⁹ This research provided information on how commercial customers use electricity, through an inventory and analysis of all mechanical and electrical equipment in each facility.²⁰ This data was used as a direct input into the CPS conducted in 2015.

In 2014, Newfoundland Power and Hydro jointly conducted a survey to gather information regarding electricity end uses in the residential sector. The information gathered was used to assess potential electricity savings opportunities, and was used as a direct input into the current planning cycle. These results are also being taken into account in making adjustments to the *takeCHARGE* programs. For example, because

¹⁸ Conservation planning costs include costs related to surveys and research, development of the potential study and the five-year plan, and general administration.

¹⁹ The CFEI was completed by CBCL Limited, a consultant that conducted on-site facility audits for participating commercial customers. CBCL Limited is a leading employee owned multidisciplinary engineering and environmental consulting firm in Atlantic Canada.

²⁰ The CFEI found, for example, that the food retail sector are the largest users of electricity on a square footage basis of the customers audited, followed by the manufacturing/fish processing sector.

of survey findings regarding the prevalence of CFLs, these have been removed from the Instant Rebates Program beginning in the fall of 2015.²¹

Newfoundland Power completed research on ductless mini-split heat pumps (“MSHP”) from 2013 to 2015. The objectives of this research were to assess the current MSHP market in Newfoundland, the use of the MSHP as a supplementary heat source and the potential impact of MSHPs on the electricity system. The results indicate that MSHP are more efficient and do save energy compared to electric baseboard heat.²² This analysis also shows that there is not likely to be peak demand reduction on the electricity system from installation of MSHPs.²³ Customer demand for MSHP products has grown significantly in recent years and continues to be strong. However, there are issues with availability of qualified installers and customer understanding of product quality requirements.

In the fall of 2014, Newfoundland Power launched a pilot program to assess the economic, market, and technical feasibility of direct load control to reduce overall peak demand. This pilot was initiated in response to the constraints on system capacity that became evident after the events in January of 2013 and 2014. The pilot involved controlling hot water tanks in approximately 500 customer homes in Paradise and Mount Pearl. Demand reduction achieved by the direct load control events on average was 0.6 kW per participant, and for events that included all participants, approximately

²¹ Customers were asked what types of lighting they use in areas of their house where they spend the most time: 63% reported that they use incandescent bulbs, 53% CFLs, and 18% LEDs (multiple responses allowed). In another question, 31% of respondents claimed to have changed all their bulbs to more energy efficient types, and 45% indicated that they have begun to change to more energy efficient types.

²² Approximately half of the homes in the study recorded energy savings after installation of the MSHP. In these homes, electricity usage declined by an average of 5,300 kWh or 19% per year, with savings ranging from 7% to 50%. The remaining homes recorded an increase or no change in energy usage. This appears to reflect factors such as heating of additional living space, fuel switching, or operational issues with the MSHP.

²³ Savings at time of system peak are dependent on a number of factors such as the efficiency and defrost cycle of the MSHP system, and temperature. A high efficiency MSHP may be capable of providing peak savings in warmer parts of the province but not in colder regions, while a less efficient MSHP may not be capable of providing peak savings in any region. On colder weekdays, the study observed little difference in the load profile of the MSHP homes vs. electric baseboard homes, and occasionally the MSHP homes' peak load was slightly higher.

298 kW of demand reduction was achieved. The Pilot results also indicate that a full scale provincial program does not meet the economic requirements.

The Provincial Office of Climate Change Home Energy Monitoring Pilot Project, which is supported by the Utilities and administered by Hydro, began in September 2014 and aims to assess whether real time display of energy use has a positive effect on electricity conservation behavior. The pilot involves approximately 750 customers: 250 with an in-home display device, 250 with an in-home display device as well as electricity conservation information in a monthly mail out, and 250 with only the electricity conservation information. Monitoring of participants will continue until January 2016 and the final report will be submitted to Government by end of March 2016.

Evaluation

The customer energy conservation programs are continuously evaluated by the Utilities on their energy savings, market impacts and delivery process effectiveness. Additional review by external third party evaluators has also been conducted. Program evaluation findings are used to refine program design and implementation details on an ongoing basis, as well as support further planning.

For example, the third party residential program evaluation in 2013 found that two-thirds of windows sold in the province were ENERGY STAR, which supported the Utilities' decision to conclude the ENERGY STAR Windows Program.²⁴

Economic and energy savings evaluation of the customer energy conservation programs is performed annually. Program participants are required to provide certain information on program rebate applications. This information ranges from technical data, such as the R-value of installed insulation, or efficiency rating of a HRV to the type of heating in the home and its geographic location. Analysis of this data allows the

²⁴ The 2013 residential program evaluation was conducted DNV GL- Energy, headquartered in Burlington, Massachusetts, and specializing in evaluating programs that promote energy efficiency, demand response, and distributed generation.

Utilities to accurately estimate the energy savings for each program and perform industry standard economic cost-benefit tests.

2.5 CDM Costs & Cost Recovery

Table 8 provides a summary of the customer energy conservation program and general costs of the Utilities from 2009 through 2015(F).²⁵

Table 8 Conservation Costs 2009 through 2015 (F) (\$000s)								
	2009	2010	2011	2012	2013	2014	2015F	Total
Programs								
Residential	1,386	2,322	3,473	3,436	3,921	4,277	5,188	24,003
Commercial	79	95	216	214	355	926	1,388	3,273
Industrial	57	226	103	173	89	1,244	19	1,910
Total Programs	1,522	2,643	3,791	3,823	4,365	6,447	6,595	29,186
General	1,303	1,121	1,156	1,052	1,149	1,779	2,054	9,614
Total	2,825	3,764	4,947	4,875	5,514	8,226	8,649	38,800

The Utilities' costs related to conservation programs have increased from approximately \$2.8 million in 2009 to \$8.6 million in 2015. This primarily reflects the addition of new customer energy conservation programs in 2013, specifically the Small Technologies Program and the Business Efficiency Program. This also reflects the increased levels of customer participation and rebates related to the joint takeCHARGE program portfolio. The expansion of customer programs has also resulted in increasing energy savings.

²⁵ This cost summary does not include (i) costs related to programs offered independently by the Utilities prior to June 2009; (ii) costs related to Newfoundland Power's demand management activities (Curtable Service Rate Option and facilities management); and (iii) costs related to Hydro's interruptible service arrangements with its Industrial Customers.

Details of the Utilities' customer energy conservation program and general costs are provided in Schedule C.

The Utilities each bear the costs related to the provision of customer energy conservation programming in their own service territory. General conservation and program costs, such as customer rebates and costs related to responding to customer inquiries are incurred directly by each utility. Costs which are incurred jointly, such as provincial mass media advertising, are split on an 85% / 15% basis between Newfoundland Power and Hydro, respectively.²⁶

Cost Recovery

Newfoundland Power's current conservation cost recovery practice reflects Board Order No. P.U. 13 (2013). Conservation program costs are deferred and amortized over a seven-year period. Through the annual operation of the Company's Rate Stabilization Adjustment, customer rates are adjusted to reflect any difference between the conservation program costs included in the most recent test year and the costs actually incurred. Newfoundland Power's annually recurring general conservation costs related to providing general customer information, community outreach and planning are expensed in the year in which the costs are incurred.

Hydro's current customer rates, as approved by the Board in Order No. P.U. 8 (2007), include recovery of approximately \$0.4 million in costs related to management and planning of conservation programming. In each year from 2009 to 2014, inclusive, Hydro has deferred recovery of direct program costs related to the expansion of customer energy conservation programming under the 2008 Plan and 2012 Plan.²⁷ As of August 14, 2015, associated with a general rate application filed by Hydro on July 30, 2013, and an amended general rate application filed by Hydro on November 10, 2014,

²⁶ This approach to division of jointly incurred costs reflects the proportion of customers served by each utility.

²⁷ The deferred recovery of these costs in 2009, 2010, 2011, 2012, 2013, and 2014 were approved by the Board in Order Nos. P.U. 14(2009), P.U. 13(2010), P.U. 4(2011), P.U. 3(2012), P.U. 35(2013), and P.U. 43(2014), respectively.

the Consumer Advocate, Newfoundland Power, the Industrial Customer Group and Vale, with participation by Board Hearing Counsel, have engaged in negotiations with Hydro. As a result, these parties agreed that “Hydro’s proposal to defer and amortize annual customer energy conservation program costs, commencing in 2015, over a discrete seven year period in a Conservation and Demand Management (CDM) Cost Deferral Account should be approved.”²⁸

3.0 PLAN: 2016-2020

3.1 Conservation Potential & Program Selection

The programs included in the 2016 Plan have been selected based on a number of considerations. Opportunities identified in the 2015 CPS are a key input and these have been further assessed by the Utilities in terms of engineering, market and economic viability. Consideration has also been given to the experience of the Utilities and others in the local marketplace, feedback from customers, as well as experience shared from other Canadian jurisdictions.

Conservation Potential Study

In June 2015, a comprehensive study was completed of electricity conservation and demand management potential for the province.²⁹ This Conservation Potential Study estimated the potential for electrical energy and demand savings by sector and by electricity system from 2015-2029. It also identified specific technologies available to assist in achieving that potential. The CPS essentially provides a framework, consistent with current North American practices, within which to assess conservation programming. The findings enabled the Utilities to quickly focus on cost effective technologies and begin assessment of market characteristics to guide program concept development.

²⁸ Newfoundland and Labrador Hydro – Amended General Rate Application – Parties’ Settlement Agreement dated August 14, 2015.

²⁹ ICF International (previously called Marbek) conducted Conservation Potential Studies for the Utilities in 2007 and 2015. ICF International is a leading environmental and energy management consultancy and has extensive experience conducting Conservation Potential Studies in Canada.

Electrical system marginal costs of supply are used in the CPS to screen the economic viability of more efficient technologies.³⁰ For the current CPS, these costs were based on the most recent marginal cost forecast as projected by Hydro in February 2015.³¹ These estimates are currently under review. Once Hydro's marginal cost study is completed, the CPS results will be reassessed. If such a review results in changes to the list of cost effective technologies with conservation potential, these will be considered in future updates to the 2016 Plan.

Figure 1 shows the baseline provincial energy usage forecast which was input to the 2015 CPS (the reference case), and the upper and lower achievable potentials estimated by the Potential Study.³²

³⁰ Technologies are considered to be economically viable when the cost of saving one kWh or kW of electricity is equal to, or less than, the marginal cost of supplying the electricity.

³¹ The 2015 CPS included an analysis of the sensitivity of potential technologies to changes in marginal costs. The analysis was based on a range of + 30% to – 10% of the February 2015 forecast marginal costs. It indicated a modest level of variability in technology viability and resulting conservation results. Please see CPS, section 7.5 Energy Efficiency Supply Curve, filed with the Board September 15, 2015.

³² The reference case is based on the provincial energy usage forecast from 2014. After this study was completed the energy usage forecast decreased due to the economic downturn, mainly in the industrial sector. The achievable potential is defined as the portion of the economic conservation potential that is achievable through utility interventions and programs given institutional, economic and market barriers. The upper achievable potential is considered to be the best case scenario with all market barriers removed, such as capital cost and product accessibility. The lower achievable potential is considered a business as usual scenario with the existing market barriers remaining in place.

Figure 1
 Conservation Potential Study Results
 Provincial Electrical Consumption
 2014-2029

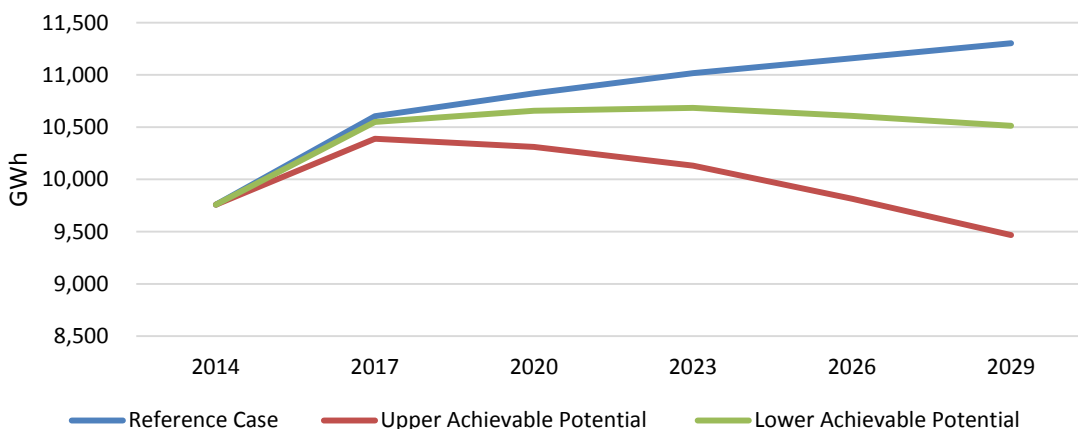


Figure 1 shows that, over time, the cumulative effects of implementing cost effective efficient technologies can significantly reduce forecast growth in electricity usage.³³

Figures 2 and 3 show the results of the CPS regarding achievable demand reduction potential from energy efficiency measures (“Energy Efficiency”) and from demand response specific measures (“Demand Response”) by 2020.³⁴

³³ At the end of the first estimation interval, in 2017, the CPS shows a range of 55 GWh for the lower achievable potential savings and 215 GWh for the upper achievable potential savings. This compares with annual savings of approximately 116 GWh currently estimated in the Plan for the same timeframe.

³⁴ The Commercial and Industrial sector includes Hydro’s large transmission level Industrial customers as well as Newfoundland Power’s general service customers.

Figure 2
 Lower Achievable Demand
 Reduction Potential
 Island Interconnected System
 2020
 (MW)

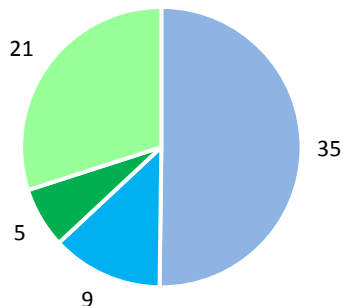
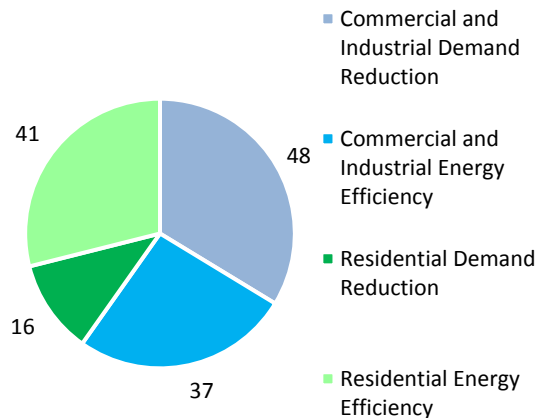


Figure 3
 Upper Achievable Demand
 Reduction Potential
 Island Interconnected System
 2020
 (MW)



Figures 2 and 3 show 70 MW for the lower potential and 142 MW for the upper potential demand reduction on the Island Interconnected System.³⁵ Installation of energy efficiency measures that reduce consumption during times of peak demand account for approximately 43% and 55% of the lower and upper achievable demand reduction, respectively, by 2020.³⁶

The majority of the demand reduction potential was identified in the Commercial and Industrial sectors. Specifically, the Industrial sector represents about 87% and 74% of the total lower and upper achievable demand reduction, respectively. The demand reduction technologies identified through the CPS as having the most potential included curtailable load arrangements with commercial and industrial customers and direct load control of residential hot water tanks.

³⁵ 21+35+9+5=70 and 41+16+37+48= 142

³⁶ (21+9)/70=43% and (37+41)/142=55%.

Selection

The technologies that passed the economic screening of the CPS were reviewed in detail to assess their possible inclusion in the 2016 Plan. Local market research was conducted to identify barriers to broader adoption of more efficient technologies, such as capital cost, market availability and awareness. This included consultation with market stakeholders and trade allies, as well as discussions with other utilities.

Once existing market barriers were identified, a program strategy was then developed to attempt to overcome those barriers. Costs associated with the program were considered and the cost effectiveness of the program determined.³⁷ This more detailed review of program costs and benefits can cause a technology that had passed economic screening in the CPS to fail the economic tests required of CDM programs.

Economic Screening

The Utilities' economic screening of the customer energy conservation programs has previously required a positive result for both the Total Resource Cost ("TRC") and Ratepayer Impact Measure ("RIM") cost-benefit tests.³⁸ Recent research indicates Canadian and U.S. utility practice has changed to focus on the TRC and Program Administrator Cost ("PAC") tests.³⁹

The Utilities recommend adoption of the TRC as the primary means of program economic screening, and the PAC as a secondary means. This is consistent with current North American practice, and is appropriate based on the electrical system marginal costs and program objectives in this jurisdiction. Based on this recommendation the programs included in the 2016 Plan passed economic screening

³⁷ Program cost estimates include marketing, delivery and administration, incentives, measurement and verification, and evaluation.

³⁸ In Order No. P.U.7 (1996-97), the Board required customer conservation programs to be evaluated with respect to rate impact, as well as the total resource costs. The Utilities' have interpreted this Order to require a TRC of 1.0 and a RIM of 0.8 as described in *Newfoundland Power Inc. – 2009 Conservation Cost Deferral Application, Section 2: Proposed Customer Program Portfolio* filed with the Board October 29, 2008.

³⁹ See Section 2.1, page 4, and Schedule B.

based on the TRC and PAC.⁴⁰ The Utilities' will continue to monitor changes to economic screening practices to appropriately reflect evolving program characteristics and electrical system costs.

3.2 Conservation & Demand Management Programs

The 2016 Plan builds on the outcomes of the 2012 plan as well as the experience of the Utilities. Programs included in the 2016 Plan address conservation opportunities in all three sectors: residential, commercial, and industrial. The 2016 Plan includes a new behavioural-based program for the residential sector, expansion of existing commercial programs, and the reshaping or discontinuation of several programs. These conservation programs are broadly consistent with programs offered by utilities in other jurisdictions.

Table 9 shows, by sector, the portfolio of programs to be offered under the 2016 Plan.

Table 9 Conservation Programs By Sector		
Residential	Commercial	Industrial
Insulation	Business Efficiency Program	Industrial Energy Efficiency Program
Thermostat	Isolated Business Efficiency Program	
HRV		
Small Technologies		
Isolated Systems Community Program		
Benchmarking		

⁴⁰ Application of the RIM test would result in elimination of a number of programs, including Benchmarking, HRV, and Small Technologies.

Residential Programs

Insulation, Thermostat and HRV Programs

These existing joint incentive programs primarily target space heating energy savings, and will continue to be offered as part of the 2016 Plan. The remaining eligible market for the Insulation and Thermostats programs has been declining in recent years. The HRV program has had limited participation due to barriers related to customer understanding and market complexity. These programs will be continuously evaluated to ensure program cost effectiveness.

Small Technology Program

The jointly offered Small Technologies program will continue to use different marketing approaches for the two different groups of energy efficient products.

The Instant Rebate component will continue to offer relatively small incentives instantly at-the-cash on a variety of low cost, every day energy efficient products for the home. As part of the 2016 Plan, Instant Rebates will include additional technologies.⁴¹ It is anticipated that this component will end during 2018 as LED lighting becomes the norm in the residential lighting market.⁴² Most of the energy savings benefits in this program are related to customers' early adoption of LED lighting from less efficient technologies, and energy savings from non-lighting products are not expected to be sufficient to offset the program delivery costs.

Incentives for the Appliance and Electronics component will continue to be available through 2017. At that time, anticipated reductions in marginal costs on the electricity system will effectively reduce the value of energy saving benefits, causing the program to fail economic screening.

⁴¹ As part of the 2016 Plan, Instant Rebates will include additional technologies, such as faucet aerators, door bottom weather stripping, door adhesive weather stripping, window insulation kits, electrical outlet gaskets, and caulking.

⁴² The uptake of LEDs will be monitored and evaluated to confirm the market saturation rate in 2017.

Isolated Systems Community Program

The existing format for this program will continue to be offered to customers in Hydro's isolated system communities through 2017. Information and feedback collected in 2014 and 2015, particularly for the direct install component, will be used to evaluate and plan for the Isolated Systems Community Program beyond 2017.

An Appliance Retirement component will be added to this program beginning in 2016, targeting at least one community. Older inefficient appliances will be removed from participating homes and routed for appropriate disposal.⁴³

Benchmarking

This new joint program will promote customer behaviour changes to encourage more efficient energy use. Benchmarking involves using social norms to encourage neighbourly competition to reduce electricity consumption. This program will include comparison of participant households' energy consumption with their energy history and that of similar households. Participants will also receive personalized home energy reports that provide household specific electricity usage information and savings tips to help them reduce energy use and lower their electricity bills. This program will be available to customers from 2016 to 2019.

Commercial Programs

Lighting Program

Beginning in 2016, existing commercial lighting program products will become prescriptive rebates under the Business Efficiency Program, including the fluorescent high bay, high performance T8 fluorescent lamp and LED exit sign. This change will allow for more specific marketing initiatives and increased awareness of the rebates available for these technologies.

⁴³ This component will be evaluated to determine whether a broader program would be cost effective.

Electronic ballasts will no longer be available for incentive as of 2016 because these ballasts have become the market standard. Industry partners indicate that approximately 55% of ballasts sold in the province in 2014 meet the program efficiency criteria.⁴⁴

Business Efficiency Program

The Business Efficiency Program, offered jointly by the Utilities, will continue to provide custom and prescriptive incentives to commercial customers for energy efficiency improvements. Continued growth in customer participation and energy savings are anticipated for this program. The Utilities will increase the customer education and awareness component of this program to include sector-based identification of energy efficiency opportunities. New technologies will also be added to the program's list of prescriptive incentives.⁴⁵

Isolated Systems Business Efficiency Program

This program will continue through 2020, and will be offered to Hydro's commercial customers located in isolated system communities. The program will continue to provide incentives based on the energy savings of customer projects, similar to the Business Efficiency Program.

Industrial Programs

Industrial Energy Efficiency Program

Through 2020, this customized program will continue to offer support and financial incentives based on energy savings for retrofit of industrial process equipment for Hydro's transmission level industrial customers.⁴⁶

⁴⁴ Note that U.S. Federal Regulations are now equivalent to this ballast efficiency specification.

⁴⁵ These include: LED screw-in lamps, high bay LED fixtures, electrically commutated motors for evaporator fans, cold climate air source heat pump systems, and low flow pre-rinse spray valves.

⁴⁶ The Industrial Energy Efficiency Program's cost effectiveness and potential energy savings will be evaluated on a year to year basis.

Customer Energy Savings

Table 10 shows forecast customer energy reduction estimates for the programs in the 2016 Plan, by sector, from 2016 through 2020.

Table 10 2016 Plan Energy Reduction Estimates 2016 through 2020 (GWh)						
	2016	2017	2018	2019	2020	Total
Residential	80.4	102.7	118.1	123.5	111.7	536.4
Commercial	18.7	27.6	37.5	48.6	61.4	193.8
Industrial	30.6	30.6	30.6	30.6	30.6	153.0
Total	129.7	160.9	186.2	202.7	203.7	883.2

The programs in the 2016 Plan will result in estimated aggregate customer energy savings of approximately 883.2 GWh from 2016 through 2020. Customer energy savings are forecast to increase annually through 2020, due to expansion of the program portfolio and the addition of program technologies for the residential and commercial sectors.

Several program offerings are expected to be concluded during the planning period. These include the Small Technologies program and the Benchmarking program. Design of alternate programming for the residential sector is anticipated through the Utilities' program planning in 2018.

Demand Management

The previous conservation and demand management plans have focused primarily on energy conservation.⁴⁷ However, the Utilities' customer energy conservation programs have resulted in quantifiable demand savings.

The technologies identified through the CPS as having the most potential for demand reduction included direct load control of residential hot water tanks and curtailable load arrangements with commercial and industrial customers. Recent research has identified issues with the cost effectiveness of residential load control on the Island Interconnected System. As a result, this measure is not included in the 2016 Plan.⁴⁸ The Utilities will continue to pursue curtailment opportunities with their larger customers.⁴⁹

A new component will also be added to the Business Efficiency Program ("BEP") to include a custom incentive for demand reduction measures that are economically viable and that provide measureable demand reduction during peak times.⁵⁰

⁴⁷ This reflected the relatively high marginal energy costs (predominantly due to fuel costs at Hydro's Holyrood Thermal Station) which justified such a focus.

⁴⁸ Although residential load control on the Island Interconnected System does not make economic sense, Hydro's isolated communities served by diesel generation have higher marginal costs which may make the program cost effective.

⁴⁹ Hydro currently has interruptible load arrangements with its Industrial Customers which have potential for more than 90 MW of capacity assistance. Newfoundland Power currently has 16 customers participating in its Curtailable Rate Option, providing 10.4 MW of potential load reduction.

⁵⁰ More information on the custom demand component of the BEP can be found in Schedule C.

Table 11 shows forecast customer demand reduction estimates for the customer energy conservation programs in the 2016 Plan, by sector, from 2016 through 2020.

Table 11 2016 Plan Demand Reduction Estimates 2016 through 2020⁵¹ (MW)						
	2016	2017	2018	2019	2020	Total
Residential	3.3	4.7	5.0	4.3	1.4	18.6
Commercial	2.1	2.0	2.3	2.5	2.8	11.7
Total	5.4	6.7	7.3	6.8	4.2	30.3

The Utilities' takeCHARGE customer energy conservation programs are forecast to achieve approximately 30.3 MW in peak demand reduction through 2020. This demand reduction will occur annually for the life of the installed technologies.⁵²

⁵¹ Hydro does not forecast demand reduction for their transmission level industrial customers.

⁵² For example, a customer who installs basement insulation in 2014 will achieve approximately 0.9 kW of annual peak demand reduction for the next 20 years.

2016 Plan Program Costs

Table 12 shows forecast costs for the programs in the 2016 Plan, by sector, from 2016 through 2020.

Table 12 2016 Plan Program Costs Estimates 2016 through 2020 (\$000s)						
	2016	2017	2018	2019	2020	Total
Residential	5,987	6,308	4,540	3,048	2,042	21,925
Commercial	1,628	1,906	1,933	2,258	2,301	10,026
Industrial ⁵³	667	10	10	10	10	707
Total	8,282	8,224	6,483	5,316	4,353	32,658

The Utilities' costs related to programs in the 2016 Plan are forecast to be approximately \$32.7 million over the five-year planning period. Forecast changes in program costs primarily reflect the expansion of programs and additional technology offerings anticipated from 2016 to 2018, and the conclusion of certain programs through the planning period.

3.3 Education & Support

The Utilities' customer education and support activities will continue to evolve to support changes in customer energy conservation programs and in the broader conservation market. The Utilities will continue to provide customer support and be responsive to customer expectations. Current activities, including customer outreach events, the takeCHARGE website and partnerships with industry stakeholders will be key elements of customer education.

⁵³ Forecasted Industrial program costs after 2016 are associated with program promotion and customer engagement. Given the small number of transmission level customers in the province, there is a high degree of uncertainty for participation in the program year to year. The forecasted amounts after 2016 will increase if customers avail of the program for feasibility assessments or incentives for energy efficiency retrofits. Projects will continue to be screened based on cost effectiveness to ensure the program remains above minimum economic thresholds.

The Utilities' educational initiatives will be expanded to include a program promoting mini-split heat pumps. The program components will include financing, education and marketing initiatives directed towards customers, and direct engagement with certified installers and suppliers. A marketing campaign will be launched to raise customer awareness of the benefits of this technology, how to choose a high quality product, as well as the necessity of having the system installed by qualified contractors. The eligibility criteria for on-bill financing of these systems will encourage the installation of high efficiency units, installed by qualified contractors.⁵⁴

The Utilities will continue to build upon their experience offering the takeCHARGE K-I-C Start School Program. Marketing will continue to build awareness of the program amongst school boards and teachers. Teaching aids will be developed and be made available on the takeCHARGE website to assist in furthering conservation education after presentations are conducted. Updates will also be made to strengthen the message of conservation for younger students, and awareness-building contests will be offered for all age groups.

Table 13 shows forecast costs for conservation education and support for the period 2016 to 2020.

Table 13 Conservation Education & Support Costs 2016 through 2020 (\$000s)						
	2016	2017	2018	2019	2020	Total
Education	770	791	827	851	873	4,112
Support	171	175	181	184	191	902
Total	941	966	1,008	1,035	1,064	5,014

⁵⁴ Financing has been offered by Newfoundland Power since the 1990s and Hydro will have financing available beginning in 2016.

3.4 Planning & Evaluation

Planning

The 2016 Plan incorporates research and analysis required for the next iteration of multi-year conservation portfolio planning by the Utilities.

Table 14 shows forecast planning costs included in the 2016 Plan.

Table 14 Conservation Planning Costs 2016-2020(F) (\$000s)						
	2016	2017	2018	2019	2020	Total
Planning	527	596	767	863	644	3,397

Variability in annual planning costs reflects the Utilities' multi-year planning cycle for customer conservation programs.

The Utilities anticipate development of the next multi-year plan for customer energy and demand conservation programming in 2018. Further clarity regarding electrical system cost dynamics is expected to be a factor in the next planning cycle.⁵⁵ Further assessment and adjustments to the programming contained in the 2016 Plan may also be required within the next three years as marginal cost forecasts are updated.

Research

The next update of the study of conservation potential in the province is being planned for 2020. In advance of this study, the Utilities will undertake a number of research projects regarding electricity end-use trends and the state of the local market for efficient technologies. For the residential sector, customer surveys will gather details on

⁵⁵ An updated marginal cost study is expected to be a key input to the next conservation plan in 2018 and the next CPS in 2019-2020.

the type of electrical equipment that customers have in their homes, as well as their energy-related behaviour and motivation. Research for the commercial sector will include on-site facility audits to collect data on mechanical and electrical equipment being used.

The residential lighting market will be evaluated in 2017 to determine whether the Small Technologies program should continue. This research is expected to include a socket saturation study, with onsite inventories, as well as customer surveying. This will provide the Utilities with detailed data regarding the remaining potential for energy efficient lighting replacements.

Hydro is currently investigating the implementation of an Isolated System Direct Load Control Pilot in the community of Postville, Labrador.⁵⁶ The community of Postville is served by diesel generation. The objective of this pilot will be to reduce the peak load in the community and defer investment in electrical system upgrades. The Utilities will also continue to coordinate conservation planning with electrical system planning, and will evaluate potential for conservation initiatives targeted in specific areas or communities that may provide a lower-cost alternative to electrical system upgrades.

The Provincial Office of Climate Change Home Energy Monitoring Pilot Project is ongoing and the final report will be submitted to Government by end of March 2016. The results of this pilot project will be used to assess whether this type of technology may be considered as part of future energy conservation programming.

During this planning period, the Utilities will also monitor developments in North American practices for economic evaluation and screening of conservation programs.⁵⁷

⁵⁶ The pilot will involve commercial and residential customers. It will include installing load controllers on hot water tanks, and commercial electric heating circuits, for commercial customers. Load controllers will only be activated during maximum system peak events. The customers that participate will receive incentives such as credits at the local store in Postville.

⁵⁷ While reliance on the TRC and PAC tests for primary economic screening is currently the norm in North American jurisdictions, modifications to the TRC methodology are being considered in a number of cases. These modifications primarily involve inclusion of customers' non-energy benefits from efficiency upgrade projects.

Evaluation

The customer program portfolio will continue to be evaluated in terms of its energy savings, market impacts and delivery process effectiveness. Additional review by third party evaluators is expected, reflecting the expanded program portfolio and delivery methods.⁵⁸ Program evaluation findings will be used to refine program design and implementation details on an ongoing basis, as well as support further planning.

Specific evaluation objectives in the 2016 Plan are to monitor market saturation of particular technologies as well as cost effectiveness of the programs. For example, the Instant Rebates component of the Small Technologies program will be evaluated and an exit strategy designed based on research into the pace and impact of LED sales growth in the local lighting market.

Similarly, the Utilities will continue to closely monitor the Insulation, Thermostat and HRV programs. These programs have unique challenges and barriers to program participation.⁵⁹ Evaluation of these programs will ensure they continue to satisfy cost effectiveness requirements.

In the case of new program introductions, post-implementation evaluations will be conducted within 12 months of program launch to ensure full assessment of program design assumptions, as well as marketing and delivery process effectiveness.

⁵⁸ Evaluation costs are primarily reflected in the costs for each specific program.

⁵⁹ For the Insulation and Thermostat Programs, these barriers primarily reflect the inherent difficulty in renovating existing living spaces and the remaining market being increasingly hard-to-reach. For the HRV program, this reflects the low level of customer understanding and slow adoption by the supply chain.

3.5 Costs & Cost Recovery

Table 15 provides a summary of the Utilities' customer energy conservation program and general costs from 2016 through 2020.⁶⁰

Table 15 Conservation Costs 2016 through 2020 (\$000s)					
	2016	2017	2018	2019	2020
Program					
Residential	5,987	6,308	4,540	3,048	2,042
Commercial	1,628	1,906	1,933	2,258	2,301
Industrial	667	10	10	10	10
Total Programs	8,282	8,224	6,483	5,316	4,353
Education	770	791	827	851	873
Support	171	175	181	184	191
Planning	527	596	767	863	644
Total General Costs	1,468	1,562	1,775	1,898	1,708
Total	9,750	9,786	8,257	7,214	6,061

Costs related to the customer energy conservation programs outlined in the 2016 Plan are forecast to be \$9.8 million in 2016 and 2017.⁶¹ This increase primarily reflects the addition of a new program, and enhanced program technology offerings. Costs begin to decrease in 2018 from \$8.3 million to \$6.0 million in 2020. This decrease primarily reflects the conclusion of the Small Technologies program in 2018 and the conclusion of the Benchmarking program in 2019.

⁶⁰ This cost summary does not include costs related to Newfoundland Power's demand management activities (Curtailable Service Rate Option and facilities management) and costs related to Hydro's interruptible load arrangements.

⁶¹ All customer energy conservation programs outlined in the 2016 Plan are cost effective, and are justified on a cost of service basis.

Schedule E provides a summary of forecast energy savings, cost estimates and cost effectiveness analysis results for the programs in the 2016 Plan.⁶²

Cost Recovery

The Utilities propose conservation cost recovery based on amortizing customer energy conservation program costs over seven years.⁶³ The amortization of program costs over a seven-year period is considered appropriate because of the extended nature of the energy savings benefits provided by program technologies.

The Utilities' annually recurring general conservation costs would continue to be expensed as incurred.⁶⁴

4.0 OUTLOOK

The Utilities anticipate significant changes in the electrical system serving the province within the five years considered in this plan. The Muskrat Falls hydroelectric development and related interconnection to the North American grid will affect system operations and costs, as well as customer prices. The next iteration of multi-year conservation program planning is anticipated in 2018, to coincide with these events.

In the interim, the approach outlined in the 2016 Plan will remain flexible to address ongoing changes. The initiatives in the 2016 Plan are cost effective based on current information, and were assessed for sensitivity to changes in system costs. As the Utilities implement the program changes outlined in this Plan, they will continue to evaluate program offerings to ensure they create economic benefits and are responsive to evolving customer expectations and market conditions.

⁶² Cost forecasts can be expected to be refined as detailed program design progresses in 2016.

⁶³ Newfoundland Power has used this approach since 2013, based on Order No. P.U. 13 (2013). Hydro has proposed this approach in its ongoing general rate application, and the proposal has been agreed to by the parties to settlement negotiations in that matter.

⁶⁴ While general customer energy conservation costs provide benefits to customers in terms of information, knowhow and advice, those benefits are not transparently quantifiable in the same manner as program benefits.

With growing customer awareness of conservation, and of the takeCHARGE brand, the Utilities will continue to seek opportunities to partner with complementary organizations and trade allies for customers' advantage. Information sharing and policy coordination with the Province will also continue, primarily through the Office of Climate Change and Energy Efficiency.

Table A-1 shows most recent marginal cost forecast as projected by Newfoundland and Labrador Hydro in February 2015.

Table A-1 Marginal Cost Projection for the Island Interconnected System 2015 - 2035		
	Energy (\$/MWh)	Capacity (\$/KW – Yr)
2015	108	51
2016	133	70
2017	134	74
2018	47	98
2019	50	99
2020	54	108
2021	56	112
2022	59	115
2023	62	119
2024	65	123
2025	68	126
2026	70	126
2027	73	125
2028	76	125
2029	78	124
2030	81	124
2031	85	121
2032	88	118
2033	92	116
2034	96	113
2035	100	110

Notes:

1. Modeled as per NERA Economic Consulting marginal cost approach (2006).
2. Fuel costs per NLH corporate assumptions, January 2015.
3. Excludes transmission marginal costs.
4. Projection is at customer bulk delivery point.
5. Island Interconnected costs beyond 2017 reflect opportunity cost as per NERA approach.

Table B-1 Current Canadian Utility Practice Economic Evaluation Practices					
Province	Economic Test				
	TRC	PAC	RIM	PCT ¹	SCT ²
British Columbia	X ³				
Ontario	X	X			
Nova Scotia	X	X			
Manitoba ⁴	X		X	X	X
Saskatchewan	X	X			
Quebec	X		X ⁵		
Prince Edward Island	X	X ⁶		X	X ⁶

¹ Participant Cost Test ("PCT").

² Societal Cost Test ("SCT").

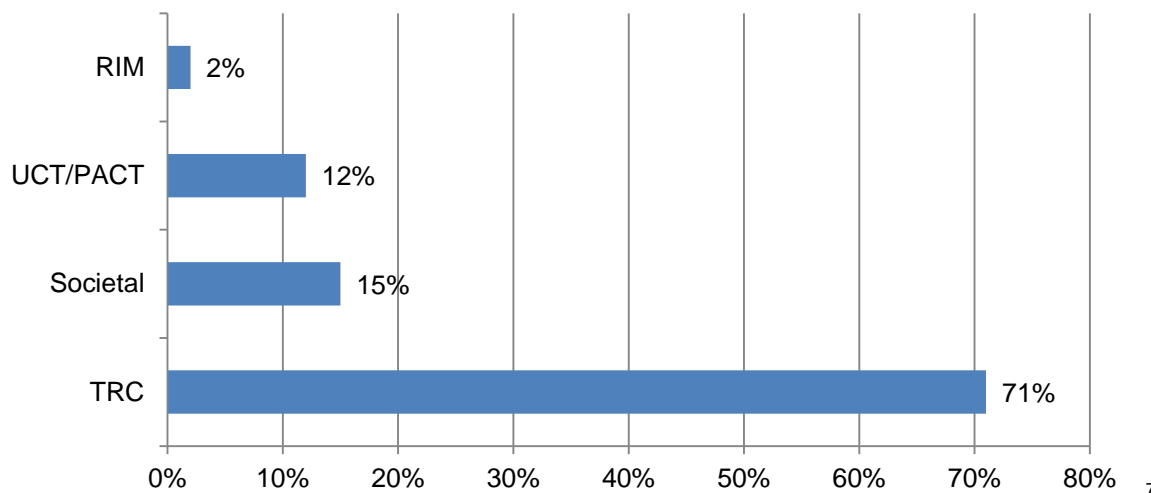
³ British Columbia uses a modified TRC that includes non-energy benefits that are not traditionally included in the TRC.

⁴ Manitoba also considers the levelized resource cost, net utility benefit, utility net present value, levelized utility cost, and simple customer payback calculation.

⁵ Quebec considers the RIM as a secondary test.

⁶ Prince Edward Island considers the PAC and SCT as secondary tests.

Chart B-1
Current American Utility Practice
Economic Evaluation Practices
(Percent of States)



n=43

⁷ Research conducted by the American Council for an Energy Efficient Economy (February 2012) "A National Survey of State Policies and Practices for the Evaluation of Ratepayer-Funded Energy Efficiency Programs".

Insulation Program

Program Description
<p>The objective of this program is to increase the insulation level in residential basements, crawl spaces and attics. Increasing the insulation R-value in a home will result in space heating energy savings. The program components include rebates and financing, and a variety of education and marketing tools. This program has been offered through takeCHARGE since 2009.</p>
Target Market: Residential
<p>This program targets residential customers completing retrofit projects. Changes to the National Building Code of Canada implemented in December 2012 mandated that all new homes install basement insulation and increased the R-Value requirements in the attic. As a result, this program is only offered to existing homes (i.e. connected to the electricity grid before January 1, 2014) to exclude minimum building code compliance in new homes. Eligibility will continue to be limited to electrically-heated homes.</p>
Eligible Measures
<p>Eligible measures in this program include insulation upgrades to basements, crawl spaces and attics. Technical requirements will be approximately aligned with National Building Code of Canada.</p>
Delivery Strategy
<p>Delivery of this program will continue to be bundled with Thermostat, Instant Rebates, Appliance & Electronics and HRV programs as part of the takeCHARGE residential portfolio.</p> <p>Marketing initiatives include partnering with retailers and trade allies in the renovation industry, and target both do-it-yourself and professional installers. Tools and tactics will include retail point-of-sale materials, advertising, website, tradeshow, community outreach and trade ally activities. Rebates and financing will be processed through mail and online customer applications.</p>

Insulation Program

Market Considerations						
Barriers to increased market penetration include initial cost, awareness of the impact on space heating energy, the practical difficulties of renovating an existing living space and a decreasing number of eligible participants. Experience with the existing program has shown participation to be responsive to awareness-building marketing activities.						
Incentive Strategy						
Incentives for this program include rebates and financing. In August 2014, the rebate structure was simplified and increased. Customers can now get a rebate of 75% of the cost of materials installed in the basement and 50% of the cost of materials in the attic. Rebates amounts are capped at \$1,000.						
Program Monitoring & Evaluation						
The program will be monitored for participation level, service quality, market saturation and cost effectiveness. A representative sample of installations will be inspected. Formal external evaluations will be conducted every two years during operation.						
Estimated Costs & Energy Savings						
	2016	2017	2018	2019	2020	Total
Estimated Costs (\$000s)	1,187	1,207	1,202	1,197	1,223	6,018
Estimated Cumulative Energy Savings (GWh)	30.0	33.1	36.1	38.9	41.8	180
Total Resource Cost						2.5

Thermostat Program

Program Description

The objective of this program is to encourage installation of programmable and high performance electronic thermostats in homes. Programmable and high performance electronic thermostats allow customers to better control the temperature of their homes and to set back the temperature during the night or while away. The program components consist of rebates, financing options, and a variety of education and marketing tools. This program has been offered through takeCHARGE since 2009.

Target Market: Residential

This program targets residential customers, including home retrofit and new home construction. Eligibility will continue to be limited to electrically-heated homes.

Eligible Measures

Eligible measures in this program include both programmable and high performance electronic thermostats. All thermostats must have a setting precision of +/- 0.5 degrees Celsius or less.

Delivery Strategy

The delivery strategy for this program remains unchanged. Delivery of this program will continue to be bundled with the Insulation, Instant Rebates, Appliance & Electronics and HRV programs as part of the takeCHARGE residential portfolio.

Marketing initiatives include partnering with retailers, electrical contractors, homebuilders and real estate professionals, to educate consumers regarding the energy savings and comfort benefits of programmable & high performance electronic thermostats. Tools and tactics include retail and model home point-of-sale materials, website, tradeshow, community outreach and trade ally activities. Rebates will be processed through mail and online customer applications.

Thermostat Program

Market Considerations

Barriers to installation of programmable and high performance electronic thermostats include lack of awareness of the potential for energy savings, difficulty programming, and reluctance to pay for an electrician to install the thermostats, and a decreasing number of eligible participants.

Incentive Strategy

Incentives for this program include rebates and financing. The rebate value is \$5 per high performance electronic thermostat and \$10 per programmable thermostat. This continues to reflect incremental cost of the more efficient options. A time limit is no longer required for incentive redemption.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, market saturation, and cost effectiveness, and a representative sample of installations will be inspected. Formal evaluations will be conducted every two years during program operation.

Estimated Costs & Energy Savings

	2016	2017	2018	2019	2020	Total
Estimated Costs (\$000s)	517	555	539	557	552	2,720
Estimated Cumulative Energy Savings (GWh)	9.7	11.1	12.5	13.8	15.2	62
Total Resource Cost						2.8

Small Technologies Program

Program Description

The objective of this program is to increase home energy efficiency and awareness by offering instant rebates on a variety of energy efficient technologies as well as online and mail in rebates for eligible appliances and electronics. This program also includes promotional events to raise awareness of the technologies and to engage the public.

Target Market: Residential

This program is marketed toward all residential customers province wide. All customers are eligible to participate regardless of age of home or heat source. A variety of marketing techniques such as TV news sponsorships, print, radio, online, website, as well as social media channels are used to engage customers.

Eligible Measures

Eligible measures in this program will vary over time and will be selected based on cost effectiveness, energy saving potential and market conditions. Instant rebates are available for small energy efficient items such as LEDs and smart power bars, and online and mail in customer applications are required for qualifying models of full-size refrigerators, clothes washers, TVs and full-size Energy Star freezers.

Six new measures will be added to the technology list in 2016. They are:

- Faucet aerators
- Door bottom weather stripping
- Door adhesive
- Window insulation kit
- Electrical outlet gaskets
- Caulking

Small Technologies Program

Delivery Strategy

Partnerships have been made with both chain and independent retailers to offer instant rebates to customers on a number of energy efficient products. Efforts to engage both urban and rural retailers have been made in order to ensure rebated products are available in all areas of the province.

Campaigns are held in the spring and fall each year. During each campaign, the Utilities set up in-store events at the participating locations to raise customer's awareness of the rebates and encourage use of energy efficient products.

Market Considerations

The technologies included in the program do not involve a major renovation. This program will allow the Utilities to reach customers that may not have been able to participate in the other incentive programs.

Incentive Strategy

Incentives for this program include instant rebates for small energy efficient items that will vary by year and campaign. Online and mail in customer applications are available for eligible appliances and electronics. The rebate value will be different for each technology offered, and will reflect incremental cost of the more efficient options.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness. Exit interviews will be conducted during selected retail events. Formal evaluations will be conducted after the first year of implementation, and biannually during operation.

It is anticipated that this program will end after 2018. The Utilities expect that LEDs will make up the majority of bulbs that are sold in the province. If this occurs, the economics of the program will no longer be cost effective. The uptake of LEDs will be monitored and evaluated to confirm the market saturation rate in 2017.

Small Technologies Program

Estimated Costs & Energy Savings						
	2016	2017	2018	2019	2020	Total
Estimated Costs (\$000s)	3,113	2,879	1,578	-	-	7,570
Estimated Cumulative Energy Savings (GWh)	23.8	33.3	38.2	37.4	36.5	169
Total Resource Cost						1.3

HRV Program

Program Description

The objective of this program is to increase the installation of higher efficiency Heat Recovery Ventilators (“HRV”). The program components include rebates and financing, and a variety of education and marketing tools.

Target Market

This program targets all residential customers regardless of heat source or age of home. Eligibility is available to all homes that install or replace an HRV.

Eligible Measures

Eligible measures in this program include all HRV models that have an SRE of 70% or more and meet the minimum fan efficacy requirements.

Delivery Strategy

Delivery of this program will be bundled with other takeCHARGE residential programs as part of the overall portfolio. Marketing initiatives include partnering with trade allies in the home building and renovation industry, particularly Heating Refrigeration and Air conditioning Institute certified installers. Tools and tactics include website presence, tradeshow, and trade ally activities. Rebates and financing will be processed through customer application.

Market Considerations

The market includes new construction and existing HRV replacement with an emphasis on existing replacements. Early HRV installations of the 1990s are at or near the end of their useful life, so many of these require replacement.

This program has faced a number of barriers such as understanding of what a HRV is and its purpose in the home, initial cost, and awareness of the benefits of selecting more efficient HRVs.

HRV Program

Incentive Strategy						
Incentives for this program include rebates and financing. The rebate value is \$175 for qualifying HRV units. This reflects the incremental cost of the more efficient options.						
Program Monitoring & Evaluation						
The program will be monitored for participation level, service quality, and cost effectiveness. This program has experienced challenging barriers to program participation. Attempting to overcome these barriers can be administratively costly and may outweigh the benefits of program delivery. This program will be monitored to ensure that the participation goals are being met in each year to ensure the program remains cost effective. A representative sample of installations will be inspected. Formal evaluations will be conducted every two years during operation.						
Estimated Costs & Energy Savings						
	2016	2017	2018	2019	2020	Total
Estimated Costs (\$000s)	223	218	232	231	267	1,171
Estimated Cumulative Energy Savings (GWh)	0.7	1.0	1.3	1.6	2.0	7
Total Resource Cost						1.3

Benchmarking Program

Program Description

Energy social benchmarking is the analysis of a household's energy consumption and the comparison of its performance with its energy history and that of other similar households. Historic consumption information, tracking over time and comparisons with other households can encourage customers to reduce energy consumption. A printed paper report is delivered to participating customers via mail. These reports include a normative comparison that compares the customer to similar neighbors. The printed Home Energy Report is supplemented by access to an online web portal allowing for increased customer energy usage information and tips and resources to facilitate energy use reduction.

Target Market: Residential

The Benchmarking program is marketed to residential customers across the province. Customers will be selected into the program and can withdraw (opt-out) at any time.

Eligible Measures

A home's energy use is compared anonymously to the usage patterns of other homes in the vicinity that are of similar size, age, heating type, etc. The Home Energy Report is designed to provide new information to help home owners understand their energy use and find ways to make the home more efficient.

Delivery Strategy

The program is delivered largely by a third party service provider that develops and issues the Home Energy Report and maintains the online web portal. takeCHARGE will oversee all aspects of the program to ensure greater customer insight into their home energy use. The program is available year round and will be supported with takeCHARGE marketing and communication efforts.

Benchmarking Program

Market Considerations

This program will allow the Utilities to reach customers that have not been able to participate in the other incentive programs. It will also allow takeCHARGE actively engage with customers using direct home energy consumption information. This program also allows for the cross promotion of existing takeCHARGE rebate programs as methods to reduce household consumption and to drive participation in these programs.

Incentive Strategy

No monetary incentive will be offered. It has been demonstrated that for this type of program that using social norm comparisons drives the greatest and longest lasting changes to household energy consumption.

Program Monitoring & Evaluation

The program is monitored for participation levels, service quality and cost effectiveness. Formal evaluation will be conducted very two years during operation.

Estimated Costs & Energy Savings

	2016	2017	2018	2019	2020	Total
Estimated Costs (\$000s)	530	1,034	989	1,063	-	3,616
Estimated Cumulative Energy Savings (GWh)	0.3	8.0	13.8	15.6	-	38
Total Resource Cost						1.0

Mini Split Heat Pump Educational Initiative

Program Description

The objective of the program is to encourage customers to choose high efficiency mini split heat pumps (MSHP), installed by qualified contractors. When installed correctly, a high efficiency MSHP will provide space heating energy savings. The program components include financing, education and marketing initiatives directed towards customers, and direct engagement of certified installers. Financing has been offered by Newfoundland Power since the 1990s and Hydro will have financing available beginning in 2016, however the eligibility criteria for MSHP will be updated to support the uptake of high efficiency units.

Target Market

This program targets residential customers. New home construction and retrofit customers with electric baseboard heat are considered to have the greatest potential for participation, however customer eligibility to participate in financing will not be limited by heating fuel, age or type of dwelling.

Eligible Measures

Financing will now be limited to MSHP with an estimated Heating Seasonal Performance Factor (HSPF) of 9.6 or higher. This is aligned with the minimum HSPF required for certification of units meeting the "ENERGY STAR® Most Efficient 2015" designation. To qualify for financing the installation must be performed by a contractor that has the necessary permits and certification to perform electrical and refrigeration work in the province.

Delivery Strategy

Delivery will be a two pronged approach including marketing to customers and engaging eligible installers.

Marketing initiatives will include information on the takeCHARGE website as well as bill inserts and mass media advertising regarding the benefits of choosing the right heat pump and installer. Installer engagement will include information sessions, contests, and maintaining relationships with qualified installers.

Financing applications will be processed through customer application via the existing customer service channels (online or by phone).

An incentive could not be offered for this program because it does not pass the economic analysis.

Mini Split Heat Pump Educational Initiative

Market Considerations

One of the biggest barriers is a lack of customer awareness and availability of certified installers in rural areas. In order to achieve significant energy savings, the unit must be appropriate for the Newfoundland climate, properly installed and operated.

Other major barriers include identifying what to look for in an installer (i.e. what certification should be required) and difficulty of customers to find qualified installers. The upfront cost of highly efficient units is also a barrier for some customers.

Program Monitoring & Evaluation

This program will be monitored for participation level, and service quality. The criteria for eligible models and installers will also be continually reviewed to ensure the program is promoting units and installers that will provide customers the highest achievable energy savings at a reasonable cost.

Estimated Costs & Energy Savings

	2016	2017	2018	2019	2020	Total
Estimated Costs (\$000s)	119	100	103	102	104	529

Business Efficiency Program

Program Description

The objective of the Business Efficiency Program is to help commercial customers increase their electrical energy efficiency by providing incentives on energy efficient options for existing facilities. The program provides supports to encourage customers to implement projects customized to their own facilities.

Target Market: Commercial

This program targets business owners and property managers who have an interest in making their businesses more energy efficient. The program includes a custom project approach which appeals primarily to large commercial customers. In 2016, the program will also include rebates for specific measures, such as LED lighting, Air Source Heat Pumps and High performance T8 Lighting, which appeal to small and medium sized customers as well.

Eligible Measures

The custom stream allows customers to obtain rebates for almost any energy efficiency measures that result in electrical energy and demand savings. The program excludes alternative energy and fuel switching.

Beginning in 2016 the custom stream of the Business Efficiency Program will also include incentives for demand reduction based on the options available at the customer's facilities as well as the amount of demand they are able to reduce during peak times.

Also beginning in 2016, the existing fluorescent High Bay program and the current Commercial lighting program (including high performance T8 fluorescent lamps and LED exit signs) will become prescriptive rebates under the Business Efficiency Program.¹ Electronic ballasts will no longer be available for incentive as of 2016 because these ballasts are now considered to be the market standard.

The specific measures eligible for per unit rebates have included programmable thermostats, occupancy sensors, high performance showerheads, and LED wall packs. In 2016, LED screw-in lamps, High Bay LED fixtures, electrically commutated motors for evaporator fans, cold climate air source heat pump systems and low flow pre-rinse spray valves will be added to the prescriptive list of incentives.

¹ Prescriptive incentive program are customer energy conservation programs that have per unit rebates for installing certain defined technologies. For example, providing a predefined rebate amount for a LED light bulb;

Business Efficiency Program

Delivery Strategy

The delivery strategy for this program is mainly through individual customer interactions. A walk through audit can help customers identify efficiency opportunities.

Marketing for this program includes partnering with lighting manufacturers, distributors, electrical contractors and lighting service providers as key market influencers and allies. The program will create business opportunities for trade allies to sell more efficient products.

The program will also target commercial property owners through direct marketing and through industry associations such as the Building Owners and Managers Association. Tools and tactics will include trade ally and business association activities, such as workshops for distributors, contractors and building operators, retail point-of-sale materials, website and advertising in trade publications. Demonstration projects will be selected from program participants.

Market Considerations

Barriers to increased market penetration include initial cost, awareness of the program and available incentives, budget & planning cycles, technical know-how, and customer time constraints.

Incentive Strategy

Incentives for this program are designed to reduce the cost barrier, attract customer attention and provide technical and financial support for energy audits and feasibility studies. The custom stream provides incentives based on project energy savings at 10 cents/kWh for first year savings or project demand savings at \$100 per kW per month over the December to March period. Demand saving projects require a minimum of 50 kW savings and be sustainable over 5 years. Incentives of up to \$50,000 per site help garner interest and lower customer project costs.

Incentives vary for the prescriptive measures. Rebates will be processed through mail-in and online submissions.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost. Each incented project will have a measurement and verification plan to confirm energy or demand savings achieved are consistent with incentives paid.

Business Efficiency Program

Estimated Costs & Energy Savings						
	2016	2017	2018	2019	2020	Total
Estimated Costs (\$000s)	1,519	1,791	1,813	2,133	2,171	9,427
Estimated Cumulative Energy Savings (GWh)	18.2	26.9	36.7	47.6	60.2	190
Total Resource Cost						2.4

Industrial Energy Efficiency Program

Program Description

The objective of this program is to improve electrical energy efficiency in a variety of industrial processes. The program components include financial incentives based on energy savings and other supports to enable industrial facilities to identify and implement efficiency and conservation projects. This program is a custom program to respond to the unique needs of the Newfoundland and Labrador industrial market, rather than a prescriptive technology approach.

Target Market: Industrial

This program targets existing, transmission level, industrial customers served by Newfoundland and Labrador Hydro.

Eligible Measures

Eligibility of projects is based on engineering review and confirmation of estimated energy savings impact. Technologies include, but are not limited to, compressed air, pump systems, process equipment and process controls.

Delivery Strategy

The program is managed internally, with external engineering services used as required. The utility takes the role of facilitator and consultant in providing methods for industrial customers to complete project proposals and implement approved projects.

This program was initially launched as a three-year pilot program in 2009, with the first project applications being submitted in 2011, and closed to new projects in 2013. The industrial pilot was reviewed in 2014 by an external party for performance; the review indicated the program matched or exceeded performance of comparable industrial CDM programs relative to the size of the industrial sector in the Newfoundland and Labrador market. The program was officially re-launched as an ongoing program in 2015, with the same structure as the pilot program.

Industrial Energy Efficiency Program

Market Considerations

This market requires a one-on-one approach to project design and delivery. The program builds on the work already completed by the industrial customers, and addresses their unique barriers to improved efficiency, which include, but are not limited to, access to capital and human resources.

The lifecycle for each program transaction will be measured in months rather than weeks because of the need for review, contract development, budgeting and implementation timelines, and post-installation evaluation. This type of program requires that facilities have financial and business stability to continue operations for a time period appropriate to achieve cost effective savings.

Incentive Strategy

Incentives for this program include an initial comprehensive energy audit for the site, funding assistance for feasibility studies, and financial assistance for project implementation based on energy savings.

Program Monitoring & Evaluation

The program will be regularly monitored for participation level, service quality, and cost effectiveness, including engineering review and inspection of all projects and assessment of long-term impact on customer processes.

Industrial Energy Efficiency Program

Estimated Costs & Energy Savings ²						
	2016	2017	2018	2019	2020	Total
Estimated Costs (\$000s)	667	10	10	10	10	707
Estimated Cumulative Energy Savings (GWh)	30.6	30.6	30.6	30.6	30.6	153
Total Resource Cost						1.7

² While Customer audits have confirmed that there are several potential projects at Hydro's customers' sites, savings for the Industrial Energy Efficiency Program (IEEP) have only been forecasted for 2016 because there are only five transmission level industrial customers in Newfoundland and Labrador and participation depends on each company's capital budgets and focus for the year. As a result of such a small market and budget considerations, participation is extremely variable from year to year and difficult to forecast. The costs from 2017-2020 are the fixed administration costs associated with program promotion and customer engagement in the IEEP. The majority of costs are incurred after a project is submitted and passes economic screening. Projects for the Industrial EE Program will be evaluated on a yearly basis and projects with a TRC of 1.0 or greater will be completed.

Isolated Business Efficiency Program

Program Description

The objective of the Isolated Business Efficiency Program is to help commercial customers increase their electrical energy efficiency by providing incentives on energy efficient options for existing facilities. The program provides supports to encourage customers to implement projects customized to their own facilities.

Target Market: Commercial

This program targets business owners and property managers in Hydro's isolated diesel and L'Anse au Loup systems who have an interest in making their businesses more energy efficient. The program includes a custom project approach and also rebates for specific measures, such as LED lighting, Air Source Heat Pumps and High performance T8 Lighting.

Eligible Measures

The custom stream allows customers to obtain rebates for almost any energy efficiency measures that result in economical electrical energy savings. The program excludes alternative energy and fuel switching. The specific measures eligible for per unit rebates have included programmable thermostats, occupancy sensors, high performance showerheads, and LED wall packs. In 2016, LED screw-in lamps, High Bay LED fixtures, Electrically Commutated Motors for Evaporator fans, Cold climate air source heat pump systems and Low Flow Pre-rinse spray valves will be added to the prescriptive list of incentives.

Isolated Business Efficiency Program

Delivery Strategy

The delivery strategy for this program is mainly through individual customer interactions. The custom track involves a walkthrough audit and feasibility analysis to determine savings and eligible incentive. This allows for a wide range of eligible technologies and projects.

Marketing for this program includes partnering with lighting manufacturers, distributors, electrical contractors and lighting service providers as key market influencers and allies. The program will create business opportunities for trade allies to sell more efficient products.

The program will also target commercial property owners through direct marketing. Tools and tactics will include trade ally and business association activities, such as workshops for distributors, contractors and building operators, and a website. Demonstration projects will be selected from program participants.

Market Considerations

Barriers to efficiency in the commercial market include financial and human resource concerns. Incentives will assist in making energy efficiency upgrades more accessible. Human resource concerns are around awareness and knowledge of the technology options as well as time to develop the business case for retrofit projects.

The isolated systems have additional challenges with access to products and access to specific technical skill sets in the evaluation of projects and technology. Hydro's program staff will assist in addressing these gaps.

Incentive Strategy

Incentives for this program are designed to reduce the cost barrier, attract customer attention and provide technical and financial support for energy audits and feasibility studies. The custom stream provides incentives based on project energy savings at the lesser of \$0.4/kWh for first year savings or 80% of eligible project costs.

Incentives vary for the prescriptive measures. Rebates will be processed through mail-in and online customer applications.

Isolated Business Efficiency Program

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost. Each incented project will have a measurement and verification plan to confirm energy savings achieved are consistent with incentives paid.

Estimated Costs & Energy Savings

	2016	2017	2018	2019	2020	Total
Estimated Costs (\$000s)	106	112	117	122	128	585
Estimated Cumulative Energy Savings (GWh)	0.5	0.7	0.8	1.0	1.2	4
Total Resource Cost						1.6

Isolated Systems Community Program

Program Description

The objective of this program is to provide a portfolio of technologies and opportunities to help residential and commercial customers in isolated diesel communities save electrical energy and to promote energy efficiency awareness.

Target Market

This program targets both residential and commercial customers in Hydro's isolated systems. This includes Isolated Diesel systems on the Island, in Labrador, and the L'Anse au Loup system.

Eligible Measures

Measures will range from efficient lighting products, hot water saving products, pipe insulation, hot water tank insulation, commercial LED exit signs, and others that may be applicable.

An Appliance Retirement program is being planned for at least one community. Old inefficient appliances will be removed from participating homes and routed for appropriate disposal. This will save energy and money for the homeowner. This component will be evaluated to determine if it is economic to develop into a broader program.

The Isolated systems T12 replacement program will take place in 2-3 Isolated communities. This project will offer, free of charge to commercial customers, the supply and install of new High Performance T8 lamps and ballasts.

Delivery Strategy

Hydro has engaged Summerhill Group to deliver this program. They are using a number of delivery strategies, including hiring and training local representatives, to engage residential and commercial customers. Direct installs will be completed, whereby the customer receives the technology in their home or business at no cost. During the direct install visit, customers also receive information on energy usage and efficiency options.

Isolated Systems Community Program

Market Considerations

Availability and awareness of energy efficient technologies continues to be an issue in rural communities and often technologies available are at a higher price than in urban markets. This program will address the barriers of availability. There is a heavy electric hot water heating penetration and opportunities exist in plug load and behavior based areas.

Commercial customers tend to be smaller businesses and as such find it challenging to find the time and resources to address energy consumption issues; this program will provide the one on one interaction needed to assist these customers. The technologies included in the program do not involve a major renovation. This program will allow the utility to reach customers that may not have been able to participate in the other incentive programs.

Following the 2015 direct install component, information collected in 2014 and 2015 will be used to plan for Isolated Systems Community programming beyond 2017. Costs and energy savings will be estimated once the technologies have been determined.

Program Monitoring & Evaluation

The program will be monitored for participation level, service quality, and cost effectiveness. A representative sample of direct installs will be surveyed for confirmation of continued installation and use. Formal evaluations will be conducted after each year of operation.

Estimated Costs & Energy Savings

	2016	2017	2018	2019	2020	Total
Estimated Costs (\$000s)	415	415	-	-	-	830
Estimated Cumulative Energy Savings (GWh)	5.2	5.5	5.5	5.5	5.5	27
Total Resource Cost						2.7

Table D-1 Conservation Programs Energy Reductions: 2012 – 2015(F) by Sector (GWh)					
	2012	2013	2014	2015F	Total
Residential					
Insulation Program	15.8	20.6	24.0	27.0	87.4
Thermostat Program	4.5	5.8	7.0	8.4	25.7
<i>ENERGY STAR</i> Window Program	6.1	8.6	10.1	10.1	34.9
Coupon Program	0.3	0.3	0.3	0.3	1.2
HRV	0.0	0.0	0.2	0.4	0.6
Small Technologies	0.0	0.0	5.5	14.4	19.9
Isolated Systems Community Program	1.7	2.8	4.1	4.8	13.4
Block Heater Timer Program	-	0.3	0.3	0.3	0.9
Total Residential Portfolio	28.4	38.4	51.5	65.7	184.0
Commercial					
Lighting Rebate Program	3.3	3.9	5.8	6.5	19.5
BEP	-	-	0.6	4.5	5.1
Isolated Systems Business Efficiency Program	-	-	0.1	0.4	0.5
Total Commercial Portfolio	3.3	3.9	6.5	11.4	25.1
Industrial					
Industrial Energy Efficiency Program	3.3	3.3	25.6	25.6	57.8
Total Portfolio	35.0	45.6	83.6	102.7	266.9

Table D-2 Conservation Programs Program Costs: 2012 – 2015(F) by Sector (\$000s)					
	2012	2013	2014	2015F	Total
Residential					
Insulation Program	882	1,092	796	1,039	3,809
Thermostat Program	492	253	227	454	1,426
<i>ENERGY STAR</i> Window Program	1,173	1,634	698	7	3,512
Coupon Program	-	-	-	-	-
HRV	-	59	56	225	340
Small Technologies	-	4	1,877	2,884	4,765
Isolated Systems Community Program	858	871	615	579	2923
Block Heater Timer Program	31	8	8	-	47
Total Residential Portfolio	3,436	3,921	4,277	5,188	16,822
Commercial					
Lighting Rebate Program	121	128	373	790	1,412
BEP	-	112	457	532	1,101
Isolated Systems Business Efficiency Program	93	115	96	66	370
Total Commercial Portfolio	214	355	926	1,388	2,883
Industrial					
Industrial Energy Efficiency Program	173	89	1,244	19	1,525
Total Portfolio	3,823	4,365	6,447	6,595	21,230

**Table E-1
Conservation Programs
Energy Reduction Estimates: 2016 – 2020
by Sector
(GWh)**

	2016	2017	2018	2019	2020	Total
Residential						
Insulation Program	30.0	33.1	36.1	38.9	41.8	179.9
Thermostat Program	9.7	11.1	12.5	13.8	15.2	62.3
<i>ENERGY STAR</i> Window Program	10.1	10.1	10.1	10.1	10.1	50.5
Coupon Program	0.3	0.3	0.3	0.3	0.3	1.5
Isolated Systems Community Program	5.2	5.5	5.5	5.5	5.5	27.2
Small Technology Program	23.8	33.3	38.2	37.4	36.5	169.1
HRV Program	0.7	1.0	1.3	1.6	2.0	6.6
Benchmarking	0.3	8.0	13.8	15.6	-	37.7
Block Heater Timer Program	0.3	0.3	0.3	0.3	0.3	1.5
Total Residential Portfolio	80.4	102.7	118.1	123.5	111.7	536.4
Commercial						
Isolated Systems Business Efficiency Program	0.5	0.7	0.8	1.0	1.2	4.3
Business Efficiency Program	18.2	26.9	36.7	47.6	60.2	189.6
Total Commercial Portfolio	18.7	27.6	37.5	48.6	61.4	193.8
Industrial						
Industrial Energy Efficiency Program	30.6	30.6	30.6	30.6	30.6	153.0
Total Portfolio	129.7	160.9	186.2	202.7	203.7	883.2

Table E-2
Conservation Programs
Program Cost Estimates: 2016 – 2020
by Sector
(\$000s)

	2016	2017	2018	2019	2020	Total
Residential						
Insulation Program	1,189	1,207	1,202	1,197	1,223	6,018
Thermostat Program	517	555	539	557	552	2,720
Isolated Systems Community Program	415	415	-	-	-	830
Small Technology Program	3,113	2,879	1,578	-	-	7,570
HRV Program	223	218	232	231	267	1,171
Benchmarking Program	530	1,034	989	1,063	-	3,616
Total Residential Portfolio	5,987	6,308	4,540	3,048	2,042	21,925
Commercial						
Isolated Systems Business Efficiency Program	106	112	117	122	128	585
Business Efficiency Program	1,522	1,794	1,816	2,136	2,173	9,441
Total Commercial Portfolio	1,628	1,906	1,933	2,258	2,301	10,026
Industrial						
Industrial Energy Efficiency Program	667	10	10	10	10	707
Total Programs Portfolio	8,282	8,224	6,483	5,316	4,353	32,658

Table E-3
Conservation Programs
Total Resource Cost Test Results
by Sector

TRC Results	
Residential	
Insulation Program	2.5
Thermostat Program	2.8
Isolated Systems Community Program	2.7
Small Technology Program	1.3
HRV Program	1.3
Benchmarking	1.0
Commercial	
Isolated Systems Business Efficiency Program	1.6
Business Efficiency Program	2.4
Industrial	
Industrial Energy Efficiency Program	1.7