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March 31, 2017

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

Attention: Mr. Patrick Wruck, Commission Secretary and Manager, Regulatory Support

Dear Mr. Wruck:

**Re: FortisBC Inc. (FBC)  
Electricity Demand-Side Management (DSM) 2016 Annual Report**

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Attached please find the Electricity DSM Program 2016 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  
2016 Annual Report**

**March 31, 2017**

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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, 2016. The Report reviews the progress of FBC's DSM programs in meeting the approved 2016 DSM Plan<sup>1</sup> (Plan) by educating and incenting FBC's customers to conserve energy and improve the energy efficiency of their homes, buildings and businesses.

2016 was the second year that FBC's PowerSense and FortisBC Energy Inc.'s (FEI) Energy Efficiency and Conservation (EEC) divisions were integrated into the Conservation and Energy Management (C&EM) department, with a joint leadership team that combined program managers' responsibilities, wherever possible. The C&EM department name is used for both the electricity and natural gas DSM divisions.

Section 1-3 includes summaries of how FBC met the requirements of the DSM Regulation enacted under the *Utilities Commission Act* (UCA) in 2016. Section 1 contains a statement of financial results (Table 1-1), including Total Resource Cost (TRC) benefit/cost ratio cost-effectiveness test results for 2016. Sections 2 through 7 of the Report provide an overview of DSM program activities in 2016, by program area, including comparisons of actual energy savings and costs to Plan.

The energy savings and cost effectiveness results presented in the Report are strictly those resulting from FBC's annual DSM activities, as calculated according to industry accepted methods. This information should not be interpreted as the total energy savings from all electric conservation initiatives in the FBC service territory nor the total savings an individual customer may experience. Examples of energy savings not reported here because they are achieved through mechanisms other than FBC's DSM activity include natural conservation through ongoing advancements in equipment efficiency and building envelope construction, and initiatives funded by individuals or entities other than FBC.

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 2016 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 2.3 on DSM expenditures of \$6.5 million, which were 85 percent higher than in 2015. Electricity savings totalled 22.8 GWh, an 81 percent increase over 2015 savings. The Company's spending levels were 13 percent less than the approved levels. In accordance with DSM Regulation, additional detail, and results for the TRC, Utility Cost Test (UCT), the Ratepayer Impact Measure (RIM), and Levelized Cost cost

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<sup>1</sup> 2016 DSM Plan expenditures were accepted by the Commission pursuant to Order G-186-14.

1 effectiveness tests are provided for the overall portfolio and each Program Area in Appendix A,  
 2 Table A-1.

3 **Table 1-1: FBC DSM Portfolio Results for 2016**

| Program Area                      | 2016 Approved Plan Savings (MWh) | 2016 Energy Savings (MWh) | Lifetime savings (MWh) <sup>1</sup> | Incentive Expenditure (\$000s) | Non-Incentive Expenditure (\$000s) | 2016 Actual Spend (\$000s) | 2016 Approved Spend (\$000s) | TRC B/C Ratio |
|-----------------------------------|----------------------------------|---------------------------|-------------------------------------|--------------------------------|------------------------------------|----------------------------|------------------------------|---------------|
| <b>Residential</b>                |                                  |                           |                                     |                                |                                    |                            |                              |               |
| Home Improvement Program          | 3,106                            | 243                       | 6,412                               | 80.6                           | 144.4                              | 225.0                      | 884                          | 1.6           |
| Behavioural                       | 1,048                            | 587                       | 2,535                               | 76.9                           | 2.4                                | 79.3                       | 106                          | 4.1           |
| Rental                            | 576                              | 840                       | 8,556                               | 61.6                           | 75.3                               | 136.9                      | -                            | 4.5           |
| Watersavers                       | 948                              | 21                        | 289                                 | 67.3                           | 4.8                                | 72.1                       | 430                          | 2.3           |
| Appliances                        | 288                              | 242                       | 3,992                               | 127.8                          | 117.4                              | 245.3                      | 96                           | 1.6           |
| Lighting                          | 1,547                            | 8,607                     | 105,689                             | 318.1                          | 41.9                               | 360.0                      | 189                          | 10.7          |
| Heat Pumps                        | 1,618                            | 753                       | 23,249                              | 167.5                          | 81.5                               | 249.0                      | 302                          | 1.6           |
| New Home Program                  | 1,179                            | 31                        | 1,078                               | 8.9                            | 30.2                               | 39.1                       | 390                          | 1.4           |
| <b>Residential Subtotal</b>       | <b>10,310</b>                    | <b>11,325</b>             | <b>151,801</b>                      | <b>908.8</b>                   | <b>498.0</b>                       | <b>1,406.8</b>             | <b>2,396</b>                 | <b>5.6</b>    |
| <b>Low Income Housing</b>         | <b>2,598</b>                     | <b>1,214</b>              | <b>7,866</b>                        | <b>938.0</b>                   | <b>173.4</b>                       | <b>1,111.4</b>             | <b>952</b>                   | <b>0.9</b>    |
| <b>Residential Total</b>          | <b>12,908</b>                    | <b>12,538</b>             | <b>159,667</b>                      | <b>1,846.8</b>                 | <b>671.4</b>                       | <b>2,518.2</b>             | <b>3,348</b>                 | <b>4.0</b>    |
| <b>Commercial</b>                 |                                  |                           |                                     |                                |                                    |                            |                              |               |
| Lighting                          | 7,616                            | 5,694                     | 102,180                             | 804.7                          | 387.1                              | 1,191.8                    | 1,519                        | 1.6           |
| Sm Business Direct Install        | 0                                | 1,139                     | 18,344                              | 188.4                          | 368.0                              | 556.4                      | -                            | 1.6           |
| Building Improvement              | 3,452                            | 1,234                     | 26,133                              | 238.3                          | 335.8                              | 574.1                      | 842                          | 1.0           |
| Computers                         | 378                              | -                         | -                                   | -                              | -                                  | -                          | 55                           | -             |
| Municipal (WWTP)                  | 759                              | 0                         | 0                                   | -                              | 4.0                                | 4.0                        | 79                           | -             |
| Irrigation                        | 490                              | 61                        | 800                                 | 8.0                            | 5.1                                | 13.1                       | 69                           | 2.1           |
| <b>Commercial Total</b>           | <b>12,695</b>                    | <b>8,128</b>              | <b>147,457</b>                      | <b>1,239.4</b>                 | <b>1,100.0</b>                     | <b>2,339.4</b>             | <b>2,564</b>                 | <b>1.5</b>    |
| <b>Industrial</b>                 |                                  |                           |                                     |                                |                                    |                            |                              |               |
| Industrial Efficiency             | 1,585                            | 2,099                     | 31,082                              | 220.2                          | 79.9                               | 300.1                      | 209                          | 6.9           |
| <b>Industrial Total</b>           | <b>1,585</b>                     | <b>2,099</b>              | <b>31,082</b>                       | <b>220.2</b>                   | <b>79.9</b>                        | <b>300.1</b>               | <b>209</b>                   | <b>6.9</b>    |
| <b>Programs Total</b>             | <b>27,188</b>                    | <b>22,766</b>             | <b>338,207</b>                      | <b>3,306.3</b>                 | <b>1,851.3</b>                     | <b>5,157.7</b>             | <b>6,122</b>                 | <b>2.6</b>    |
| <b>Portfolio Level Activities</b> |                                  |                           |                                     |                                |                                    |                            |                              |               |
| P&E, M&E, Dev                     |                                  |                           |                                     |                                | 718.4                              | 718.4                      | 735                          |               |
| Supporting Initiatives            |                                  |                           |                                     | 65.0                           | 592.3                              | 657.3                      | 675                          |               |
| <b>Total</b>                      | <b>27,188</b>                    | <b>22,766</b>             | <b>338,207</b>                      | <b>3,371.3</b>                 | <b>3,162.1</b>                     | <b>6,533.4</b>             | <b>7,532</b>                 | <b>2.3</b>    |

4 <sup>1</sup> Lifetime savings are energy savings over the estimated life of the measure.

5 In 2016, FBC met the conditions of the Province's DSM Regulation, achieving a portfolio TRC  
 6 value of 2.3. The Low Income program achieved a TRC of 0.9, after including the allowed  
 7 40 percent adder to benefits.

8 The TRC test results (2.3 overall) are higher than in 2015 (2.0 overall), as a result of achieving  
 9 higher savings using a similar level of fixed labour costs, combined with a higher proportion of  
 10 lower cost programs.

## 11 **1.2 MEETING APPROVED SPENDING LEVELS**

12 The Company's 2016 actual DSM expenditures were below the 2016 Plan levels accepted by  
 13 the Commission as part of FBC's 2015-2016 DSM Expenditure Application (2015-16 DSM



1 Plan). The Company’s 2016 expenditure of \$6.5 million was 87 percent of the approved level  
 2 and the 22.8 GWh of energy savings were commensurate at 84 percent of the Plan target.

3 Over 2015 and 2016, the Company has been rebuilding DSM activities and although 2016  
 4 results were under 2016 Plan, they increased significantly over 2015 actual results. Table 1-2  
 5 shows the FBC 2015-2016 actual spending and savings trajectory and indicates that FBC is on  
 6 track to achieve its 2017 approved plan.

7 **Table 1-2: FBC Spend and Savings Trajectory**

| Year:                | 2015A   | 2016A   | 2017P   |
|----------------------|---------|---------|---------|
| Expenditure (\$000)  | \$3,531 | \$6,533 | \$7,610 |
| Energy Savings (MWh) | 12,608  | 22,766  | 25,715  |

8

9 **1.3 MEETING ADEQUACY REQUIREMENTS OF THE DEMAND-SIDE MEASURES**  
 10 **REGULATION**

11 The DSM Regulation sets out the following requirements for a utility’s portfolio of DSM activity to  
 12 be considered adequate:

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

- 15 a) A demand-side measure intended specifically to assist residents of low-income  
 16 households to reduce their energy consumption;
- 17 b) If the plan portfolio is introduced on or after June 1, 2009, a demand-side measure  
 18 intended specifically to improve the energy efficiency of rental accommodations;
- 19 c) An education program for students enrolled in schools in the public utility’s service  
 20 area;
- 21 d) If the plan portfolio is submitted on or after June 1, 2009, an education program for  
 22 students enrolled in post-secondary institutions in the public utility’s service area.

23

24 As detailed in the Report, the Company met all the requirements for adequacy under the DSM  
 25 Regulation. Programs and incentives for low income customers, including Energy Savings Kits  
 26 (ESK) and Energy Conservation Assistance Program (ECAP), are discussed in Section 3.  
 27 ECAP and ESK offers, as well as all Residential Energy Efficiency programs, are available to  
 28 qualifying rental properties. With regard to offerings to rental apartment buildings, a number of  
 29 the Commercial Energy Efficiency programs are intended for use by owners of rental buildings,  
 30 including the Rental Apartment Efficiency Program (RAP), detailed in Section 4.2.1.

31 In terms of education programs, the Company funded a variety of initiatives for K-12 students,  
 32 including Destination Conservation, BC Lions Energy Champion school assembly presentations,  
 33 FortisBC Energy Leaders, Energy is Awesome, and Green Bricks. The Company also funded

1 post-secondary student engagement initiatives, including a program at Selkirk College and  
2 providing training grants (see Section 6.2.3).

### 3 **1.4 ADDRESSING BCUC DIRECTIVES FROM ORDER G-186-14**

4 BCUC Decision and Order G-186-14 accepting FBC's 2015-16 DSM Plan included a number of  
5 Directives related to the Company's Annual Reports. Directives 7, 15 and 17 were previously  
6 addressed in Table 1-2 of the 2014 Annual Report and Directives 13 and 14 were addressed in  
7 the 2015 Annual Report. Directive 21, "FBC is directed to file, confidentially if appropriate, the  
8 full versions of EM&V reports with its DSM Annual Report", is ongoing and addressed in  
9 Section 7.3.

### 10 **1.5 COLLABORATION & INTEGRATION**

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

14 2016 was the second year of integration for FBC's PowerSense and FEI's EEC divisions into  
15 the C&EM department, with a joint leadership team that combined program managers'  
16 responsibilities, wherever possible. The C&EM department name now refers to both the  
17 electricity and natural gas departments.

18 The Company recognizes that collaboration among utilities maximizes program efficiency and  
19 effectiveness. Collaborative activity is reported in the individual Program Area sections and  
20 program descriptions.

21 FBC, FEI and BC Hydro (the BC Utilities) also continue to experience additional benefits from  
22 collaboration efforts, including cost savings, streamlined application processes for customers,  
23 extended program reach and consistent and unified messaging, resulting in improved energy  
24 literacy among each utility's customers.

### 25 **1.6 PORTFOLIO SUMMARY**

26 The Company's DSM portfolio met the goal of cost effectiveness, with a TRC value of 2.3 in  
27 2016. FBC is of the view that both energy savings accounted for in the portfolio and the  
28 resulting TRC are conservative. In addition to the direct energy benefits accounted for in the  
29 TRC, benefits from additional activities, such as Supporting Initiatives, play an important role in  
30 supporting the development and delivery of programs, while helping create a culture of  
31 conservation in British Columbia.

32 Considerable program development work continued in 2016, positioning the Company for  
33 meeting its approved targets in 2017.

## 2. RESIDENTIAL PROGRAM AREA

### 2.1 OVERVIEW

The Residential Program Area was successful in reducing annual electricity consumption by 11.3 GWh, an 111 percent increase over 2015, and achieving an overall TRC of 5.6. Over \$1.4 million was invested in Residential energy efficiency measures in 2016, and 65 percent of these expenditures were in the form of incentives. The energy savings results from Residential programs were 110 percent of Plan, with the Lighting program contributing 76 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 C&EM's 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 2016 compared to Plan, including incentive and non-incentive spending, annual and lifetime electric savings, as well as TRC cost-effectiveness test results.

**Table 2-1: 2016 Residential Program Area Results Summary**

| Program Area                | 2016 Approved Plan Savings (MWh) | 2016 Energy Savings (MWh) | Lifetime savings (MWh) <sup>1</sup> | Incentive Expenditure (\$000s) | Non-Incentive Expenditure (\$000s) | 2016 Actual Spend (\$000s) | 2016 Approved Spend (\$000s) | TRC B/C Ratio |
|-----------------------------|----------------------------------|---------------------------|-------------------------------------|--------------------------------|------------------------------------|----------------------------|------------------------------|---------------|
| <b>Residential</b>          |                                  |                           |                                     |                                |                                    |                            |                              |               |
| Home Improvement Program    | 3,106                            | 243                       | 6,412                               | 80.6                           | 144.4                              | 225.0                      | 884                          | 1.6           |
| Behavioural                 | 1,048                            | 587                       | 2,535                               | 76.9                           | 2.4                                | 79.3                       | 106                          | 4.1           |
| Rental                      | 576                              | 840                       | 8,556                               | 61.6                           | 75.3                               | 136.9                      | -                            | 4.5           |
| Watersavers                 | 948                              | 21                        | 289                                 | 67.3                           | 4.8                                | 72.1                       | 430                          | 2.3           |
| Appliances                  | 288                              | 242                       | 3,992                               | 127.8                          | 117.4                              | 245.3                      | 96                           | 1.6           |
| Lighting                    | 1,547                            | 8,607                     | 105,689                             | 318.1                          | 41.9                               | 360.0                      | 189                          | 10.7          |
| Heat Pumps                  | 1,618                            | 753                       | 23,249                              | 167.5                          | 81.5                               | 249.0                      | 302                          | 1.6           |
| New Home Program            | 1,179                            | 31                        | 1,078                               | 8.9                            | 30.2                               | 39.1                       | 390                          | 1.4           |
| <b>Residential Subtotal</b> | <b>10,310</b>                    | <b>11,325</b>             | <b>151,801</b>                      | <b>908.8</b>                   | <b>498.0</b>                       | <b>1,406.8</b>             | <b>2,396</b>                 | <b>5.6</b>    |

### 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 2016:

- 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

- 1 Pump and Home Improvement programs' results, continued to gain momentum. By  
2 focusing on the most cost-effective retrofit measures and using a "menu" approach, the  
3 program provides incentives to customers for insulation and draft-proofing, bathroom  
4 fans, and space and water heating. Based on feedback received from two DSM  
5 Monitoring and Evaluation studies, the BC utility partners refreshed the program offer  
6 and terms, and a new program offer was launched in late 2016 that includes the new  
7 requirement for Program Qualified Energy Advisors and Service Organizations, British  
8 Columbia Ministry of Energy and Mines (MEM) Energy Coaching, as well as a name  
9 change to the Home Renovation Rebate Program (HRR);
- 10 • A retail point of sale program was implemented in partnership with FEI and BC Hydro  
11 with RONA, Canadian Tire, and Home Depot. Instant rebates were offered on draft-  
12 proofing products, bathroom fans, thermostats and low-flow showerheads;
  - 13 • In partnership with FEI, BC Hydro and the MEM, funding was provided to support a  
14 Home Performance Stakeholder Council; and
  - 15 • Heat pump rebates were offered through two channels: ductless heat pumps through the  
16 HERO program and central heat pump systems through a stand-alone program. A lower  
17 interest rate was introduced in the Company's long-standing air source heat pump loan  
18 offer for electrically-heated homes. In addition, the heat pump tune up program was re-  
19 introduced in late fall with nearly 170 customers participating.

### 20 **2.2.2 Appliance Program**

21 The Appliance Retail Program continues to grow and push retailers to carry higher efficiency  
22 models (top tier) for clothes washers, clothes dryers and refrigerators. By engaging  
23 retailers more consistently, the appliance program grew substantially (367 percent) in 2016,  
24 processing over 1,600 appliance rebates.

### 25 **2.2.3 Residential Lighting Program**

26 The Residential Lighting program offered point-of-sale rebates for ENERGY STAR certified  
27 lighting products. Offered in collaboration with BC Hydro to provide a BC-wide offer to  
28 customers and lighting retailers across the BC market, the program ran for one month in the  
29 spring and two months in the fall in major retail stores. Another campaign in the fall gave local  
30 service organizations ENERGY STAR 9.5W LED bulbs to sell as a means of fundraising for  
31 their organizations. The Residential Lighting program exceeded Plan savings by 456 percent  
32 due to successful retail campaigns, while costs were approximately double the Plan amount.

### 33 **2.2.4 New Home Program**

34 The New Home program offers incentives for homes built to the ENERGY STAR New Home  
35 standard. This higher performance standard is challenging to builders who are still adapting to  
36 the new BC Building Code, issued in December 2014. The second tier of the Residential  
37 Conservation Rate (RCR) rate is also a deterrent to builders/home owners choosing electric

1 heat. An internal review of this program is underway in order to identify improvements to  
 2 increase participation, with plans to implement changes in the latter part of 2017.

3 **2.2.5 Rental**

4 There are three components to the Rental Assistance Program (RAP):

- 5 1. To provide direct install in-suite energy efficiency measures for occupants (renters) in rental  
 6 properties;
- 7 2. To provide those building owners and/or property/management companies with energy  
 8 assessments recommending building level energy efficiency upgrades, such as common  
 9 area lighting upgrades; and
- 10 3. To provide support in implementing the recommended upgrades and applying for rebates.

11 The program is offered jointly by FEI and FBC in the shared service territory (SST)<sup>2</sup> and by FEI  
 12 in its service territory. RAP installations in the SST began in March 2016 and by year end, there  
 13 were a total of 1,366 in-suite installations, installing 11,570 individual measures, as shown in  
 14 Table 2-2 below:

15 **Table 2-2: 2016 RAP Installations**

| Installed Measure Type | # Units |
|------------------------|---------|
| CFL PAR 38, 23 W bulb  | 106     |
| LED 16W bulb           | 554     |
| LED 9.5 W bulb         | 10,910  |

17 **2.2.6 Behavioural Programs**

18 The Company undertook the following two behavioural programs that achieved savings:

- 19 • Clothes Line distribution program: During the summer and early fall, 3,000 clotheslines  
 20 were distributed throughout the service territory at community events. The program  
 21 achieved 451 MWh savings; and
- 22 • In-Home Displays: As part of a larger community energy efficiency outreach program,  
 23 250 In-Home Displays were received for homes on the Lower Similkameen Indian Band.  
 24 The estimated savings of these units are 92.5 MWh.

25 The Customer Engagement Tool (CET) pilot was postponed to ensure that customer data  
 26 exchanged with the service provider is secure and in compliance with the *Personal Information*  
 27 *Protection Act* (PIPA) and corporate privacy policies. Work is currently underway to further  
 28 develop and move forward with the CET pilot.

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<sup>2</sup> FBC's shared service area is essentially the Company's electric service area wherein both natural gas & electricity are supplied by FortisBC.

### 1 **2.3 RESIDENTIAL SUMMARY**

2 In 2016, the Lighting program remained the core Residential measure. It delivered 76 percent of  
3 Residential energy savings and was the most cost-effective program in the portfolio.

4 In 2017, FBC will focus on increasing customer participation in its other DSM programs by  
5 further engaging with retailers, contractors and manufacturers to bring broader awareness of the  
6 programs. In particular, a new energy efficiency representative is being assigned to engage  
7 builders, contractors and energy advisors to increase participation in the Appliance, New Home  
8 and Home Renovation programs.

### 3. LOW INCOME PROGRAM AREA

#### 3.1 OVERVIEW

In 2016, the Company experienced a 78 percent increase in the ESK program. FBC worked collaboratively with FEI to deliver the Energy Conservation Assistance Program (ECAP), and in collaboration with MEM, to install air source heat pumps in 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 DSM Regulation, the TRC of 0.9 for low income programs includes a 40 percent adder in the benefits, increasing the deemed cost effectiveness.

**Table 3-1: 2016 Low Income Program Results Summary**

| Program Area       | 2016 Approved Plan Savings (MWh) | 2016 Energy Savings (MWh) | Lifetime Savings (MWh) | Incentive Expenditure (\$000s) | Non-Incentive Expenditure (\$000s) | 2016 Actual Spend (\$000s) | 2016 Approved Spend (\$000s) | TRC B/C Ratio |
|--------------------|----------------------------------|---------------------------|------------------------|--------------------------------|------------------------------------|----------------------------|------------------------------|---------------|
| Low Income Housing | 2,598                            | 1,214                     | 7,866                  | 938.0                          | 173.4                              | 1,111.4                    | 952                          | 0.9           |

Savings were 1,213.7 MWh for the Low Income programs. Over 1,100 ECAP direct installations were completed in 2016.

A total of 1,362 ESKs were distributed in 2016, contributing savings of 370.9 MWh.

#### 3.2 LOW INCOME PROGRAMS

Three Low Income programs were delivered in 2016:

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 to deliver a direct mail brochure through the Ministry of Social Development's cheque run and promoted the program through in-bill stuffers.

In partnership with FEI, the Company delivered ECAP in the SST for eligible low-income single and multi-family dwellings. The program provided energy evaluations, consumer education, and the direct installation of energy efficiency measures including LED lighting, low-flow showerheads, faucet aerators and hot water pipe insulation at no cost. ENERGY STAR refrigerators, high-efficiency furnaces, draft-proofing and insulation were also provided for homes that met the eligibility criteria for the "Advanced" program level. The program was promoted primarily through community-based social service organizations.

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

- 1 and was expanded to other bands within the Company's service territory in 2016. Twenty-seven
- 2 heat pumps were installed in First Nations as part of the Advanced energy assessments, for
- 3 which 151.3 MWh were recorded in 2016.



1 **4. COMMERCIAL PROGRAM AREA**

2 **4.1 OVERVIEW**

3 Commercial DSM programs encourage Commercial customers to reduce overall consumption  
4 of electricity and associated energy costs. The Commercial programs produced aggregate  
5 electricity savings of 8.1 GWh and achieved an overall TRC of 1.5. Actual Commercial program  
6 expenditures totaled \$2.3 million, 53 percent of which was in the form of incentives.

7 Table 4-1 summarizes Plan and actual expenditures for the Commercial programs, including  
8 incentive and non-incentive spending, annual and lifetime savings, and the TRC cost-  
9 effectiveness test results.

10 **Table 4-1: 2016 Commercial Program Results Summary**

| Program Area               | 2016<br>Approved<br>Plan Savings<br>(MWh) | 2016 Energy<br>Savings<br>(MWh) | Lifetime<br>Savings<br>(MWh) | Incentive<br>Expenditure<br>(\$000s) | Non-<br>Incentive<br>Expenditure<br>(\$000s) | 2016<br>Actual<br>Spend<br>(\$000s) | 2016<br>Approved<br>Spend<br>(\$000s) | TRC<br>B/C<br>Ratio |
|----------------------------|---|---------------------------------|------------------------------|--------------------------------------|--|-------------------------------------|---------------------------------------|---------------------|
| <b>Commercial</b>          |   |                                 |                              |                                      |  |                                     |                                       |                     |
| Lighting                   | 7,616                                     | 5,694                           | 102,180                      | 804.7                                | 387.1  | 1,191.8                             | 1,519                                 | 1.6                 |
| Sm Business Direct Install | 0   | 1,139                           | 18,344                       | 188.4                                | 368.0  | 556.4                               | -                                     | 1.6                 |
| Building Improvement       | 3,452                                     | 1,234                           | 26,133                       | 238.3                                | 335.8  | 574.1                               | 842                                   | 1.0                 |
| Computers                  | 378                                       | -                               | -                            | -                                    | -  | -                                   | 55                                    | -                   |
| Municipal (WWTP)           | 759                                       | 0                               | 0                            | -                                    | 4.0  | 4.0                                 | 79                                    | -                   |
| Irrigation                 | 490                                       | 61                              | 800                          | 8.0                                  | 5.1  | 13.1                                | 69                                    | 2.1                 |
| <b>Commercial Total</b>    | <b>12,695</b>                             | <b>8,128</b>                    | <b>147,457</b>               | <b>1,239.4</b>                       | <b>1,100.0</b>                               | <b>2,339.4</b>                      | <b>2,564</b>                          | <b>1.5</b>          |

11  
12 The Commercial sector recorded savings of 8.1 GWh, or 64 percent of the 2016 Plan.  
13 Approximately 84 percent of these savings were realized through the commercial lighting  
14 programs, including point-of-sale product, business direct install and custom lighting retrofit  
15 rebates. An example of a commercial lighting project was an interior LED lighting retrofit project  
16 at a furniture store that contributed 145 MWh of energy savings.

17  
18 Building and Process Improvement (BIP) energy savings were 1.2 GWh or 35 percent of Plan.  
19 An example of a BIP project was the installation of 26 ductless heat pumps and HVAC  
20 occupancy sensors at a hotel that contributed to 23 MWh of energy savings. In addition, there  
21 were two irrigation projects completed in 2016.

22  
23 Commercial sector costs in 2016 amounted to \$2.34 million or 91 percent of Plan. The largest  
24 cost component of Commercial programs was the Lighting program, which includes incentives  
25 paid through the Commercial Product Rebate (CPR) program, Business Direct Install (BDI)  
26 program and custom lighting projects incented through the Custom Business Efficiency program  
27 (CBEP).

## 1 **4.2 COMMERCIAL PROGRAMS**

2 The following outlines the key Commercial DSM programs offered in 2016:

### 3 **4.2.1 Product Rebate and Direct Installation Programs**

- 4 • The CPR program offers prescribed rebates for commercial lighting, HVAC, refrigeration,  
5 commercial kitchen appliances, irrigation and other electric energy efficiency measures.  
6 The program was offered through point-of-sale rebates at lighting wholesalers and  
7 directly to customers. A third party study was conducted to expand CPR offers and  
8 several new lighting, HVAC, kitchen and refrigeration measures were added. Another  
9 third party study will be conducted in 2017 to revisit program assumptions for prescribed  
10 lighting and new construction measures. A separate multi-unit residential building  
11 (MURB) retrofit program was scheduled to be launched in 2016, but was instead  
12 incorporated into the CPR program.
- 13 • The BDI program was launched in April 2016 and provides point-of-sale rebates for the  
14 direct installation of lighting, HVAC, refrigeration, plug load and other end use measures  
15 to small and medium businesses. The new BDI program is a contractor-focussed  
16 program that provides a vetted energy assessment tool and contractor sales training. In  
17 2016, primary program activities and expenditures focused on registering and training  
18 new contractors and conducting marketing. Customers participating in the program in  
19 2016 received a free Tier 1 smart power strip to reduce energy usage from computers  
20 and other electronic equipment. In 2017, the program will be expanded to provide  
21 customers receiving contractor energy assessments with screw-in LED light bulbs  
22 installed at no cost to the customer. The BDI program term ends in December 2017 and  
23 will be re-evaluated for renewal beyond 2017;
- 24 • In partnership with FEI, FBC offers the Rental Apartment Efficiency Program (RAP) that  
25 specifically addresses the rental market by providing direct in-suite installations of hot  
26 water and LED lighting measures, energy assessments and implementation support for  
27 deeper energy efficiency retrofits at the building-wide level; and
- 28 • To support customers in MURBs, FBC developed the MURB New Construction program  
29 jointly with FEI to encourage building energy efficiency above code. The MURB New  
30 Construction program provides prescribed rebates for energy efficient lighting, controls,  
31 electric HVAC, natural gas HVAC, natural gas hot water and natural gas fireplace  
32 measures.

### 33 **4.2.2 Custom Rebates**

- 34 • CBEP provides custom rebates for larger, more complex energy efficiency retrofits and  
35 new construction projects in both the Commercial and Industrial sectors;

- 1       • No CBEP/CPR projects materialized related to computer energy efficiency, but Smart  
2       Power Bar Strips that reduce power usage when computer or electronic peripherals are  
3       not in use, are offered as a part of the BDI program, launched in 2016; and
- 4       • The Building Optimization Program, launched in 2013, provided re-commissioning and  
5       energy management information system support and continuous energy efficiency  
6       improvements to large multi-building institutional customers. In 2016 the final energy  
7       coaching phase was completed for all participants. In 2017, FBC is working on  
8       developing a successor program with FEI.

### 9       **4.3    COMMERCIAL PROGRAMS PLANNED FOR 2017**

#### 10       **4.3.1 Joint Custom New Construction**

11       FBC and FEI have piloted a joint new construction program, similar to the FEI Commercial  
12       Custom Design – New Construction program, to encourage energy efficient electric and natural  
13       gas measures to be installed in large new construction projects. The program will allow new  
14       building projects over 85,000 square feet to access subsidized energy modelling and provide  
15       custom rebates for both electric and natural gas energy conservation measures. One building  
16       has fully participated in the Joint Custom New Construction pilot, with another building currently  
17       participating in the pilot. In 2017, FEI and FBC will look to formalize the requirements and  
18       processes that support this program.

#### 19       **4.3.2 Joint Custom Retrofit**

20       FBC and FEI have piloted a joint retrofit program, similar to the FEI Commercial Custom Design  
21       - Retrofit program, to encourage energy efficient electric and natural gas retrofits in existing  
22       buildings. The energy efficiency electric measures are primarily focussed on deeper building  
23       and process retrofit energy conservation measures. The program will allow existing buildings to  
24       access a subsidized energy assessment and then provide custom rebates for both electric and  
25       natural gas energy conservation measures. One building is currently participating in the Joint  
26       Custom Retrofit pilot. In 2017, FEI and FBC will look to formalize the requirements and  
27       processes that support this program.

### 28       **4.4    SUMMARY**

29       Commercial Program Area activity in 2016 successfully achieved 8.1 GWh of annual electricity  
30       savings, a 38 percent increase over 2015, and achieved a positive TRC of 1.5.

31       The pillars of the Commercial program, are the CPR and CBEP programs. Participation in the  
32       BDI program is accelerating and is expected to be a third pillar for the Commercial program  
33       area in 2017.

## 5. INDUSTRIAL PROGRAM AREA

### 5.1 OVERVIEW

The Industrial DSM programs continued to encourage industrial customers to consume electricity more efficiently in 2016. The Industrial programs achieved an overall TRC of 6.9, with electricity savings of 2.1 GWh. Actual Industrial expenditures in 2016 totaled \$0.3 million, of which 73 percent was incentive spending.

Table 5-1 summarizes the plan and actual expenditures for the Industrial Program Area in 2016, including incentive and non-incentive spending, annual and lifetime electricity savings, as well as the TRC cost-effectiveness test results.

**Table 5-1: 2016 Industrial Program Results Summary**

| Program Area          | 2016 Approved Plan Savings (MWh) | 2016 Energy Savings (MWh) | Lifetime Savings (MWh) | Incentive Expenditure (\$000s) | Non-Incentive Expenditure (\$000s) | 2016 Actual Spend (\$000s) | 2016 Approved Spend (\$000s) | TRC B/C Ratio |
|-----------------------|----------------------------------|---------------------------|------------------------|--------------------------------|------------------------------------|----------------------------|------------------------------|---------------|
| <b>Industrial</b>     |                                  |                           |                        |                                |                                    |                            |                              |               |
| Industrial Efficiency | 1,585                            | 2,099                     | 31,082                 | 220.2                          | 79.9                               | 300.1                      | 209                          | 6.9           |

The Industrial Efficiency program achieved savings of 2.1 GWh, or 132 percent of the 1.6 GWh Plan for 2016. This was an increase of 93 percent over 2015 savings (1.1 GWh) for the Industrial sector. An example of an industrial energy efficiency project was a compressed air upgrade for a lumber mill that contributed to 439 MWh of energy savings.

Industrial sector costs incurred totaled \$0.3 million for 2016, or 144 percent of Plan. The Industrial sector is characterized by large projects that generally occur less frequently and take much longer to complete, so the realization of energy savings is frequently delayed.

### 5.2 2016 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 Industrial Optimization Program (IOP) provides industrial customers who use in excess of 3 GWh electricity per year two different energy assessment offers:
  - The Plant Wide Audit and Feasibility Study. 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 electricity and natural gas more efficiently. In 2017, the first IOP studies will be completed.

**1 5.3 SUMMARY**

2 In 2016, program costs and energy savings were largely attributable to the completion of a  
3 large lumber mill modernization project in the West Kootenay region that represented  
4 approximately 80 percent of program spend and savings. Activities in the Industrial programs  
5 resulted in four new funding agreements being executed, one of which included 845 MWh of  
6 industrial lighting electric savings.

## 1    **6.    SUPPORTING INITIATIVES**

### 2    **6.1    OVERVIEW**

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

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

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

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

20   The approved Supporting Initiatives expenditures for 2016 were \$0.675 million and actual  
21   spending in 2016 was \$0.657 million.

### 22   **6.2    SUPPORTING INITIATIVES**

#### 23   **6.2.1    Community Energy Planning**

24   For the second year, the Company offered a strategic Community Energy Planning pilot project  
25   to provide financial assistance to local governments and publically-funded institutions (up to 50  
26   percent of project costs to a maximum of \$20,000 per participant) to facilitate future energy  
27   efficiency activities. Three local governments used the funding to facilitate and write Strategic  
28   Energy and Emission Reduction plans and two local governments accessed funding to develop  
29   energy efficiency bylaws.

#### 30   **6.2.2    Education Programs (elementary and secondary)**

31   The focus for 2016 was the development of the elementary school curriculum-based Energy  
32   Leaders program, which started its piloting phase in late 2016. The program accessed through  
33   an on-line portal will be fully launched in the fall of 2017.

1 A number of additional programs were continued:

- 2 • Energy is Awesome (curriculum-based education packages for educators and volunteer  
3 presenters);
- 4 • BC Lions Energy Champions program; and
- 5 • Financial sponsorship of Destination Conservation (Elements Society), Green Bricks and  
6 Beyond Recycling (Wildsight) programs.

### 7 **6.2.3 Education Programs (post-secondary), including Trades Training**

8 The Company partnered with and supported several university and college trade training  
9 programs that provided real life/ living lab learning opportunities, as well as support for post-  
10 college upgrade training. These included:

- 11 • Support for Okanagan College for curriculum enhancement to include more efficiency  
12 construction techniques and the purchase of blower door equipment to better illustrate  
13 air-tightness;
- 14 • Support for the University of British Columbia Okanagan (UBCO) and Okanagan College  
15 Wilden Living Lab project, which saw two identically designed homes constructed side-  
16 by-side, one built to the current building code and the other to an EnerGuide rating of  
17 47 GJ. The homes will be monitored and analysed by UBCO for energy use over the  
18 next three years;
- 19 • Sponsorship of Selkirk College Red Bird Communications' campus energy conservation  
20 program;
- 21 • Sponsorship of Illumination Engineering Society Fundamentals of Lighting course, and  
22 grants for electricians and local contractors to participate; and
- 23 • Grant support for Certified Energy Manager (CEM) training.

### 24 **6.2.4 Community Outreach**

25 Opportunities to communicate directly with customers in less formal, community focused venues  
26 are important. In 2016, the Company engaged in the following outreach activities:

- 27 • Junior hockey game sponsorship: promotion of conservation in public venues;
- 28 • Sponsorship of community events, such as the Rock Creek Fair, that promote energy  
29 efficiency;
- 30 • FortisBC's Street Team attended 159 community events last year in the SST for C&EM;
- 31 • Attendance and seminar presentations to residential home shows, building supply and  
32 hardware retail outlets and commercial trade shows; and
- 33 • Behaviour change on-line contest and an electronic newsletter, The Conserver Club.

## 1     **6.2.5 Sector Support**

2     To help promote energy efficiency and rebate programs, the Company supported several large  
3     institutions and harder to reach communities and stakeholders with resources and educational  
4     opportunities. This included:

- 5         • The Company co-sponsored two Energy Specialist positions (City of Kelowna and  
6         Interior Health), in partnership with FEI, to promote both natural gas and electricity  
7         energy efficiency projects. The Energy Specialist serves as an in-house customer  
8         resource that supports the development and execution of energy efficiency projects that  
9         increase participation in energy efficiency programs. These were considered and treated  
10        as incentive costs;
- 11       • The Company, in collaboration with FEI, provided start-up funding for an Okanagan  
12       Nation Alliance “Energy Champion” to promote residential energy literacy and  
13       conservation and energy management for the four First Nation’s bands within the  
14       Company’s service area. On a pilot project basis, the Company also provided funds to  
15       the Regional District of Central Kootenay for a Community Senior Energy Advisor to  
16       promote residential energy efficiency and the C&EM rebate programs; and
- 17       • FBC supported and provided education to energy efficiency equipment contractors to  
18       promote energy efficiency products and C&EM rebate programs to their customers.



## 1 7. PLANNING AND EVALUATION

### 2 7.1 OVERVIEW

3 The BC-wide<sup>3</sup> dual-fuel Conservation Potential Review (BC CPR) were substantially completed  
4 in 2016. The BC CPR yielded technical and economic potential results. FBC was provided with  
5 its own individual CPR report that was filed in the 2016 Long Term Electric Resource Plan  
6 (LTERP) and Long Term Demand Side Management Plan (LTDSM Plan), as Exhibit B-1 on  
7 November 30, 2016. Collectively, the participating utilities' results will be rolled up into a  
8 provincial summary report to better inform public policy.

9 Several DSM programs were configured in the “cloud-based” Demand Side Management  
10 Central (DSMC) software that is now the system of record for all of the Company's DSM  
11 projects and programs.

12 FBC continued to advance its Monitoring and Evaluation (M&E) activities in 2016 in alignment  
13 with the DSM Monitoring and Evaluation Plan 2013-15<sup>4</sup>, as amended and extended for 2016<sup>5</sup>.  
14 Evaluation activities are undertaken at different stages of the program's lifecycle, when  
15 appropriate. The 2016 evaluation activities presented in Table 7.1 reflect the number of mature  
16 programs in the market and the level of studies required to provide program feedback.

### 17 7.2 2016 PROGRAM EVALUATION ACTIVITIES

18 Primary types of Evaluation, Measurement and Verification (EM&V) activities include the  
19 following:

- 20 • Process evaluations, where surveys and interviews of participants and trade allies are  
21 used to assess customer satisfaction and program success;
- 22 • Impact evaluations, to measure the achieved energy savings attributable from the  
23 program, including free-ridership and spillover<sup>6</sup> impacts; and
- 24 • Measurement & Verification (M&V) activities, to confirm project specific energy savings  
25 associated with energy conservation measures. Secondary evaluation findings of  
26 market effects may be revealed through interviews of market players, such as trade  
27 allies.

28 FBC's evaluation activities for 2016 continued to focus on identifying energy savings, assessing  
29 participant awareness and satisfaction, barriers to participation, the effectiveness of education

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<sup>3</sup> BC Utilities include FBC, FEI, BC Hydro and Pacific Northern Gas.

<sup>4</sup> FortisBC Inc. PBR Revenue Requirements 2014-2018 filing, Appendix H3.

<sup>5</sup> FBC Application for Demand Side Management (DSM) Expenditures for 2015 and 2016, s.6 and Appendix A5.

<sup>6</sup> 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>).

1 initiatives and conducting industry research regarding best practices. M&V activities were  
 2 focused on identifying and verifying project and measure level savings assumptions and  
 3 understanding any issues associated with equipment installation in the field. M&V activities  
 4 associated with specific projects, conducted by third party engineering consultants to verify  
 5 installed measures and savings thereof, are included in the project costs and not in the portfolio  
 6 level EM&V costs.

7 **Table 7-1: 2016 DSM Program Planning, Evaluation and Research Activities**

| <b>Evaluation Name</b>  | <b>Program Area</b>     | <b>Type of Evaluation</b>   | <b>Evaluation Partnership</b> | <b>Evaluation Status</b>   |
|---|-------------------------|-----------------------------|-------------------------------|--|
| Home Energy Rebate Offer (HERO) - Participant Survey                  | Residential             | Process - Customer Survey   | FEI, BC Hydro                 | Customer survey conducted for the program evaluation. Partnership funding. Completed April 2016 by Sentis Research.  |
| Home Energy Rebate Offer (HERO) - Quality Study of Insulation measure | Residential             | Evaluation and Audit        | FEI, BC Hydro                 | On-site visits of homes with insulation and draftproofing measures. Completed May 2016 by RDH Science Inc.   |
| Business Direct Install   | Commercial              | M&V                         | None                          | Darft report complete. Final report expected Q2 2017 by Mazzi.   |
| BC Fenestration Market Study  | Residential/ Commercial | Market analysis             | FEI, BC Hydro and MEM         | Study to characterize market conditions for fenestration products manufactured, sold and/or installed in British Columbia. Completed October 2016 by RDH Building Science Inc. |
| Commercial Prescriptive Measure Review                                | Commercial              | Market and technical review | None                          | Market and technical review of Commercial prescriptive measures. Completed by CLEAResult, December 2016.   |

8

9 **7.3 PLANNING AND EVALUATION (P&E) EXPENDITURES**

10 The actual P&E expenditure for 2016 was \$718 thousand, or 98 percent of Plan, and it is largely  
 11 comprised of fixed salary costs.

12

13 The DSM Advisory Committee (DSMAC) did not meet in 2016, however two members of the  
 14 DSMAC were recruited to the Long Term Electric Resouce Plan (LTERP) advisory group. The  
 15 Company anticipates meeting the DSMAC for feedback on its next DSM expenditure plan filing.

16 Two evaluation studies planned for 2016, one for Residential Heat Pumps and another for  
 17 Custom Commercial projects, were delayed due to increased due-diligence of vendors for  
 18 privacy policy compliance, and were not completed in time for filing with this Report. They are  
 19 expected to be completed in mid-2017, at which time they will be filed separately with the  
 20 BCUC, as per Directive 21, G-186-18 (see Section 1.4 above).

**Appendix A**

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**DSM PROGRAMS COST AND SAVINGS SUMMARY REPORT**

1

**Table A-1: FBC DSM Summary Report for Year Ended December 31, 2016**

| Program Area                      | 2016 Approved Plan Savings (MWh) | 2016 Energy Savings (MWh) | Lifetime savings (MWh) <sup>1</sup> | Incentive Expenditure (\$000s) | Non-Incentive Expenditure (\$000s) | 2016 Actual Spend (\$000s) | 2016 Approved Spend (\$000s) | TRC B/C Ratio | Calc UTC   | Calc RIM   | Levelized cost (¢/kWh) |
|-----------------------------------|----------------------------------|---------------------------|-------------------------------------|--------------------------------|------------------------------------|----------------------------|------------------------------|---------------|------------|------------|------------------------|
| <b>Residential</b>                |                                  |                           |                                     |                                |                                    |                            |                              |               |            |            |                        |
| Home Improvement Program          | 3,106                            | 243                       | 6,412                               | 80.6                           | 144.4                              | 225.0                      | 884                          | 1.6           | 1.6        | 0.6        | 7.4                    |
| Behavioural                       | 1,048                            | 587                       | 2,535                               | 76.9                           | 2.4                                | 79.3                       | 106                          | 4.1           | 3.6        | 0.7        | 3.0                    |
| Rental                            | 576                              | 840                       | 8,556                               | 61.6                           | 75.3                               | 136.9                      | -                            | 4.5           | 5.5        | 0.7        | 2.6                    |
| Watersavers                       | 948                              | 21                        | 289                                 | 67.3                           | 4.8                                | 72.1                       | 430                          | 2.3           | 1.4        | 0.6        | 6.8                    |
| Appliances                        | 288                              | 242                       | 3,992                               | 127.8                          | 117.4                              | 245.3                      | 96                           | 1.6           | 2.1        | 0.9        | 13.7                   |
| Lighting                          | 1,547                            | 8,607                     | 105,689                             | 318.1                          | 41.9                               | 360.0                      | 189                          | 10.7          | 30.3       | 0.8        | 1.1                    |
| Heat Pumps                        | 1,618                            | 753                       | 23,249                              | 167.5                          | 81.5                               | 249.0                      | 302                          | 1.6           | 3.5        | 0.7        | 7.7                    |
| New Home Program                  | 1,179                            | 31                        | 1,078                               | 8.9                            | 30.2                               | 39.1                       | 390                          | 1.4           | 1.3        | 0.5        | 8.5                    |
| <b>Residential Subtotal</b>       | <b>10,310</b>                    | <b>11,325</b>             | <b>151,801</b>                      | <b>908.8</b>                   | <b>498.0</b>                       | <b>1,406.8</b>             | <b>2,396</b>                 | <b>5.6</b>    | <b>9.9</b> | <b>0.8</b> | <b>2.1</b>             |
| <b>Low Income Housing</b>         | <b>2,598</b>                     | <b>1,214</b>              | <b>7,866</b>                        | <b>938.0</b>                   | <b>173.4</b>                       | <b>1,111.4</b>             | <b>952</b>                   | <b>0.9</b>    | <b>1.0</b> | <b>0.6</b> | <b>13.0</b>            |
| <b>Residential Total</b>          | <b>12,908</b>                    | <b>12,538</b>             | <b>159,667</b>                      | <b>1,846.8</b>                 | <b>671.4</b>                       | <b>2,518.2</b>             | <b>3,348</b>                 | <b>4.0</b>    | <b>6.0</b> | <b>0.8</b> | <b>2.9</b>             |
| <b>Commercial</b>                 |                                  |                           |                                     |                                |                                    |                            |                              |               |            |            |                        |
| Lighting                          | 7,616                            | 5,694                     | 102,180                             | 804.7                          | 387.1                              | 1,191.8                    | 1,519                        | 1.6           | 5.0        | 1.0        | 7.5                    |
| Sm Business Direct Install        | 0                                | 1,139                     | 18,344                              | 188.4                          | 368.0                              | 556.4                      | -                            | 1.6           | 2.0        | 0.7        | 7.1                    |
| Building Improvement              | 3,452                            | 1,234                     | 26,133                              | 238.3                          | 335.8                              | 574.1                      | 842                          | 1.0           | 2.6        | 0.8        | 11.3                   |
| Computers                         | 378                              | -                         | -                                   | -                              | -                                  | -                          | 55                           |               |            |            |                        |
| Municipal (WWTP)                  | 759                              | 0                         | 0                                   | -                              | 4.0                                | 4.0                        | 79                           | -             | -          | -          | -                      |
| Irrigation                        | 490                              | 61                        | 800                                 | 8.0                            | 5.1                                | 13.1                       | 69                           | 2.1           | 3.8        | 0.9        | 5.2                    |
| <b>Commercial Total</b>           | <b>12,695</b>                    | <b>8,128</b>              | <b>147,457</b>                      | <b>1,239.4</b>                 | <b>1,100.0</b>                     | <b>2,339.4</b>             | <b>2,564</b>                 | <b>1.5</b>    | <b>3.7</b> | <b>0.9</b> | <b>8.1</b>             |
| <b>Industrial</b>                 |                                  |                           |                                     |                                |                                    |                            |                              |               |            |            |                        |
| Industrial Efficiency             | 1,585                            | 2,099                     | 31,082                              | 220.2                          | 79.9                               | 300.1                      | 209                          | 6.9           | 6.6        | 1.0        | 1.7                    |
| <b>Industrial Total</b>           | <b>1,585</b>                     | <b>2,099</b>              | <b>31,082</b>                       | <b>220.2</b>                   | <b>79.9</b>                        | <b>300.1</b>               | <b>209</b>                   | <b>6.9</b>    | <b>6.6</b> | <b>1.0</b> | <b>1.7</b>             |
| <b>Programs Total</b>             | <b>27,188</b>                    | <b>22,766</b>             | <b>338,207</b>                      | <b>3,306.3</b>                 | <b>1,851.3</b>                     | <b>5,157.7</b>             | <b>6,122</b>                 | <b>2.6</b>    | <b>5.0</b> | <b>0.8</b> | <b>4.5</b>             |
| <b>Portfolio Level Activities</b> |                                  |                           |                                     |                                |                                    |                            |                              |               |            |            |                        |
| P&E, M&E, Dev                     |                                  |                           |                                     |                                | 718.4                              | 718.4                      | 735                          |               |            |            |                        |
| Supporting Initiatives            |                                  |                           |                                     | 65.0                           | 592.3                              | 657.3                      | 675                          |               |            |            |                        |
| <b>Total</b>                      | <b>27,188</b>                    | <b>22,766</b>             | <b>338,207</b>                      | <b>3,371.3</b>                 | <b>3,162.1</b>                     | <b>6,533.4</b>             | <b>7,532</b>                 | <b>2.3</b>    | <b>3.9</b> | <b>0.8</b> | <b>5.1</b>             |

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**Appendix B**

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**HISTORICAL SUMMARY OF DSM COST AND  
ENERGY SAVING RESULTS**

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**Table B-1: Historical FBC DSM Costs and Energy Savings 2011-2015**

|    | 1  | 2              | 3            | 4            | 5                    | 6             | 7              | 8          |
|----|--|----------------|--------------|--------------|----------------------|---------------|----------------|------------|
|    |  |                |              |              | <b>2011 (Actual)</b> |               |                |            |
|    |  | Spend (\$000s) |              |              | Energy Savings (MWh) |               |                | TRC        |
|    |  | Planned        | Actual       | Variance     | Planned              | Actual        | Variance       | (B/C)      |
| 1  | <b>Residential</b>   |                |              |              |                      |               |                |            |
| 2  | Home Improvements  | 2,145          | 479          | 1,666        | 8,960                | 3,692         | (5,268)        | 1.6        |
| 3  | Building Envelope <sup>1</sup>   |                |              |              |                      |               |                |            |
| 4  | Heat Pumps   | 694            | 532          | 162          | 3,397                | 2,257         | (1,140)        | 1.0        |
| 5  | Residential Lighting   | 438            | 239          | 199          | 3,420                | 3,308         | (112)          | 2.2        |
| 6  | New Home Program   | 54             | 205          | (151)        | 105                  | 689           | 584            | 1.0        |
| 7  | Appliances <sup>1</sup>  |                |              |              |                      |               |                |            |
| 8  | Electronics <sup>1</sup>   |                |              |              |                      |               |                |            |
| 9  | Water Heating <sup>1</sup>   |                |              |              |                      |               |                |            |
| 10 | Low Income <sup>1</sup>  | 305            | 245          | 60           | 540                  | 1,447         | (907)          | 1.0        |
| 11 | Behavioural <sup>1</sup>   |                |              |              |                      |               |                |            |
| 12 | <i>Residential Total</i>   | <b>3,636</b>   | <b>1,700</b> | <b>1,936</b> | <b>16,422</b>        | <b>11,393</b> | <b>(6,843)</b> | <b>1.3</b> |
| 13 | <b>Commercial</b>  |                |              |              |                      |               |                |            |
| 14 | Lighting   | 1,114          | 1,995        | (881)        | 7,370                | 20,577        | 13,207         | 2.3        |
| 15 | Building and Process Improvements                                      | 572            | 606          | (34)         | 3,010                | 1,386         | (1,624)        | 0.7        |
| 16 | Computers  |                |              |              |                      |               |                |            |
| 17 | Municipal (Water)  | 432            | 231          | 201          | 3,560                | 2,199         | (1,361)        | 1.6        |
| 18 | Irrigation <sup>2</sup>  |                |              |              |                      |               |                |            |
| 19 | <i>Commercial Total</i>  | <b>2,118</b>   | <b>2,832</b> | <b>(714)</b> | <b>13,940</b>        | <b>24,162</b> | <b>10,222</b>  | <b>1.9</b> |
| 20 | <b>Industrial</b>  |                |              |              |                      |               |                |            |
| 21 | Compressed Air   |                |              |              |                      |               |                |            |
| 23 | EMIS   | 10             | 9            | 1            | 80                   | -             | (80)           | -          |
| 22 | Industrial Efficiencies  | 603            | 128          | 475          | 9,280                | 794           | (8,486)        | 2.5        |
| 24 | <i>Industrial Total</i>  | <b>613</b>     | <b>137</b>   | <b>476</b>   | <b>9,360</b>         | <b>794</b>    | <b>(8,566)</b> | <b>2.4</b> |
| 25 | <b>Programs Total</b>  | <b>6,367</b>   | <b>4,669</b> | <b>1,698</b> | <b>39,722</b>        | <b>36,349</b> | <b>(5,187)</b> | <b>1.8</b> |
| 26 | Supporting Initiatives   | 725            | 658          | 67           | -                    | -             | -              | -          |
| 27 | Planning & Evaluation  | 750            | 590          | 160          | -                    | -             | -              | -          |
| 28 | <b>Total</b>   | <b>7,842</b>   | <b>5,918</b> | <b>1,924</b> | <b>39,722</b>        | <b>36,349</b> | <b>(5,187)</b> | <b>1.6</b> |
|    | <sup>1</sup> These programs were included in Home Improvements program |                |              |              |                      |               |                |            |
|    | <sup>2</sup> Irrigation was part of Building and Process Improvement   |                |              |              |                      |               |                |            |

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**Table B-1: Historical FBC DSM Costs and Energy Savings 2011-2015 (Continued)**

|  | 1              | 2            | 3            | 4                    | 5             | 6              | 7          | 8              | 9            | 10           | 11                   | 12            | 13             | 14         |
|--|----------------|--------------|--------------|----------------------|---------------|----------------|------------|----------------|--------------|--------------|----------------------|---------------|----------------|------------|
|  | 2012 (Actual)  |              |              |                      |               |                |            | 2013 (Actual)  |              |              |                      |               |                |            |
|  | Spend (\$000s) |              |              | Energy Savings (MWh) |               |                | TRC        | Spend (\$000s) |              |              | Energy Savings (MWh) |               |                | TRC        |
|  | Planned        | Actual       | Variance     | Planned              | Actual        | Variance       | (B/C)      | Planned        | Actual       | Variance     | Planned              | Actual        | Variance       | (B/C)      |
| <b>1 Residential</b>   |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |
| 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        |
| 3 Building Envelope <sup>1</sup>                                       |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |
| 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        |
| 5 Residential Lighting   | 328            | 337          | (9)          | 2,530                | 2,599         | 69             | 1.8        | 313            | 473          | (160)        | 2,467                | 3,300         | 833            | 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        |
| 7 Appliances <sup>1</sup>  | 247            | 332          | (85)         | 690                  | 1,248         | 558            |            | 267            | 241          | 26           | 739                  | 578           | (161)          |            |
| 8 Electronics <sup>1</sup>   |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |
| 9 Water Heating <sup>1</sup>   |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |
| 10 Low Income  | 677            | 308          | 369          | 1,774                | 1,054         | (720)          | 1.3        | 660            | 415          | 245          | 1,570                | 2,000         | (430)          | 1.6        |
| 11 Behavioural <sup>1</sup>  |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |
| 12 Residential Total   | <b>3,717</b>   | <b>2,564</b> | <b>1,153</b> | <b>16,101</b>        | <b>12,758</b> | <b>(3,343)</b> | <b>1.5</b> | <b>3,944</b>   | <b>3,168</b> | <b>776</b>   | <b>16,946</b>        | <b>16,200</b> | <b>(1,606)</b> | <b>1.6</b> |
| <b>13 Commercial</b>   |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |
| 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        |
| 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        |
| 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        |
| 18 Irrigation <sup>2</sup>   |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |
| 19 Commercial Total  | <b>2,199</b>   | <b>3,019</b> | <b>(820)</b> | <b>13,380</b>        | <b>17,892</b> | <b>4,512</b>   | <b>2.0</b> | <b>2,085</b>   | <b>1,909</b> | <b>176</b>   | <b>11,980</b>        | <b>10,900</b> | <b>(1,080)</b> | <b>1.8</b> |
| <b>20 Industrial</b>   |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |
| 21 Compressed Air  |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |
| 23 EMIS  | 27             | 10           | 17           | 190                  | -             | (190)          | 2.0        | 41             | 17           | 24           | 290                  | -             | (290)          | -          |
| 22 Industrial Efficiencies   | 323            | 163          | 160          | 2,290                | 937           | (1,353)        | -          | 323            | 307          | 16           | 2,290                | 2,500         | 210            | 1.0        |
| 24 Industrial Total  | <b>350</b>     | <b>173</b>   | <b>177</b>   | <b>2,480</b>         | <b>937</b>    | <b>(1,543)</b> | <b>1.9</b> | <b>364</b>     | <b>324</b>   | <b>40</b>    | <b>2,580</b>         | <b>2,500</b>  | <b>(80)</b>    | <b>1.0</b> |
| 25 Programs Total  | <b>6,266</b>   | <b>5,756</b> | <b>510</b>   | <b>31,961</b>        | <b>31,587</b> | <b>(374)</b>   | <b>1.8</b> | <b>6,393</b>   | <b>5,401</b> | <b>992</b>   | <b>31,506</b>        | <b>29,600</b> | <b>(2,766)</b> | <b>1.9</b> |
| 26 Supporting Initiatives  | 725            | 816          | (91)         | -                    | -             | -              | -          | 725            | 706          | 19           | -                    | -             | -              | -          |
| 27 Planning & Evaluation   | 740            | 728          | 12           | -                    | -             | -              | -          | 760            | 748          | 12           | -                    | -             | -              | -          |
| 28 Total   | <b>7,731</b>   | <b>7,300</b> | <b>431</b>   | <b>31,961</b>        | <b>31,587</b> | <b>(374)</b>   | <b>1.6</b> | <b>7,878</b>   | <b>6,855</b> | <b>1,023</b> | <b>31,506</b>        | <b>29,600</b> | <b>(2,766)</b> | <b>1.6</b> |
| <sup>1</sup> These programs were included in Home Improvements program |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |
| <sup>2</sup> Irrigation was included in Municipal (Water Handling)     |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |
| <sup>3</sup> Benefits calculated using RS3808 applicable at the time   |                |              |              |                      |               |                |            |                |              |              |                      |               |                |            |

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**Table B-1: Historical FBC DSM Costs and Energy Savings 2011-2015 (Continued)**

|   | 1                    |              | 2            |                      | 3             |                | 4          |                | 5            |              | 6                    |               | 7             |            | 8                    |  |  |  |  |  |  |  |  |  |  |
|---|----------------------|--------------|--------------|----------------------|---------------|----------------|------------|----------------|--------------|--------------|----------------------|---------------|---------------|------------|----------------------|--|--|--|--|--|--|--|--|--|--|
|   | <b>2014 (Actual)</b> |              |              |                      |               |                |            |                |              |              |                      |               |               |            | <b>2015 (Actual)</b> |  |  |  |  |  |  |  |  |  |  |
|   | Spend (\$000s)       |              |              | Energy Savings (MWh) |               |                | TRC        | Spend (\$000s) |              |              | Energy Savings (MWh) |               |               | TRC        |                      |  |  |  |  |  |  |  |  |  |  |
|   | Planned              | Actual       | Variance     | Planned              | Actual        | Variance       | (B/C)      | Planned        | Actual       | Variance     | Planned              | Actual        | Variance      | (B/C)      |                      |  |  |  |  |  |  |  |  |  |  |
| <b>1 Residential</b>  |                      |              |              |                      |               |                |            |                |              |              |                      |               |               |            |                      |  |  |  |  |  |  |  |  |  |  |
| 2 Home Improvements   | 295                  | 391          | (96)         | 1,881                | 1,299         | 582            | 1.5        | 884            | 199          | 685          | 3,106                | 231           | 2,875         | 1.7        |                      |  |  |  |  |  |  |  |  |  |  |
| 3 Heat Pumps  | 158                  | 252          | (94)         | 553                  | 865           | (312)          | 1.6        | 302            | 182          | 120          | 1,618                | 569           | 1,049         | 1.5        |                      |  |  |  |  |  |  |  |  |  |  |
| 4 Residential Lighting  | 176                  | 291          | (115)        | 2,136                | 3,411         | (1,275)        | 1.5        | 193            | 198          | (5)          | 1,569                | 4,144         | (2,575)       | 5.3        |                      |  |  |  |  |  |  |  |  |  |  |
| 5 New Home Program  | 67                   | 254          | (187)        | 98                   | 733           | (635)          | 2.7        | 390            | 111          | 279          | 1,179                | 356           | 823           | 1.1        |                      |  |  |  |  |  |  |  |  |  |  |
| 6 Appliances <sup>1</sup>   | -                    | -            | -            | -                    | -             | -              |            | 96             | 71           | 25           | 288                  | 52            | 236           | 1.2        |                      |  |  |  |  |  |  |  |  |  |  |
| 7 Water Heating   | 99                   | 3            | 96           | 425                  | 92            | 333            |            | 387            | 2            | 385          | 850                  | 5             | 845           | 1.5        |                      |  |  |  |  |  |  |  |  |  |  |
| 8 Low Income  | 242                  | 502          | (260)        | 707                  | 2,286         | (1,579)        | 1.9        | 824            | 287          | 537          | 2,598                | 282           | 2,316         | 1.3        |                      |  |  |  |  |  |  |  |  |  |  |
| 9 Behavioural <sup>1</sup>  |                      |              | -            |                      |               | -              |            | 85             | -            | 85           | 888                  | -             | 888           | 0.0        |                      |  |  |  |  |  |  |  |  |  |  |
| 10 Residential Total  | <b>1,037</b>         | <b>1,694</b> | <b>(657)</b> | <b>5,800</b>         | <b>8,686</b>  | <b>(2,886)</b> | <b>1.7</b> | <b>3,160</b>   | <b>1,050</b> | <b>2,110</b> | <b>12,096</b>        | <b>5,639</b>  | <b>6,457</b>  | <b>2.9</b> |                      |  |  |  |  |  |  |  |  |  |  |
| <b>11 Commercial</b>  |                      |              |              |                      |               |                |            |                |              |              |                      |               |               |            |                      |  |  |  |  |  |  |  |  |  |  |
| 12 Lighting   | 510                  | 646          | (136)        | 3,359                | 3,353         | 6              | 2.0        | 1,485          | 735          | 750          | 7,445                | 4,089         | 3,356         | 2.0        |                      |  |  |  |  |  |  |  |  |  |  |
| 13 Building and Process Improvements  | 592                  | 533          | 59           | 2,641                | 1,926         | 715            | 1.4        | 897            | 543          | 354          | 3,832                | 1,606         | 2,226         | 1.6        |                      |  |  |  |  |  |  |  |  |  |  |
| 14 Municipal (Water Handling)   | -                    | 5            | (5)          | -                    | -             | -              |            | 79             | 36           | 43           | 759                  | 187           | 572           | 2.3        |                      |  |  |  |  |  |  |  |  |  |  |
| 15 Irrigation   | 32                   | -            | 32           | 200                  | -             | 200            | 0.0        | 69             | 9            | 60           | 490                  | -             | 490           | 0.0        |                      |  |  |  |  |  |  |  |  |  |  |
| 16 Commercial Total   | <b>1,134</b>         | <b>1,184</b> | <b>(50)</b>  | <b>6,200</b>         | <b>5,279</b>  | <b>921</b>     | <b>1.6</b> | <b>2,530</b>   | <b>1,324</b> | <b>1,206</b> | <b>12,526</b>        | <b>5,882</b>  | <b>6,644</b>  | <b>1.8</b> |                      |  |  |  |  |  |  |  |  |  |  |
| <b>17 Industrial</b>  |                      |              |              |                      |               |                |            |                |              |              |                      |               |               |            |                      |  |  |  |  |  |  |  |  |  |  |
| 18 Compressed Air <sup>2</sup>  |                      |              |              |                      |               |                |            |                |              |              |                      |               |               |            |                      |  |  |  |  |  |  |  |  |  |  |
| 19 Industrial Efficiencies  | 148                  | 188          | (40)         | 800                  | 614           | 1,121          | 1.2        | 202            | 226          | (24)         | 1,537                | 1,087         | 450           | 2.0        |                      |  |  |  |  |  |  |  |  |  |  |
| 20 Industrial Total   | <b>148</b>           | <b>188</b>   | <b>(40)</b>  | <b>800</b>           | <b>614</b>    | <b>2,041</b>   | <b>1.2</b> | <b>202</b>     | <b>226</b>   | <b>(24)</b>  | <b>1,537</b>         | <b>1,087</b>  | <b>450</b>    | <b>2.0</b> |                      |  |  |  |  |  |  |  |  |  |  |
| <b>21 Programs Total</b>  |                      |              |              |                      |               |                | <b>2.0</b> |                |              |              |                      |               |               | <b>2.2</b> |                      |  |  |  |  |  |  |  |  |  |  |
| 22 Supporting Initiatives   | 190                  | 207          | (17)         |                      |               |                |            | 675            | 346          | 329          |                      |               |               | 0.0        |                      |  |  |  |  |  |  |  |  |  |  |
| 23 Planning & Evaluation  | 492                  | 579          | (87)         |                      |               |                |            | 725            | 585          | 140          |                      |               |               | 0.0        |                      |  |  |  |  |  |  |  |  |  |  |
| 24 Recoveries from 2013   |                      | (378)        | 378          |                      |               |                |            |                |              |              |                      |               |               |            |                      |  |  |  |  |  |  |  |  |  |  |
| 25 Total  | <b>3,001</b>         | <b>3,473</b> | <b>(472)</b> | <b>12,800</b>        | <b>14,580</b> | <b>75</b>      | <b>1.6</b> | <b>7,292</b>   | <b>3,531</b> | <b>3,761</b> | <b>26,159</b>        | <b>12,608</b> | <b>13,551</b> | <b>2.0</b> |                      |  |  |  |  |  |  |  |  |  |  |
| <sup>1</sup> In 2014, these programs were included in Home Improvements program.                  |                      |              |              |                      |               |                |            |                |              |              |                      |               |               |            |                      |  |  |  |  |  |  |  |  |  |  |
| <sup>2</sup> In 2014, Compressed Air was included in Industrial Efficiencies.                     |                      |              |              |                      |               |                |            |                |              |              |                      |               |               |            |                      |  |  |  |  |  |  |  |  |  |  |
| <sup>3</sup> In 2015, Computers was added to Process Improvements and had no Spending or Savings. |                      |              |              |                      |               |                |            |                |              |              |                      |               |               |            |                      |  |  |  |  |  |  |  |  |  |  |

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