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March 31, 2016

British Columbia Utilities Commission
6th Floor, 900 Howe Street
Vancouver, BC
V6Z 2N3

Attention: Ms. Laurel Ross, Acting Commission Secretary and Director

Dear Ms. Ross:

Re: FortisBC Inc. (FBC)
Electricity Demand-Side Management (DSM) 2015 Annual Report

Attached please find the Electricity DSM Program 2015 Annual Report for FBC.

If further information is required, please contact Sarah Wagner, Senior Regulatory Analyst, at (250) 469-6081.

Sincerely,

FORTISBC INC.

Original signed:

Diane Roy

Attachments



FortisBC Inc.

**Electricity
Demand-Side Management Programs
2015 Annual Report**

March 31, 2016

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1. REPORT OVERVIEW

This Demand-Side Management (DSM) Annual Report (the Report) provides highlights of FortisBC Inc.'s (FBC or the Company) DSM programs for the year ended December 31, 2015. The Report reviews the progress of FBC's DSM programs in meeting the approved 2015 DSM Plan by educating and incenting FBC's customers to conserve energy and improve the energy efficiency of their homes, buildings and businesses.

2015 was the first full year of integration for the FBC's DSM and FortisBC Energy Inc.'s (FEI) Energy Efficiency and Conservation (EEC) divisions, with a joint leadership team that combined program managers' responsibilities, wherever possible. The integration prompted FBC's PowerSense sub-brand to be retired. The Conservation and Energy Management (C&EM) department name was adopted for both electricity and natural gas divisions.

Summaries of how FBC met the DSM Regulation requirements in 2015 and FBC's response to Directives from Order G-186-14 approving FBC's 2015-2016 DSM Expenditure Plan are included in Section 1-3 and Section 1-4 respectively. Section 2 through Section 7 of the Report provide an overview of DSM program activities in 2015, along with a comparison of actual energy savings and costs to Plan and a statement of financial results (Table 1-1), including Total Resource Cost (TRC) cost-effectiveness test results for 2015. Consistent with previous years' Reports, additional test results and historical DSM costs and energy savings are included in Appendix A and Appendix B, respectively.

1.1 PORTFOLIO LEVEL TOTAL RESOURCE COST (TRC) RESULTS

Table 1-1 provides an overview of FBC's 2015 energy savings, expenditures and TRC cost-effectiveness test results for all DSM programs, by program, sector and at the portfolio level. The Company achieved an overall portfolio TRC of 2.0 on DSM expenditures of \$3.5 million and electricity savings totalling 12.6 GWh. The Company's spending levels were less than the approved levels for the reasons set out in Section 1.2 below. In accordance with British Columbia's Demand-Side Measures Regulation, additional detail, including results for the following cost effectiveness test calculations, are provided for the overall portfolio and each Program Area in Appendix A, Table A-1: TRC, Utility Cost Test (UCT), and the Ratepayer Impact Measure (RIM).

Table 1-1: FortisBC Inc. DSM Portfolio Results for 2015

Program Area	2015 Approved Plan Savings (MWh)	2015 Actual Energy Savings (MWh)	Lifetime savings (MWh) ¹	Incentive Expenditure (\$000)	Non- Incentive Expenditure (\$000)	2015 Actual Spend (\$000s)	2015 Approved Plan (\$000s)	TRC
Residential								
Home Improvement	3,106	231.2	6,326	62.0	136.8	198.7	884	1.7
Behavioural	888	0.0				-	85	
Watersavers	850	4.6	64	0.3	1.8	2.2	387	1.5
Appliances	288	51.9	865	23.3	47.7	71.0	96	1.2
Lighting	1,569	4,144.4	50,893	167.9	30.1	198.0	193	5.3
Heat Pumps	1,618	569.0	17,561	138.4	44.1	182.5	302	1.5
New Home Program	1,179	356.2	12,366	37.6	73.2	110.8	390	1.1
Low Income Housing	2,598	281.8	1,827	97.5	189.9	287.3	824	1.3
Residential Total	12,096	5,639.0	89,903	526.9	523.5	1,050.4	3,160	2.9
Commercial								
Lighting	7,445	4,089.3	71,188	404.4	331.0	735.4	1,485	2.0
Building Improvement	3,454	1,605.9	41,841	175.8	367.3	543.0	842	1.6
Computers	378	0.0		-	-	-	55	
Municipal (WWTP)	759	186.6	4,900	24.5	11.7	36.2	79	2.3
Irrigation	490	0.0		-	9.0	9.0	69	
Commercial Total	12,526	5,881.8	117,929	604.7	719.0	1,323.7	2,530	1.8
Industrial								
Industrial Efficiency	1,537	1,086.8	27,937	146.2	79.8	226.0	202	2.0
Industrial Total	1,537	1,086.8	27,937	146.2	79.8	226.0	202	2.0
Total Programs	26,159	12,607.6	235,769	1,277.8	1,322.3	2,600.1	5,892	2.2
Portfolio Level Activities								
Planning & Evaluation	-	-		-	584.9	584.9	725	
Supporting Initiatives	-	-		-	346.3	346.3	675	
Total Portfolio	26,159	12,608	235,769	1,277.8	2,253.5	3,531.3	7,292	2.0

¹ Lifetime savings are energy savings over the lifetime of the measure

In 2015, FBC met the conditions of the Province's *Demand-Side Measures Regulation*, achieving a portfolio TRC value of 2.0. There were no measures or programs with a TRC less than 1.0, therefore use of the modified TRC¹ (MTRC) was not required. The Low Income program achieved a TRC of 1.3, after including the allowed 40 percent adder to benefits.

The TRC test results are higher than in 2014 (1.6) as a result of using the approved long run marginal cost (LRMC) of BC clean or renewable electricity, of \$111.96 per MWh², as compared to the long run avoided power purchase cost of \$84.94 per MWh used in 2014.

1.2 MEETING APPROVED SPENDING LEVELS

The Company's DSM expenditures were below the levels approved in the 2015-2016 DSM Plan. The Company's spending was 48% of the approved levels and savings were 48% of the corresponding target.

¹ FBC employs a 15% non-energy benefit (NEB) for its MTRC adder (per 2014 DSM Regulation 326/2008).

² BCUC Order G-186-14

The Company has a long record of successfully meeting or exceeding its savings targets, while keeping expenditures within approved plans and 2015 results were not in line with past performance. A number of factors contributed to the 2015 outcome:

- The Commission's Decision and Order G-186-14, approving FBC's Application for Approval of DSM Expenditures for 2015 and 2016 (2015-16 DSM Plan), that restored 2015 DSM expenditures to the much higher 2012-2013 DSM spending levels, was received on December 3, 2014. The timing of the Decision impacted the 2015 DSM expenditure year due to:
 - the lead time required to hire and train additional qualified staff necessary to develop and manage DSM programs;
 - the lead time to reintroduce or to develop and launch new programs;
 - the time required to follow the comprehensive procurement processes for developing and implementing new programs (e.g., the RFP for the new Business Direct Install program that is configured considerably differently than the previous direct install offer); and
 - the time required to rebuild customer and trade ally awareness that DSM programs, discontinued in 2014, were reintroduced and available to them.
- Collaboration with other public utilities resulted in harmonized rebates at lower levels than those offered on a stand-alone basis in the past, which resulted in diminished returns on certain maturing programs (e.g., top tier Energy Star appliances); and
- The withdrawal of partners in the LiveSmartBC and ecoEnergy programs left the Company offering stand-alone programs with lower customer rebates, the consequence of which was reduced participation in the Home Improvement program.

Given that 2015 was a transition year from 2014's scaled-back programs and considerable development work was undertaken for new and relaunched programs, the Company believes it now has the necessary resources and a fulsome complement of programs in place going forward to achieve budget and target performance in 2016.

1.3 MEETING ADEQUACY REQUIREMENTS OF THE DEMAND-SIDE MEASURES REGULATION

The *Demand-Side Measures Regulation* has the following requirements for a utility's portfolio of DSM activity to be considered adequate:

A public utility's plan portfolio is adequate for the purposes of Section 44.1 (8) c of the Act only if the plan portfolio includes all the following:

- a) A demand-side measure intended specifically to assist residents of low-income households to reduce their energy consumption;

- b) If the plan portfolio is introduced on or after June 1, 2009, a demand-side measure intended specifically to improve the energy efficiency of rental accommodations;
- c) An education program for students enrolled in schools in the public utility's service area;
- d) If the plan portfolio is submitted on or after June 1, 2009, an education program for students enrolled in post-secondary institutions in the public utility's service area.

The Company met all the requirements for adequacy. The programs for low income customers are discussed in Section 3, including Energy Savings Kits (ESK) and Energy Conservation Assistance Program (ECAP). With regard to offerings to rental apartment buildings, a number of the Commercial Energy Efficiency programs are intended for use by owners of rental buildings, including Rental Apartment Efficiency Program (RAP), (see Section 4.2.1). ECAP and ESK programs, as well as all Residential Energy Efficiency programs, are also available to qualifying rental properties.

In terms of education programs, the Company funded a variety of initiatives for K-12 students, including Destination Conservation, BC Lions Energy Champion School Assembly Presentations, Energy is Awesome and Green Bricks. The Company also funded post-secondary student engagement initiatives, including a program at Selkirk College and providing training grants (see Section 6.2.2).

1.4 ADDRESSING BCUC DIRECTIVES FROM ORDER G-186-14

The British Columbia Utilities Commission (BCUC or the Commission) approved FBC's 2015-2016 DSM Expenditures on December 3, 2014 (Order G-186-14) and the three Directives related to the 2015 Annual Report and FBC's responses to them are summarized in Table 1-2 below, (note that Directives 7, 15 and 17 issued in Order G-186-14 were previously addressed in Table 1.1 of the 2014 Annual Report):

Table 1-2: Responses to BCUC Directives (Order G-186-14)

Directive Reference	BCUC Directive	FBC Response
Directive 13	Commission Panel directs FBC to include in its next DSM Annual Report a review and discussion of whether opportunities exist in expanding DSM funding to 2013 actual levels for residential heat pumps, lighting and new home programs while continuing to obtain cost-effective energy savings.	The BC Conservation Potential Review (BC CPR) study that is underway, will reassess the economics and market opportunity (economic potential) for all DSM measures. The BC CPR findings for the listed measures will form the major input to the next long-term DSM Plan, which in turn will inform the DSM expenditure filings and hence targets for future years.
Directive 14	Commission Panel directs FBC to include in its next DSM Annual Report a review and discussion of whether opportunities exist in expanding DSM funding to 2013 approved levels for municipal water while continuing to obtain cost-effective energy savings.	Municipal infrastructure, including water/wastewater measures, are included in the BC CPR study scope to assess the cost-effective potential. In the interim, such projects are vetted through the Custom Business Efficiency Program (see Section 4.2.2 of this report).
Directive 21	FBC is directed to file, confidentially if appropriate, the full versions of EM&V reports with its DSM Annual Report.	FBC is compliant with this directive in the current DSM Annual Report and will follow it in subsequent DSM Annual Reports. The Executive Summary of the Home Improvement Program EM&V report is filed as Appendix C and the full report has been filed confidentially.

1.5 COLLABORATION & INTEGRATION

The Company continues to collaborate and integrate energy efficiency programming with both FortisBC Energy Inc. (FEI) and British Columbia Hydro and Power Authority (BC Hydro), as well as with other entities such as governments and industry associations.

2015 was the first full year of integration for the FBC's DSM and FEI's EEC divisions, with a joint leadership team that combined program managers' responsibilities, wherever possible. The integration prompted FBC's PowerSense sub-brand to be retired. The Conservation and Energy Management (C&EM) department name was adopted for both electricity and natural gas divisions.

The Company recognizes that collaboration among utilities will maximize program efficiency and effectiveness. Collaborative activity is reported in the individual Program Area sections and program descriptions.

FBC, FEI and BC Hydro also continue to experience additional benefits from their collaboration efforts, including cost savings, streamlined application processes for customers, extended program reach and consistent and unified messaging, resulting in improved energy literacy.

1.6 PORTFOLIO SUMMARY

The Company's DSM portfolio met the goal of cost effectiveness, with a TRC value of 2.0 in 2015 and FBC is of the view that both energy savings accounted for in the portfolio and the resulting TRC are conservative. Benefits from additional activities, such as Supporting

- 1 Initiatives, play an important role in supporting the development and delivery of programs, while
- 2 helping create a culture of conservation in British Columbia.
- 3 Although spending and savings levels were about half of the approved Plan, they approximate
- 4 2014 results. Considerable program development work was undertaken in 2015, which positions
- 5 the Company for meeting its approved targets in 2016.

2. RESIDENTIAL PROGRAM AREA

2.1 OVERVIEW

The Residential Program Area was successful in reducing annual electricity consumption by 5.6 GWh and achieving an overall TRC of 2.9. Over \$1.05 million was invested in Residential energy efficiency upgrades in 2015, and 50 percent of this expenditure was incentives. The energy savings results from Residential programs were 47 percent of Plan with Lighting contributing 73 percent of total residential savings.

Residential programs address customers' major end-uses in residential single-family homes, row houses, townhomes or mobile homes, and include retrofit and new home applications. Residential programs, in combination with the Companies' education and outreach activities, play an important role in driving the culture of conservation in British Columbia.

Table 2-1 summarizes the actual expenditures for the Residential Program Area in 2015 compared to the Plan, including incentive and non-incentive spending, annual and lifetime electric savings, as well as TRC cost-effectiveness test results.

Table 2-1: 2015 Residential Program Area Results Summary

Program Area	2015 Approved Plan Savings (MWh)	2015 Actual Energy Savings (MWh)	Lifetime savings (MWh)	Incentive Expenditure (\$000)	Non- Incentive Expenditure (\$000)	2015 Actual Spend (\$000s)	2015 Approved Plan (\$000s)	TRC
Residential								
Home Improvement	3,106	231.2	6,326	62.0	136.8	198.7	884	1.7
Behavioural	888	0.0				-	85	
Watersavers	850	4.6	64	0.3	1.8	2.2	387	1.5
Appliances	288	51.9	865	23.3	47.7	71.0	96	1.2
Lighting	1,569	4,144.4	50,893	167.9	30.1	198.0	193	5.3
Heat Pumps	1,618	569.0	17,561	138.4	44.1	182.5	302	1.5
New Home Program	1,179	356.2	12,366	37.6	73.2	110.8	390	1.1
Low Income Housing	2,598	281.8	1,827	97.5	189.9	287.3	824	1.3
Residential Total	12,096	5,639.0	89,903	526.9	523.5	1,050.4	3,160	2.9

2.2 RESIDENTIAL PROGRAMS

The highlights of the Residential programs are outlined below:

2.2.1 Home Improvement Program and Heat Pump Program

The following activities were undertaken in the Home Improvement and Heat Pumps programs in 2015:

- The Home Energy Rebate Offer (HERO), a province wide program delivered and marketed in collaboration with BC Hydro and FEI, and the main contributor to the Heat Pump and Home Improvement programs' results, continued to gain momentum. By focusing on the most cost-effective retrofit measures and using a "menu" approach, the

program provides incentives to customers for insulation and draft-proofing, ventilation, and space and water heating. A technical review of the program took place in late 2015 as part of the DSM Monitoring and Evaluation activities discussed in Section 7 of the report and its recommendations will inform 2016 program implementation. The executive summary of the Home Improvement program M&E report is provided in Appendix C;

- A pilot retail point of sale program was implemented in partnership with FEI and BC Hydro with RONA, Canadian Tire and Home Depot. Instant rebates were offered on draft-proofing products, thermostats and low-flow showerheads;
- In partnership with FEI, BC Hydro and the British Columbia Ministry of Energy and Mines (MEM), funding was provided to support a Home Performance Stakeholder Council; and
- Heat pump rebates were offered through two channels: ductless heat pumps were offered through the HERO program and central heat pump systems were accessed through a stand-alone program. The Company's long-standing air source heat pump loan offer continued for electrically-heated homes.

As noted previously, the executive summary of the completed M&E report for the Home Improvement program is provided in Appendix C. The full evaluation report is filed separately in Confidential Appendix D and FBC requests that the Commission hold these reports in confidence. These reports contain customer-specific information that should not be disclosed to the public. In addition, the methodology and processes used in the reports are proprietary to the consultants hired by FBC.

2.2.2 Appliance Program

The Appliance Retail Program was re-launched in 2015 with higher efficiency standards (top tier) for clothes washer and refrigerators. The program introduced the ENERGY STAR clothes dryers incentive, which had a higher than expected response rate.

2.2.3 Residential Lighting Program

The Residential Lighting program offered point-of-sale rebates for ENERGY STAR certified lighting products. Offered in collaboration with BC Hydro to provide a BC wide offer to customers and lighting retailers across the BC market, the program ran for two two-month periods in major retail stores. The Residential Lighting program exceeded Plan savings by 264 percent due to successful retail campaigns, while costs were 103 percent of Plan.

2.2.4 New Home Program

In response to building code updates, the New Home program was re-designed and launched in late 2015. It offers incentives for homes built to the ENERGY STAR New Home standard. Approximately half of the 2015 New Home rebate expenditures were a wrap-up of 2014 projects.

2.2.5 Low Income Program

This program is discussed in Section 3 of the Report.

2.2.6 Behavioural Program

The Plan included provisions for a Customer Engagement Tool (CET) and for In-Home Display (IHD) pilots, neither of which proceeded in 2015. The CET relies heavily on social norms by comparing a customer's energy usage to the average of their neighbours' in order to prompt behavioural change (i.e. energy savings). The CET pilot was postponed to ensure that customer data exchanged with the service provider is secure and in compliance with the *Personal Information Protection Act* (PIPA) and corporate privacy policies. In the case of IHDs, the AMI meter data management system is not yet configured for the necessary two-way communication necessary to enable IHDs to display the customers' rate, billing dates and other pertinent information. Hence, there were no expenditures nor savings attained in 2015 in the Behavioural program.

2.2.7 Residential Summary

In 2015, the Lighting program remained the core Residential measure. It delivered 73% of Residential MWh savings and it was the most cost-effective program in the portfolio.

In 2016, FBC will focus on increasing customer participation in its DSM programs by further engaging with retailers, contractors and manufacturers to bring broader awareness of the programs. In particular, a part-time position is being assigned to engage retailers to increase customer participation in the Lighting and Appliance programs, by providing in-store training on the programs. The Home Energy Rebate Offer is going through a program refresh to increase incentives provided to customers. A pilot program is in the planning stages that could provide participating customers with a home performance plan for energy efficient home renovation projects.

3. LOW INCOME PROGRAM AREA

3.1 OVERVIEW

In 2015, the Company saw continued success with the Energy Savings Kit (ESK) program. It worked collaboratively with FEI to develop and launch the Energy Conservation Assistance Program (ECAP) within its service territory. FBC also secured \$225,000 in funding from MEM to deliver a direct installation program for heating system upgrades (air source heat pumps) for eligible First Nations housing stock.

Table 3-1 summarizes the planned and actual expenditures for the Low Income Program Area. In accordance with July 2014 amendments to Section 4(2)(b) of the Demand-Side Measures Regulation, the TRC of 1.3 for low income programs includes a 40 percent adder in the benefits, which increases the deemed cost effectiveness.

Table 3-1: 2015 Low Income Program Results Summary

Program Area	2015 Approved Plan Savings (MWh)	2015 Actual Energy Savings (MWh)	Lifetime savings (MWh)	Incentive Expenditure (\$000)	Non- Incentive Expenditure (\$000)	2015 Actual Spend (\$000s)	2015 Approved Plan (\$000s)	TRC
Low Income Housing	2,598	281.8	1,827	97.5	189.9	287.3	824	1.3
Low Income Total	2,598	281.8	1,827	97.5	189.9	287.3	824	1.3

Savings were 281.8 MWh for the Low Income programs. No savings were attributed to the Basic ECAP, as the program was launched in November and only energy evaluations were completed by the end of the year. ECAP energy efficient measure installations and savings will be accounted for in 2016.

A total of 764 ESKs were distributed in 2015, contributing savings of 201.1 MWh. There were also First Nations ECAP measures installed in 2015 that were carried over from 2014 First Nations energy assessments, for which 80.8 MWh for 15 heat pumps were recorded. Incentives recorded for all First Nations ECAP projects were \$63,137, after recovery of 50 percent of costs from the MEM grant.

3.2 LOW INCOME PROGRAMS

The following outlines the three Low Income programs delivered in 2015:

In partnership with FEI, ESKs were promoted and distributed at local food banks in the pre-heating season, as well as direct mailed to on-line applicants and Contact Centre referrals. The Company worked with FEI and BC Hydro on a direct mail brochure through the Ministry of Social Development's cheque run, which reached over 180,000 recipients in the province.

The First Nation ECAP direct-install program, offered with MEM co-funding, provides energy evaluations, energy conservation advice and the direct installation of air source heat pumps to electrically-heated homes on Reserves within the service territory. The program was piloted with

- 1 the Penticton Indian Band and will be expanded to other bands within the Company's service
2 territory in 2016.
- 3 For eligible low-income single or multi-family dwellings, the Company designed and launched
4 ECAP for the FortisBC shared service area³, in collaboration with BC Hydro and in partnership
5 with FEI. The ECAP program provides energy evaluations, advice, and the direct installation of
6 energy efficiency measures like LED and CFL lighting, low-flow showerheads and faucet
7 aerators at no cost to eligible households. Some single-family homes may also qualify for new
8 Energy Star refrigerators, high-efficiency furnaces, and draft-proofing and insulation at the
9 "advanced" program level. The program met its 2015 participation objectives within the first six
10 weeks of launching.

³ FortisBC's shared service area is essentially the Company's electric service area wherein both natural gas & electricity are supplied by FortisBC.

4. COMMERCIAL PROGRAM AREA

4.1 OVERVIEW

Commercial DSM programs encourage commercial customers to reduce overall consumption of electricity and associated energy costs. The Commercial programs produced aggregate electricity savings of 5.9 GWh and achieved an overall TRC of 1.8. \$1.3 million was invested in Commercial programs, of which 46 percent was incentive spending.

Table 4-1 summarizes the plan and actual expenditures for the Commercial programs, including incentive and non-incentive spending, annual and lifetime savings, as well as the TRC cost-effectiveness test results.

Table 4-1: 2015 Commercial Program Results Summary

Program Area	2015 Approved Plan Savings (MWh)	2015 Actual Energy Savings (MWh)	Lifetime savings (MWh)	Incentive Expenditure (\$000)	Non- Incentive Expenditure (\$000)	2015 Actual Spend (\$000s)	2015 Approved Plan (\$000s)	TRC
Commercial								
Lighting	7,445	4,089.3	71,188	404.4	331.0	735.4	1,485	2.0
Building Improvement	3,454	1,605.9	41,841	175.8	367.3	543.0	842	1.6
Computers	378	0.0		-	-	-	55	
Municipal (WWTP)	759	186.6	4,900	24.5	11.7	36.2	79	2.3
Irrigation	490	0.0		-	9.0	9.0	69	
Commercial Total	12,526	5,881.8	117,929	604.7	719.0	1,323.7	2,530	1.8

The Commercial sector recorded savings of 5.9 GWh, or 47 percent of the 2015 Plan. Almost 60 percent of these savings were realized through the commercial lighting programs, including point-of-sale product and custom lighting retrofit rebates. An example of a commercial lighting project was an LED parking lot lighting upgrade at a Kelowna car dealership, incented through the Commercial Product Rebate (CPR) program, which contributed 52 MWh of savings.

Building and Process Improvement (BIP) energy savings were 1.6 GWh or 46 percent of Plan. An example of a BIP project was a refrigeration upgrade at a grocery store in Penticton, incented through the Custom Business Efficiency Program, which contributed 350 MWh of savings. There were no irrigation projects completed in 2015.

Commercial sector costs in 2015 amounted to \$1.32 million or 52 percent of Plan. The largest cost component of Commercial programs was the Lighting program, which includes incentives paid through the CPR program and custom lighting projects incented through the Custom Business Efficiency program (CBEP).

4.2 COMMERCIAL PROGRAMS

The following outlines the key Commercial DSM programs offered in 2015:

4.2.1 Product Rebate and Direct Installation Programs

- The CPR program offers prescribed rebates for commercial lighting, HVAC, refrigeration, commercial kitchen appliances and other electric energy efficiency measures. The program was offered through point-of-sale rebates at lighting wholesalers and directly to customers. In 2015, the number of point-of-sale distributors was increased significantly. New irrigation, LED signage and pool pump rebates were also added to the program. Recent updates to general service lighting regulations prompted the elimination of most T8 lighting incentives. A third party study was initiated to revisit and expand CPR offers for 2016;
- After consulting with customers and irrigation suppliers, new prescriptive and custom irrigation offers were developed to improve accessibility and uptake by irrigation customers. Irrigation rebates will be available starting in the first quarter of 2016;
- In partnership with FEI, FBC launched the Rental Apartment Efficiency Program (RAP) in September 2015. The program specifically addresses the rental market by providing direct in-suite installations of hot water and LED lighting measures, energy assessments and implementation support for deeper energy efficiency retrofits at the building-wide level; and
- To support customers in multi-unit residential buildings (MURBs), FBC developed the MURB New Construction program to encourage building energy efficiency above code. The program was launched in late 2015.

4.2.2 Custom Rebates

- The Custom Building Efficiency Program (CBEP) provides custom rebates for larger, more complex energy efficiency retrofits and new construction projects in both the Commercial and Industrial sectors. In 2015, rebates for new construction continued to be offered based on building modeling, however, a new more accessible incentive pathway was developed for medium-sized buildings to provide lighting-only incentives based on lighting efficiency performance over building code;
- The Municipal Water Infrastructure program was discontinued as a discrete program and became part of CBEP. Incentives provided under this program include a city in the West Kootenays that received a \$24,500 rebate for upgrading its water infrastructure equipment to achieve more efficient operations, saving 245 MWh per year.
- No CBEP/CPR projects materialized related to computer energy efficiency, but Smart Power Bar Strips that reduce power usage when computer peripherals are not in use, will be offered as a part of the BIP program, launching in 2016.
- The Building Optimization Program, launched in 2013, provided re-commissioning and energy management information system support and continuous energy efficiency improvements to large multi-building institutional customers. In 2015, the final energy coaching phase began and the investigation and implementation phase was completed

for all participants. The program will be concluded in 2016 and its successor will launch as a joint Continuous Optimization program with FEI and BC Hydro.

4.3 COMMERCIAL PROGRAMS PLANNED FOR 2016

4.3.1 Business Direct Install (BDI) Program

FBC developed a successor to the 2011-2013 FortisBC Lighting Installation program (FLIP) direct install program that was co-funded by LiveSmartBC. An RFP was issued and a third party implementer was selected in the last quarter of 2015. The new BDI program is contractor-focussed, including provision of an energy assessment tool and sales training. BDI will provide point-of-sale rebates for the direct installation of lighting, HVAC, refrigeration, plug load and other end use measures. The BDI program is scheduled to launch in March 2016.

4.3.2 Multi-Unit Residential Building (MURB) Retrofit Program

FBC is developing a rebate program to encourage energy efficient retrofits for existing MURB stratas. The program is expected to launch in mid-2016.

4.4 SUMMARY

Commercial Program Area activity in 2015 successfully achieved 5.9 GWh of annual electricity savings and a positive TRC of 1.8.

The pillars of the Commercial program, delivering the bulk of savings, will continue to be the CPR and CBEP. The BDI program is expected to significantly increase savings in the small and medium business sector. Additional programs and offers launched in late 2015 and continued in 2016 will provide new offers to MURB and irrigation customers to improve their energy efficiency.

5. INDUSTRIAL PROGRAM AREA

5.1 OVERVIEW

The Industrial DSM programs continued to encourage industrial customers to consume electricity more efficiently in 2015. The Industrial programs achieved an overall TRC of 2.0, with electricity savings of 1.1 GWh. \$1.3 million was invested, of which 65 percent was incentive spending. Throughout 2015, the Company worked to enhance program offerings and build relationships with key industry players.

Table 5-1 summarizes the plan and actual expenditures for the Industrial Program Area in 2015, including incentive and non-incentive spending, annual and lifetime electricity savings, as well as the TRC cost-effectiveness test results.

Table 5-1: 2015 Industrial Program Results Summary

Program Area	2015 Approved Plan Savings (MWh)	2015 Actual Energy Savings (MWh)	Lifetime savings (MWh)	Incentive Expenditure (\$000)	Non- Incentive Expenditure (\$000)	2015 Actual Spend (\$000s)	2015 Approved Plan (\$000s)	TRC
Industrial Efficiency	1,537	1,086.8	27,937	146.2	79.8	226.0	202	2.0
Industrial Total	1,537	1,086.8	27,937	146.2	79.8	226.0	202	2.0

The Industrial Efficiency program achieved savings of 1.1 GWh, or 71 percent of the 1.5 GWh Plan for 2015. This was an increase of 77% over 2014 savings (0.6 GWh) for the industrial sector. An example of an industrial energy efficiency project was a compressed air upgrade at a West Kootenay lumber mill, incented through CBEP, contributing 216 MWh of savings.

Industrial sector costs incurred by the Company were \$226,040 for 2015, or 112 percent of Plan. The Industrial sector expenditures exceeded Plan while the savings fell short of Plan. The higher level of expenditure was due partly to costs for new program development and the ramp up of existing programs, which won't produce savings until 2016. The Industrial sector is also characterized by large projects that generally occur less frequently and take much longer to complete so the materialization of energy savings is frequently delayed.

5.2 2015 INDUSTRIAL PROGRAMS

CBEP provides custom rebates for larger, more complex energy efficiency retrofits, including, but not limited to, lighting, compressed air, hydraulics, industrial controls, fans and pumps. The eligibility policy and process structures continued to be improved in 2015. FBC developed new tracking and project management tools to reduce the lead time between project agreement, project implementation and issuance of the final rebate.

Activities in the Industrial programs resulted in three new funding agreements being executed, one of which included 246 MWh of industrial lighting electric savings. Program costs and

energy savings were dominated by the first phase of a large lumber mill modernization project in the West Kootenay region, which represented approximately 80 percent of program spend and savings.

FBC commercial and industrial Technical Advisors increased the number of site visits with industrial customers to promote the overall program.

5.3 INDUSTRIAL PROGRAMS PLANNED FOR 2016

5.3.1 Industrial Optimization Program

FBC developed two new joint energy assessment offers under FEI's existing Industrial Optimization Program:

- The Plant Wide Audit is a high level, whole facility audit to identify energy efficiency and both electric and natural gas conservation measures;
- The Feasibility Study is a detailed engineering study of a specific process or system to fully investigate opportunities to use energy from both electricity and natural gas, more efficiently.

These new industrial energy assessment offers will be available by March 2016 to FBC's industrial customers and the industrial customers of FBC's municipal wholesale customers who use in excess of 3 GWh per year. FBC will continue to provide incentives for implementation of industrial energy efficiency measures identified in the energy assessments through its existing CBEP program.

6. SUPPORTING INITIATIVES

6.1 OVERVIEW

Supporting initiatives support the goals of energy conservation in a variety of ways, from funding and supporting educational opportunities in schools to promoting energy conservation at community events.

To maximize internal efficiencies and minimize messaging duplication, the Company worked collaboratively with FEI for all initiatives except for a limited number of electricity-only outreach events. Budgets and other resources were coordinated to provide school and community outreach, retail campaigns, communications pieces and various event materials. The Company also supported various training seminars and educational workshops in collaboration with such organizations as the Canadian Home Builders' Association and other industry associations.

The Community Energy Planning program, described in further detail in section 6.2.1, was fully subscribed and will result in community or institutional strategic energy plans that will promote energy efficiency into the future.

The aforementioned activities are not incentive-based programs, therefore the Company has not attributed any direct savings to them. Supporting Initiatives costs are included at the portfolio level and incorporated into the overall portfolio cost-effectiveness results. Like FEI and other utilities, the Company is investigating opportunities to identify and confirm energy savings for future Supporting Initiatives activities.

The approved Supporting Initiatives expenditures for 2015 were \$0.67 million and actual spending in 2015 was \$0.35 million. The primary reason for the under-expenditure was the delay in overall program ramp-up from 2014.

6.2 SUPPORTING INITIATIVES

6.2.1 Community Energy Planning

The Company introduced a strategic Community Energy Planning pilot project to provide financial assistance to local governments and publically-funded institutions (up to 50 percent of project costs to a maximum of \$20,000 per participant) to facilitate future energy efficiency activities. The offer was fully subscribed in 2015 with University of British Columbia Okanagan (UBCO), Okanagan College and eight local governments, in partnership with the Columbia Basin Trust, participating.

The Company's support of community planning processes was highly praised by participating organizations. It is anticipated that the energy plans that were completed, or will be finalized in mid-2016, will result in several upgrade projects, the incorporation of efficiency in new

1 construction projects, and/or the adoption of policies and program development to further
2 promote energy efficiency.

3 **6.2.2 Education Programs (elementary and secondary)**

- 4 • Development of a curriculum-based elementary school program to be delivered in
5 schools by classroom teachers in 2016;
- 6 • Energy is Awesome (curriculum-based education packages for educators and
7 volunteer presenters);
- 8 • BC Lions Energy Champions program; and
- 9 • Financial sponsorship of Destination Conservation (Elements Society), Green Bricks and
10 Beyond Recycling (Wildsight) programs.

11 **6.2.3 Education Programs (post-secondary), including Trades Training**

- 12 • Sponsorship of Selkirk College Red Bird Communications' campus energy conservation
13 program;
- 14 • Sponsorship of Illumination Engineering Society Fundamentals of Lighting course, and
15 grants for electricians and local contractors to participate; and
- 16 • Grant support for Certified Energy Manager (CEM) training.

17 **6.2.4 Community Outreach**

- 18 • Junior hockey game sponsorship: promotion of conservation in public venues;
- 19 • Sponsorship of community events, e.g., Rock Creek Fair, that promote energy efficiency;
- 20 • Attendance and seminar presentations to residential home shows, building supply and
21 hardware retail outlets and commercial trade shows;
- 22 • Business Energy Savings Kits: pilot project for fire departments to provide energy
23 efficiency measure give-aways and tips to small businesses; and
- 24 • Behaviour change on-line contest: The Conserver Club.

25 **6.2.5 Sector Support**

- 26 • In collaboration with BC Hydro and FEI, the Company assumed the MEM LiveSmart
27 Business Efficiency Advisor (BEA) program and offered free walk-through audits for
28 small commercial enterprises;
- 29 • As a program pilot, working jointly with the FEI Energy Specialist Program, the Company
30 co-sponsored its first Energy Specialist position with the City of Kelowna to promote both
31 natural gas and electricity energy efficiency projects. The Energy Specialist serves as

- 1 an in-house customer resource that supports the development and execution of energy
- 2 efficiency projects that increase participation in energy efficiency programs; and
- 3 • Contractor Ally Program: support and education to contractors to promote energy
- 4 efficiency products and rebate programs to their customers.

7. PLANNING AND EVALUATION

7.1 OVERVIEW

The BC-wide⁴ dual-fuel Conservation Potential Review (BC CPR) got underway in 2015, following a rigorous procurement process in which the successful proponent was selected. The BC CPR is expected to yield draft economic potential results in the first quarter of 2016, followed by final reports in the second quarter. FBC will be provided with its own individual CPR report, and collectively the participating utilities' results will be rolled up into a provincial summary report to better inform public policy. A joint FBC-FEI Commercial End-Use Survey (CEUS) was completed in 2015 that provides a primary input to the BC CPR study.

The conversion of the DSM tracking and reporting system to the "cloud-based" Demand Side Management Central (DSMC) software was completed in 2015, with the configuration of six additional programs. DSMC is now the system of record for all of the Company's DSM projects and programs, thus completely replacing the previous Access database. System maintenance to add new DSM programs and respond to program changes is ongoing.

FBC continued to advance its Monitoring and Evaluation (M&E) activities in 2015 in alignment with the DSM Monitoring and Evaluation Plan 2013-15⁵, as amended and extended for 2016⁶. Evaluation activities are undertaken at different stages of the program's lifecycle, when appropriate. The 2015 evaluation activities presented in Table 7.1 reflect the number of mature programs in the market and the level of studies required to provide program feedback.

7.2 2015 PROGRAM EVALUATION ACTIVITIES

Primary types of Evaluation, Measurement and Verification (EM&V) activities include: Process evaluations, where surveys and interviews of participants and trade allies are used to assess customer satisfaction and program success; Impact evaluations, to measure the achieved energy savings attributable from the program including free-ridership and spillover⁷ impacts; and Measurement & Verification (M&V) activities, to confirm project specific energy savings associated with energy conservation measures. Secondary evaluation findings of market effects may be revealed through interviews of market players, such as trade allies.

FBC's evaluation activities for 2015 continued to focus on identifying energy savings, assessing participant awareness and satisfaction, barriers to participation, the effectiveness of education initiatives and conducting industry research regarding best practices. M&V activities were focused on identifying and verifying project and measure level savings assumptions and

⁴ BC Utilities include FBC, FEI, BC Hydro and Pacific Northern Gas.

⁵ FortisBC Inc. PBR Revenue Requirements 2014-2018 filing, Appendix H3.

⁶ FBC Application for Demand Side Management (DSM) Expenditures for 2015 and 2016, s.6 and Appendix A5.

⁷ Free-ridership refers to participants who would have participated in the absence of the program and spillover refers to additional reductions in energy consumption or demand that are due to program influences that are not directly associated with program participation, (as per National Renewable Energy Laboratory, <http://www.nrel.gov/docs/fy14osti/62678.pdf>).

understanding any issues associated with equipment installation in the field. M&V activities associated with specific projects, conducted by third party engineering consultants to verify installed measures and savings thereof, are included in the project costs and not in the portfolio level EM&V costs.

Table 7-1: 2015 DSM Program Evaluation and Research

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partnership	Evaluation Status
Home Improvement Program	Residential	Comprehensive	None	Technical review, participant survey and contractor interviews conducted for program evaluation. Completed in Q4 2015. Executive Summary of the final report by Evergreen Economics is included in Appendix C.
Home Energy Rebate Offer (HERO) - Contractor Survey	Residential	Process	BC Hydro	Telephone survey of participating contractors by ^e NRG. Completed December 2015. Data extracts only.
Home Energy Rebate Offer (HERO) - Technical review	Residential	Impact and measure review	FEI and BC Hydro	Presentation of data by Dunskey Energy Consulting, December 2015
Energy Conservation Assistance Program (ECAP)	Low Income	Process	FEI and BC Hydro	Ongoing Quality Assurance to ensure all products are installed according to vetted installation policies and procedures.
Energy Savings Kit (ESK)	Low Income	Process	FEI and BC Hydro	Ongoing BC Hydro participant survey to assess customer satisfaction and program awareness.

7.3 PLANNING AND EVALUATION (P&E) EXPENDITURES

The actual P&E expenditure for 2015 was \$585 thousand, or 81% of Plan as it is largely comprised of fixed salary costs.

The DSM Advisory Committee (DSMAC) did not meet in 2015, however two members of the DSMAC were recruited to the Long Term Electric Resource Plan (LTERP) advisory group.

The P&E Plan was \$140 thousand underspent largely due to postponed Evaluation activities for various reasons, as follows:

- The New Home (EnerGuide 80) program was replaced on August 1, 2015 by Energy Star for New Homes. Evaluation was postponed until the Energy Star for New Homes program has enough participants to provide meaningful process evaluation results.
- Custom Commercial Lighting program (planned to be combined with Low Income Direct Install Lighting) only had a handful of participants; insufficient to provide robust impact evaluation results.

The postponed evaluation activities will be rescheduled in due course, either as stand-alone reviews or in combination with similar programs.

7.4 EVALUATION REPORT – HOME IMPROVEMENT PROGRAM

The executive summary of the third party Evaluation report completed on the Home Improvement Program (HIP) in 2015 is included in Appendix C. The full report is provided in Confidential Appendix D separately requesting the Commission keep this report confidential.

The high level impact findings were as follows:

1. The report authors found a gross realization rate of 92% of the booked energy savings that indicated a sound technical basis for the measure savings.
2. The Net-to-Gross (NTG) ratio of 37.5% indicated a high free-ridership rate. The authors note that FortisBC's HIP program ran in parallel to the provincial LiveSmartBC program, that covered many of the same measures, and thus respondents may not have been able to distinguish between the influences of both programs when responding to the self-report survey questions.

Many of the HIP report findings and recommendations have already been incorporated into the successor program, the Home Energy Retrofit Offer (HERO). The following improvements, to trade ally and energy assessor communications, were implemented in 2015 to address Recommendation #5 of the HIP report:

1. Development of a contractor directory to help to meet customers' needs by geographically being able to connect with a qualified contractors in their hometown;
2. Sending regular emails and newsletters to keep contractors informed about program news, incentive levels, industry information and other valuable updates. These communications allow them to be ambassadors for FBC's programs;
3. Participation in annual mini-trade shows in conjunction with the Trade Alley Network; and
4. Contractor ad hoc meetings. FBC occasionally meets with contractors to get their feedback on program incentives and design.

Appendix A

DSM PROGRAMS COST AND SAVINGS SUMMARY REPORT

Table A-1: FBC DSM Summary Report for Year Ended December 31, 2015

Program Area	2015 Approved Plan Savings (MWh)	2015 Actual Energy Savings (MWh)	Lifetime savings (MWh) ²	Incentive Expenditure (\$000)	Non- Incentive Expenditure (\$000)	2015 Actual Spend (\$000s)	2015 Approved Plan (\$000s)	Benefit/Cost Tests			Levelized cost (¢/kWh)
								TRC	UCT	RIM	
Residential											
Home Improvement	3,106	231.2	6,326	62.0	136.8	198.7	884	1.7	1.7	0.7	7.1
Behavioural	888	0.0				-	85				
Watersavers	850	4.6	64	0.3	1.8	2.2	387	1.5	3.2	1.0	10.8
Appliances	288	51.9	865	23.3	47.7	71.0	96	1.2	1.5	0.9	17.9
Lighting	1,569	4,144.4	50,893	167.9	30.1	198.0	193	5.3	26.5	1.1	2.1
Heat Pumps	1,618	569.0	17,561	138.4	44.1	182.5	302	1.5	4.3	0.9	7.9
New Home Program	1,179	356.2	12,366	37.6	73.2	110.8	390	1.1	5.1	0.9	10.2
Low Income Housing	2,598	281.8	1,827	97.5	189.9	287.3	824	1.3	0.9	0.6	9.7
Residential Total	12,096	5,639.0	89,903	526.9	523.5	1,050.4	3,160	2.9	7.0	1.00	4.0
Commercial											
Lighting	7,445	4,089.3	71,188	404.4	331.0	735.4	1,485	2.0	5.7	1.0	6.0
Building Improvement	3,454	1,605.9	41,841	175.8	367.3	543.0	842	1.6	4.3	1.0	8.3
Computers	378	0.0		-	-	-	55				
Municipal (WWTP)	759	186.6	4,900	24.5	11.7	36.2	79	2.3	5.5	0.9	5.0
Irrigation	490	0.0		-	9.0	9.0	69				
Commercial Total	12,526	5,881.8	117,929	604.7	719.0	1,323.7	2,530	1.8	5.2	1.0	6.7
Industrial											
Industrial Efficiency	1,537	1,086.8	27,937	146.2	79.8	226.0	202	2.0	6.2	1.0	5.7
Industrial Total	1,537	1,086.8	27,937	146.2	79.8	226.0	202	2.0	6.2	1.0	5.7
Total Programs	26,159	12,607.6	235,769	1,277.8	1,322.3	2,600.1	5,892	2.2	6.0	1.0	5.3
Portfolio Level Activities											
Planning & Evaluation	-	-		-	584.9	584.9	725				
Supporting Initiatives	-	-		-	346.3	346.3	675				
Total Portfolio	26,159	12,607.6¹	235,769	1,277.8	2,253.5	3,531.3	7,292	2.0	4.4	0.9	6.0

¹ Commensurate Demand Savings are 2.6 MW² Lifetime savings are energy savings over the lifetime of the measure

Appendix B

HISTORICAL SUMMARY OF DSM COST AND ENERGY SAVING RESULTS

Table B-1: Historical FBC DSM Costs and Energy Savings 2010-2014

		2010 (Actual)							2011 (Actual)						
		Spend (\$000s)			Energy Savings (MWh)			TRC ³ (B/C)	Spend (\$000s)			Energy Savings (MWh)			TRC ³ (B/C)
		Planned	Actual	Variance	Planned	Actual	Variance		Planned	Actual	Variance	Planned	Actual	Variance	
1	Residential														
2	Home Improvements	294	434	(140)	953	4,948	3,995	3.1	2,145	479	1,666	8,960	3,692	(5,268)	1.6
3	Building Envelope ¹														
4	Heat Pumps	624	749	(125)	6,377	3,239	(3,138)	1.2	694	532	162	3,397	2,257	(1,140)	1.0
5	Residential Lighting	243	278	(35)	2,383	2,589	206	2.4	438	239	199	3,420	3,308	(112)	2.2
6	New Home Program	254	247	7	1,392	477	(915)	1.1	54	205	(151)	105	689	584	1.0
7	Appliances ¹														
8	Electronics ¹														
9	Water Heating ¹														
10	Low Income ¹	100	131	(31)	1,000	385	615	0.7	305	245	60	540	1,447	(907)	1.0
11	Behavioural ¹														
12	Residential Total	1,515	1,838	(323)	12,105	11,638	764	1.9	3,636	1,700	1,936	16,422	11,393	(6,843)	1.3
13	Commercial														
14	Lighting	722	526	196	5,304	7,971	2,667	3.5	1,114	1,995	(881)	7,370	20,577	13,207	2.3
15	Building and Process Improvements	658	597	61	6,751	6,685	(67)	1.5	572	606	(34)	3,010	1,386	(1,624)	0.7
16	Computers														
17	Municipal (Water Handling) ²								432	231	201	3,560	2,199	(1,361)	1.6
18	Irrigation ²														
19	Commercial Total	1,380	1,123	257	12,055	14,655	2,600	2.1	2,118	2,832	(714)	13,940	24,162	10,222	1.9
20	Industrial														
21	Compressed Air	87	25	62	938	114	(823)	0.7							
23	EMIS								10	9	1	80	-	(80)	-
22	Industrial Efficiencies	302	216	86	2,412	2,853	441	2.1	603	128	475	9,280	794	(8,486)	2.5
24	Industrial Total	389	241	148	3,350	2,967	(383)	2.0	613	137	476	9,360	794	(8,566)	2.4
25	Programs Total	3,284	3,203	81	27,510	29,261	2,981	2.1	6,367	4,669	1,698	39,722	36,349	(5,187)	1.8
26	Supporting Initiatives	148	155	(7)	-	-	-		725	658	67	-	-	-	-
27	Planning & Evaluation	519	354	165	-	-	-	-	750	590	160	-	-	-	-
28	Total	3,951	3,712	239	27,510	29,261	2,981	2.0	7,842	5,918	1,924	39,722	36,349	(5,187)	1.6

¹ These programs were included in Home Improvements program² Irrigation was included in Municipal (Water Handling) and in 2010, Municipal (Water Handling) was part of Building and Process Improvement³ Benefits calculated using RS3808 applicable at the time

Table B-2: Historical FBC DSM Costs and Energy Savings 2010-2014

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		2012 (Actual)							2013 (Actual)							
		Spend (\$000s)			Energy Savings (MWh)			TRC	Spend (\$000s)			Energy Savings (MWh)			TRC	mTRC
		Planned	Actual	Variance	Planned	Actual	Variance	(B/C)	Planned	Actual	Variance	Planned	Actual	Variance	(B/C)	(B/C)
1	Residential															
2	Home Improvements	1,719	637	1,082	7,620	4,656	(2,964)	1.7	1,961	725	1,236	8,680	5,222	(3,458)	1.7	1.8
3	Building Envelope ¹															
4	Heat Pumps	703	636	67	3,397	2,161	(1,236)	1.0	698	532	166	3,397	2,100	(1,297)	1.3	1.9
5	Residential Lighting	328	337	(9)	2,530	2,599	69	1.8	313	473	(160)	2,467	3,300	833	1.4	1.4
6	New Home Program	43	314	(271)	90	1,040	950	1.4	45	782	(737)	93	3,000	2,907	1.9	1.9
7	Appliances ¹	247	332	(85)	690	1,248	558		267	241	26	739	578	(161)		
8	Electronics ¹															
9	Water Heating ¹															
10	Low Income	677	308	369	1,774	1,054	(720)	1.3	660	415	245	1,570	2,000	(430)	1.6	1.6
11	Behavioural ¹															
12	<i>Residential Total</i>	3,717	2,564	1,153	16,101	12,758	(3,343)	1.5	3,944	3,168	776	16,946	16,200	(1,606)	1.6	1.8
13	Commercial															
14	Lighting	1,157	2,152	(995)	7,390	14,256	6,866	2.2	1,170	1,235	(65)	7,140	7,600	460	2.0	2.0
15	Building and Process Improvements	659	612	47	3,410	1,959	(1,451)	1.3	738	594	144	3,730	2,600	(1,130)	1.6	1.6
16	Computers															
17	Municipal (Water Handling)	383	255	128	2,580	1,677	(903)	2.6	177	80	97	1,110	700	(410)	1.4	1.4
18	Irrigation ²															
19	<i>Commercial Total</i>	2,199	3,019	(820)	13,380	17,892	4,512	2.0	2,085	1,909	176	11,980	10,900	(1,080)	1.8	1.8
20	Industrial															
21	Compressed Air															
22	EMIS	27	10	17	190	-	(190)	2.0	41	17	24	290	-	(290)	-	-
23	Industrial Efficiencies	323	163	160	2,290	937	(1,353)	-	323	307	16	2,290	2,500	210	1.0	1.0
24	<i>Industrial Total</i>	350	173	177	2,480	937	(1,543)	1.9	364	324	40	2,580	2,500	(80)	1.0	1.0
25	Programs Total	6,266	5,756	510	31,961	31,587	(374)	1.8	6,393	5,401	992	31,506	29,600	(2,766)	1.9	2.0
26	Supporting Initiatives	725	816	(91)	-	-	-	-	725	706	19	-	-	-	-	-
27	Planning & Evaluation	740	728	12	-	-	-	-	760	748	12	-	-	-	-	-
28	Total	7,731	7,300	431	31,961	31,587	(374)	1.6	7,878	6,855	1,023	31,506	29,600	(2,766)	1.6	1.7

¹ These programs were included in Home Improvements program² Irrigation was included in Municipal (Water Handling)

Table B-3: Historical FBC DSM Costs and Energy Savings 2010-2014

		1	2	3	4	5	6	7	8
		2014 (Actual)							
		Spend (\$000s)			Energy Savings (MWh)			TRC	mTRC
		Planned	Actual	Variance	Planned	Actual	Variance	(B/C)	(B/C)
1	Residential								
2	Home Improvements	295	391	(96)	1,881	1,299	582	1.5	1.5
3	Heat Pumps	158	252	(94)	553	865	(312)	1.6	1.6
4	Residential Lighting	176	291	(115)	2,136	3,411	(1,275)	1.5	1.5
5	New Home Program	67	254	(187)	98	733	(635)	2.7	2.7
6	Appliances ¹	-	-	-	-	-	-		
7	Water Heating	99	3	96	425	92	333		
8	Low Income	242	502	(260)	707	2,286	(1,579)	1.9	1.9
9	Behavioural ¹			-			-		
10	<i>Residential Total</i>	1,037	1,694	(657)	5,800	8,686	(2,886)	1.7	1.7
11	Commercial								
12	Lighting	510	646	(136)	3,359	3,353	6	2.0	2.0
13	Building and Process Improvements	592	533	59	2,641	1,926	715	1.4	1.5
14	Municipal (Water Handling)	-	5	(5)	-	-	-		
15	Irrigation	32	-	32	200	-	200	0.0	0.0
16	<i>Commercial Total</i>	1,134	1,184	(50)	6,200	5,279	921	1.6	1.7
17	Industrial								
18	Compressed Air ²			-					
19	Industrial Efficiencies	148	188	(40)	800	614	1,121	1.2	1.2
20	<i>Industrial Total</i>	148	188	(40)	800	614	2,041	1.2	1.2
21	Programs Total								2.0
22	Supporting Initiatives	190	207	(17)					-
23	Planning & Evaluation	492	579	(87)					-
24	Recoveries from 2013		(378)	378					
25	Total	3,001	3,473	(472)	12,800	14,580	75	1.6	1.7

¹ These programs were included in Home Improvements program² Compressed Air was included in Industrial Efficiencies

Appendix C

EVALUATION OF THE FORTISBC HOME IMPROVEMENT PROGRAM EXECUTIVE SUMMARY



Evaluation of the FortisBC Home Improvement Program

Prepared for FortisBC Inc.

December 14, 2015



Dr. Phil Willems / PWP

1 Executive Summary

1.1 Introduction

This report presents the findings of the impact and process evaluation of the FortisBC Home Improvement Program covering the 2012-2014 period. This program was designed to provide rebates for residential customers pursuing energy efficiency upgrades to their homes, including lighting, window, insulation, and other common household measure projects. Customers received the rebate by completing a FortisBC mail-in rebate form after purchasing a qualifying measure.

The evaluation relied on several data collection and analysis methods to complete the impact and process research:

- **Engineering analysis.** The Evergreen team reviewed the background information and technical assumptions used to determine the deemed savings for all measures covered by the Home Improvement Program. Recommendations for changing savings parameters are made where appropriate based on this review.
- **Participant phone surveys.** A phone survey was conducted on a sample of program participants (n=150). These surveys were used primarily to collect feedback on the program experience as part of the process evaluation.
- **Self-report free-ridership analysis.** A separate component of the participant phone survey was a battery of questions asking what equipment would have been installed if the FortisBC program had not been available. Responses for these questions were scored and used to create an estimate of program free-ridership.
- **Participating Contractor interviews.** Interviews were conducted with contacts provided by FortisBC (n=5) to evaluate the effectiveness of the program's design and delivery. Some of these responses were also used to create the estimate of net program impacts.

Details on each of these analysis methods and the evaluation estimates they produced are discussed below.

1.2 Impact Evaluation Results

1.2.1 Engineering Review

The engineering review examined the background and technical assumption used to develop the deemed savings values for the Program (HIP). General topic areas that were covered in the engineering review included:

- Lighting Upgrades
- Energy Star Appliances
- Insulation
- Windows
- Programmable Thermostats
- Heat Pumps

- Water Heaters

In general, the deemed savings values for this program in all these areas were documented reasonably, however, including proper citations would improve the usability and credibility of the documentation considerably. Additionally, the deemed savings values were generally found to be reasonable for using one value for all types of installations. However, there were several measures where the evaluation team recommended significant changes. Finally, the evaluation team provided several recommendations for breaking down the savings claimed by different metrics such as heating system type or building type to improve accuracy and allow the program additional flexibility.

1.2.2 Net Impact Analysis

The net impact analysis utilized a participant self-report survey method combined with information from the contractor interviews to estimate a free ridership rate for the program. For the purposes of this analysis, free-ridership measures the rate at which program participants would have installed the same program-qualifying equipment or taken the same action (e.g., installed energy efficient lighting) in the absence of the program. Information needed to support this approach was collected as part of the participant phone survey.

The self-report method calculates free-ridership as the sum of two components:

- The influence of program-related factors on a customer's decision to install equipment, termed the Program Influence Score, which can take on a value from 0 to 0.5; and
- The customer's description of actions they would have taken had the program not existed, termed the Change Score, which can also take on a value of 0 to 0.5.

The values for the two scores are determined from participant responses to survey questions, and summed to estimate a self-report free-ridership rate ranging from 0 to 1.0.

Additionally, to supplement the self-report method and assess the free-ridership rate from the perspective of vendors who provided equipment through the program, results from the contractor interviews were used to estimate sales of program qualifying measures in the absence of the program.

The contractor-response method calculates free-ridership using the following steps:

1. Asking contractors to provide the approximate number of residential projects they completed in 2014
2. Asking contractors what percentage of those projects were purchased through the Home Improvement Program
3. Multiplying the percentage of projects purchased through the program by the number of projects to calculate the number of projects completed through the program
4. Multiplying contractor estimates of the percentage of customers who would have purchased the same program qualifying equipment even without the program rebate by the number of projects completed through the program

5. Summing the number of projects calculated in Step 4 and dividing by the total number of projects calculated in Step 3 to estimate free-ridership as the number of projects that would have used program qualifying equipment even without the program as a percentage of the total projects completed through the program

The results from the participant self-report and contractor-response methods were averaged to calculate free-ridership and net-to-gross adjustment factors (1 – free-ridership rate) for the program.

1.2.3 Combined Impact Evaluation Results

Savings for the Home Improvement Program are calculated using each of the analysis components discussed above and are summarized in Table ES-1 for both energy (kWh) and demand (kW). The Gross Realization Rate is based solely on the engineering adjustments as applied to the current participant population. The weighted net-to-gross ratio is calculated as 1 minus the program free-ridership rate.

To calculate the final savings for the program, the ex ante savings are multiplied by the Gross Realization Rate to determine Gross Annual Savings. This value is then multiplied by the net-to-gross ratio determined from the phone survey data to obtain Net Annual Savings. The Final Realization Rate (0.35) is obtained by dividing the Net Annual Savings value by the original ex ante savings total. As previously discussed, the Final Realization Rate is relatively small for the Home Improvement Program because of the high self-reported free ridership and resulting low net-gross-ratio.

Table ES-1: Summary of Gross and Net Savings

	<i>Ex Ante</i> Electrical Savings	Gross Realization Rate (%)	Gross Annual Savings	Net-to- Gross Ratio (Weighted)	Net Annual Savings	Final Realization Rate
Energy (kWh)	2,994,643	92.2%	2,760,732	0.375	1,035,274 .5	34.6%
Demand (kW)	2,836	81.4%	2,307.9	0.375	865.5	30.5%

Source: Analysis by Evergreen Economics of impact evaluation results combined with participation data provided by FortisBC.

1.3 Process Evaluation

In addition to the impact analysis, the Evergreen team conducted a process evaluation of the Home Improvement Program. To accomplish this, the process evaluation had two primary analysis components:

1. **Participant phone survey.** A phone survey was conducted that targeted program participants over the 2012-2014 period.
2. **Participating Contractor interviews.** Interviews with participating FortisBC Home Improvement Program Contractors – specifically windows/door and insulation contractors – were completed to provide additional perspectives on the functionality and success of the program.

In August 2014, a phone survey was conducted among end-use customers that participated in the Home Improvement Program during the 2012-2014 period. From a total sample frame of 660 participants, we were able to obtain 150 completed surveys for a response rate of approximately 23 percent. To support the process evaluation, this survey covered a variety of topics including the program participation process, expected energy savings and overall satisfaction with the program.

Overall, a majority of homes were built between 1960 and 2000 (68 percent), with 38 percent of those built between 1960 and 1980 and 30 percent built between 1980 and 2000. Additionally, 53 percent of participants' homes were between 2,000 and 5,000 square feet, 39 percent were between 1,000 and 1,999 square feet, and 8 percent were less than 1,000 square feet.

Among the 150 survey participants, 174 total measures were purchased, as 24 participants said they purchased multiple measures that were eligible for a FortisBC rebate through the Residential Home Improvement Program. Within the 174 measures, 49 percent were windows or doors, 16 percent was insulation, 14 percent were bathroom fans, and an additional 14 percent were thermostats. A majority of participants said they were replacing an existing piece of equipment when purchasing the rebate-eligible measure. The measures were general installed by contractors or electricians (51 percent) however, 30 percent of participants installed the measures themselves.

A vast majority of participants (89 percent) said they were unsure of how much they expected to save on their energy bill from installing the energy efficiency upgrade. Those that did have an expectation, generally estimated between 10 and 49 percent savings on their energy bill. Following the installation, a large majority of participants still did not know how their energy bills had changed since the installation. 36 percent of participants said they did not know if their energy bills were about what they expected, while another 90 percent of customers that provided an actual expected savings amount also said they did not know what they were actually saving.

In general, participants across all measures were very satisfied with their new measure, with average more than 90 percent of participants rating their satisfaction between 8 and 10 on a 10-point scale, where 1 is not at all satisfied and 10 is very satisfied.

In addition to the participant phone surveys, the Evergreen team also conducted in-depth interviews with participating program contractors – specifically those focused on windows and doors or insulation. In June of 2015, Evergreen Economics spoke with five contractors about their experiences with the program, focusing primarily on the following main topics:

- Company demographics
- Program awareness
- Customer outreach and marketing
- Project & Program processes
- Program involvement
- Overall feedback

Four of the contractors worked primarily on insulation projects, while one contractor focused on window and door installations. Overall, activity level ranged dramatically across participating contractors, as some contractors had completed over 100 projects through the Home Improvement Program while others had completed only a handful.

As expected, the more active contractors indicated high levels of satisfaction with the program, specifically the rebate levels and ease of administrative burden. Contractors suggested that increased marketing efforts by FortisBC could help increase customer awareness and participation in the Home Improvement Program and other similar residential rebate programs.

1.4 Conclusions and Recommendations

The following conclusions are derived from the FortisBC Home Improvement Program Evaluation; these conclusions are accompanied by recommendations to improve the Home Improvement Program offering.

Improve the documentation for the HIP deemed savings. The overall documentation was usable and sufficient, but could be improved to provide more relevant sources and citations.

Recommendation #1: Properly cite all sources referenced when developing deemed savings including the title of the report, author, page number referenced, along with a web address if available.

The lighting savings will need to be updated to account for increased lighting standards enforced in Canada. Lighting efficiency standards were adopted and came into effect in 2014 and 2015. As a result, the baseline wattage for all incandescent lamps under 100W will be decreasing. These standards will impact the savings for both CFL and LED lamp types going forward.

Recommendation #2: Savings calculated in 2015 should use replace 100W and 75W baselines with 72 W and 53 W, respectively. Additionally, looking ahead into 2016, the program should make an additional adjustment to reduce the baseline wattages from 60 W and 40 W to 43 W and 29 W, respectively.

The deemed savings for windows, programmable thermostats, and bathroom ventilation fans appear to be too high. Based on the engineering review, the deemed savings for these measures are higher than what was found in the literature, and what is consistent with the Evergreen team's engineering judgment.

Recommendation #3: Update the deemed savings values for these measures to the values recommended in the body of the report. These savings were based on data found from similar jurisdictions and national Canadian organizations.

Separating appliance, window, and insulation savings would increase accuracy and flexibility.

Currently a single value for all appliance, window, or insulation measures is claimed. While this provides easy data tracking, separating out the claimed savings values by varying metrics would improve the

accuracy of the deemed savings. Additionally, it could provide additional program design flexibility to the program for future program modifications.

Recommendation #4: Separate out the savings by appliance type to improve the accuracy. Consider separating the window savings by building type and baseline window type to improve accuracy and program flexibility. Consider separating the savings for insulation measures by insulation location and baseline insulation level to increase accuracy and program flexibility.

Participating contractors reported high levels of overall satisfaction with the Home Improvement Program but noted that communication could be improved between FortisBC, contractors, and EnerGuide Assessors. Several participating contractors had little or no interactions with FortisBC representatives or EnerGuide Assessors over the course of participating in the program. As a result, some contractors mentioned they would like more interactions between program members to increase communication efforts in regards to program changes and updates.

Recommendation #5: Increase the number of interactions between FortisBC, program contractors, and EnerGuide Assessors through monthly or quarterly email updates and training seminars along with additional FortisBC service reps that prioritize meeting with contractors in person on a semi-regular basis.

Contractors found a lack of promotional material for the Home Improvement Program. Contractors said that because customers are familiar with the FortisBC name, the Home Improvement Program could benefit from increased advertisements from FortisBC that clearly state the available rebates and where the rebates are coming from

Recommendation #6: Consider increasing promotional material for the Home Improvement Program and other similar residential rebate programs going forward to increase customer awareness and participation. Additionally, consider providing promotional material – with the FortisBC logo included – directly to contractors so they have material to show their customers regarding potential rebates.

Across all measures, the weighted net-to-gross ratio was 0.375 for the Home Improvement Program. The low net-to-gross ratio is a direct impact of the high self-reported free ridership among participants. Over 95 percent of participants said they were planning on purchasing their energy efficient equipment prior to learning about the FortisBC rebate offering.

Recommendation #7: Consider revising the qualifying measures for the Home Improvement Program to increase the net-to-gross ratio. Measures such as windows, insulation, thermostats, and bathroom fans are well established in the market, relatively inexpensive in certain cases, and are commonly purchased as part of a scheduled household upgrade or retrofit, regardless of available rebates or incentives in the market. As a result, these measures dramatically increase free ridership and consequently decrease the program's net-to-gross ratio.

Appendix D

**EVALUATION OF THE
FORTISBC HOME IMPROVEMENT PROGRAM**

FILED CONFIDENTIALLY