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March 29, 2018

British Columbia Utilities Commission  
Suite 410, 900 Howe Street  
Vancouver, BC  
V6Z 2N3

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

Dear Mr. Wruck:

**Re: FortisBC Energy Inc. (FEI)**  
**Natural Gas Demand-Side Management (DSM) – 2017 Annual Report**

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Attached please find the Natural Gas DSM Program 2017 Annual Report for FEI.

If further information is required, please contact Ken Ross, Manager, Integrated Resource Planning and DSM Reporting at 604-576-7343 or [ken.ross@fortisbc.com](mailto:ken.ross@fortisbc.com).

Sincerely,

**FORTISBC ENERGY INC.**

***Original signed:***

Diane Roy

Attachment



**FortisBC Energy Inc.**

**Natural Gas  
Demand-Side Management Programs  
2017 Annual Report**

**March 29, 2018**

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## 1. REPORT OVERVIEW

FortisBC Energy Inc. (FEI or the Company), is committed to delivering a broad portfolio of cost-effective natural gas Demand-side Management<sup>1</sup> (DSM) measures that address the expectations of customers while meeting the requirements for public utilities to pursue cost-effective DSM. In 2017, total expenditures, including \$1.104 million attributable to third party co-funding such as received from the British Columbia Ministry of Energy, Mines and Petroleum Resources (MEM), were \$35.143 million. Based solely on FEI's DSM expenditures, the Company achieved a combined portfolio Modified Total Resource Cost (MTRC)<sup>2</sup> of 1.2 on expenditures of \$34.039 million, meeting FEI's goal of cost-effective program delivery.

This DSM Annual Report (the Report) outlines the Company's actual results and expenditures for 2017. The Report follows a similar format to the 2016 and previous Annual Reports, relying on detailed tables to demonstrate Program results and expenditures. The Report compares 2017 actual activity and results to the Company's 2014-2018 DSM Plan, filed as part of FEI's 2014-2018 Performance Based Ratemaking (PBR) Application (2014-2018 PBR Plan) and accepted by the Commission in its Decision and Order G-138-14 (the Decision). Where the details of individual programs vary substantially from the 2014-2018 DSM Plan, explanations are provided in the applicable Program Area sections of the Report.

### 1.1 Purpose of Report: Transparency, Accountability and Update on Progress

The Report details the Company's activities for the overall DSM Portfolio and in each Program Area. Incentive and non-incentive expenditures are reported at the level of each program or measure, as well as at the program area and Portfolio levels. Results for the following cost effectiveness tests are provided for the overall Portfolio and each Program Area in Section 2, and for each program as appropriate in the respective Program Area sections: Total Resource Cost (TRC), Ratepayer Impact Measure (RIM), Participant Cost Test (PCT), and Utility Cost Test (UCT). In accordance with British Columbia's Demand-Side Measures Regulation (DSM Regulation), results of the MTRC calculations are also provided where appropriate (see Section 2.1).

The Report also demonstrates that the Company is meeting the accountability mechanisms directed by the Commission in Order No. G-36-09. One such mechanism was the requirement to file DSM Annual Reports, which states:

A requirement that Terasen [now FEI] submit annually to the Commission, by the end of the first quarter following year-end, for each year of the funding period, a

<sup>1</sup> Throughout this Annual Report the use of the term Demand-Side Management or "DSM" is intended to refer to demand-side measures in BC as defined in the BC Demand-Side Measures Regulation.

<sup>2</sup> Pursuant to the BC Demand-side Measures Regulation, the Portfolio level MTRC is calculated based on costs and benefits of all programs in the Portfolio as well as any Program Area and Portfolio level administration costs, and including the benefit adders for those programs for which the MTRC is relied upon to determine cost effectiveness on an individual program basis (i.e. those programs that have been designated as being under the MTRC Cap as presented in Section 2.1 of this report).

report on all [DSM] initiatives and activities, expenditures and results for TGI and TGI.

It should be noted that the DSM Regulation was amended by the Province in March, 2017. These amendments impact some of the cost-effectiveness calculations, increase spending limits under the MTRC Cap (see Section 2.1) and expand the adequacy requirements of a DSM Portfolio (see Section 2.3). At the time of filing and acceptance, the 2014-2018 DSM Plan was in compliance with the DSM Regulation. Due to the timing of the DSM Regulation amendments, certain aspects of the DSM Regulation amendments, particularly the adequacy requirements, could not be feasibly implemented in 2017, however FEI considers its 2014-2018 DSM Plan to be in compliance with the DSM Regulation at the time of acceptance by the Commission. As such, FEI is reporting its activity as related to adequacy requirements against the DSM Regulation in place at the time of acceptance. FEI will address the expanded adequacy requirements of the DSM Regulation noted above in its next DSM expenditure plan application for the period 2019 – 2022 to be submitted to the Commission in 2018.

## 1.2 Organization of the DSM Annual Report

The following describes how each section of the Report presents the results of 2017 DSM activities:

### Section 1: Report Overview

- Provides a high-level background for the Report.

### Section 2: Portfolio Overview

- Provides a summary and detail regarding the overall actual 2017 expenditures for DSM activities, along with an explanation of expenditures held in both the DSM deferral account and another deferral account set up for DSM incentive amounts provided to Alternative Energy Services (AES) projects in which FEI is a participant.
- Section 2.5 discusses any new requirements from the Commission concerning information to be included in the 2017 DSM Annual Report.

### Section 3: Funding Transfers

- Provides a discussion on funding transfers.

### Section 4: Advisory Group Activities

- Provides information regarding Energy Efficiency and Conservation Advisory Group (EECAG) activities in 2017, including a summary of meetings and accountability considerations.

### Sections 5 - 9 provide information on:

- Residential, Low Income, Commercial, Innovative Technologies, and Industrial Energy Efficiency Program Areas, respectively;



- Each section contains a table summarizing the planned and actual expenditures for the respective Program Area in 2017, including incentive and non-incentive spending, annual and NPV gas savings, as well as TRC and other cost-effectiveness test results. Additional tables outline the individual 2017 programs, including program and measure descriptions, program assumptions and sources for these assumptions, and a breakdown of incentive and non-incentive spending. Where applicable, details on program closures or planned programs that were not launched in 2017 are also included in these program detail sections.

## **Section 10: Conservation Education and Outreach Initiatives**

- Provides both a summary and details regarding actual 2017 expenditures for the Conservation Education and Outreach (CEO) Program Area.

## **Section 11: Enabling Activities**

- Provides both summary and detail regarding actual 2017 expenditures for the Enabling Activities that support the work of the DSM Portfolio as a whole.

## **Section 12: Evaluation**

- Provides both summary and detail regarding pending and actual expenditures for 2017 program evaluation activities, as well as summary results from evaluations and studies completed in 2017.

## **Section 13: Data Gathering, Reporting and Internal Control Processes**

- Provides a summary of the Company's data tracking, process control, and reporting for 2017 DSM activities, and a high-level description of the Company's internal approval process for programs.

## **Section 14: 2017 DSM Annual Report Summary**

- Provides a summary of the Report and FEI's 2017 DSM activity.

## 2. PORTFOLIO OVERVIEW

In this Section, FEI provides its DSM energy savings, expenditures and cost-effectiveness test results at an overall Portfolio level for 2017. A summary of the overall Portfolio results is provided in Table 2-1, demonstrating that the Company achieved a combined Portfolio MTRC of 1.2. FEI achieved DSM expenditures of \$34.039 million and recorded annual natural gas savings of 533,538 GJ in 2017.

**Table 2-1: Overall DSM Portfolio Results for 2017**

Indicator - 2017 Results		Total
Annual Gas Savings (GJ/yr.)		533,538
NPV of Gas Savings (GJ)		4,769,193
Utility Expenditures, Incentives (\$000s)		21,836
Utility Expenditures, Non-Incentives (\$000s)		12,203
Utility Expenditures, Total (\$000s)		34,039
Benefit/Cost Ratios	TRC	0.7
	MTRC	1.2
	Utility	1.2
	Participant	1.2
	RIM	0.7

Table 2-2 provides the expenditures and cost-effectiveness test results by Program Area for the overall DSM Portfolio.

**Table 2-2: Overall DSM Portfolio Level Results by Program Area 2017**

Portfolio	Annual Gas Savings (GJ/yr.)		NPV Gas Savings (GJ)	Utility Expenditures (\$000s)						Benefit/Cost Ratios				
	2014-2018 DSM Plan	2017 Actual		Incentives		Non-Incentives		All Spending		TRC	MTRC	Utility	Participant	RIM
				2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual					
Portfolio Level Activities														
Total	No Direct Savings			n/a	n/a	n/a	1,559	n/a	1,559	No Direct Savings				
Residential Sector														
Total	136,672	137,161	1,446,618	7,486	9,688	3,214	2,515	10,700	12,203	0.5	1.7	1.0	1.1	0.5
Commercial Sector														
Total	237,665	238,688	1,906,805	8,424	8,847	1,992	1,987	10,416	10,834	0.8	n/a	1.4	1.4	0.6
Industrial Sector														
Total	190,300	105,516	1,007,011	2,193	1,614	789	485	2,983	2,099	1.3	n/a	4.5	0.7	2.0
Low Income														
Total	27,768	47,263	343,071	1,778	1,592	1,469	1,052	3,247	2,644	1.2	2.1	1.4	2.9	0.7
Conservation Education and Outreach														
Total	No Direct Savings			0	0	2,400	2,590	2,400	2,590	No Direct Savings				
Innovative Technologies														
Total	5,343	4,910	65,687	574	95	644	833	1,218	928	0.5	n/a	0.6	7.1	0.4
Enabling Activities														
Total	No Direct Savings			n/a	n/a	4,425	1,181	4,425	1,181	No Direct Savings				
TOTAL PORTFOLIOS														
Total	597,748	533,538	4,769,193	20,455	21,836	14,933	12,203	35,388	34,039	0.7	1.2	1.2	1.2	0.7

**Notes:**

- Portfolio Level Activities are those activities for which the costs cannot be assigned to individual DSM programs. It should be noted that these activities are distinct from the Enabling Activities specifically listed in Section 9 of the 2014-2018 DSM Plan. These distinct Portfolio Level Activities include expenditures such as EECAG activities, Portfolio level staff labour, staff training and conferences, research and association memberships, Portfolio level research studies, and regulatory work including consulting fees.

Throughout this Report, the following general notes also apply to all the Program Areas:

- In the above table, and in tables throughout the Report, any difference in the totals between the Portfolio Overview, Program Area, and individual program tables is due to rounding. Some “zero” values are a reflection of rounding to the \$000 expenditure level when expenditures were under \$500.
- A “Non-Program Specific Expense” line item has been included for each Program Area in Sections 5 through 10. These expenditures support multiple programs within that Program Area and, therefore, are not specific to only one program. Generally, these expenditures represent items such as training, travel, marketing collateral and consulting services that support the overall Program Area.

It is FEI’s view that, as with prior annual reports, the savings reported herein continue to be conservative and lower than the savings experienced in the marketplace as a result of the Company’s DSM activities, causing the cost-effectiveness test results reported to be lower than they would be otherwise, for the following reasons:

- Net to Gross Ratio - The Net-to-Gross ratio that FEI is using to report energy savings from DSM activity is highly conservative in that it includes the free ridership impact, which serves to reduce reported energy savings, but in most cases does not include the energy savings benefits of spillover effect.<sup>3</sup> FEI intends to continue identifying and incorporating spillover effects into reporting of energy savings impacts from DSM activity on a program-by-program basis, wherever spillover can be supported.
- Attribution from Government Regulation – The introduction of many municipal, provincial and federal minimum equipment and system performance standards is supported by the Company’s DSM activity. Attribution savings for the implementation of a new standard on minimum fireplace efficiency have been identified and estimated as part of the Residential EnerChoice Fireplace Program (see Section 5.3). As the Province has shifted the implementation of the new standard to January of 2019, FEI expects to claim those attributed savings in its 2018 Annual Report. The Company continues to believe the claimed savings are conservative and do not represent all of the savings attributable to FEI’s codes and standards work. FEI will continue to look for opportunities to claim energy savings from the implementation of new standards.
- Conservation Education and Outreach – CEO activities had expenditures of \$2.5 million in 2017. These activities do result in energy savings; however, since these savings remain difficult to quantify, FEI does not currently attribute energy savings to them and these benefits are not reflected in the TRC.

<sup>3</sup> Free ridership refers to individuals who participate in a program who would have participated in the absence of an incentive. Spillover refers to individuals that adopt efficiency measures because they are influenced by program-related information and marketing efforts, though they do not actually participate in the program. These can be included in the Net-to-Gross ratio employed in the cost-effectiveness analysis to capture the additive effects of spillover to balance the reductive effects of free ridership.

- Enabling Activities – Enabling Activities similarly had expenditures of \$1.1 million in 2017 for work that contributes to energy savings but that cannot currently be quantified. Since these savings are not included in the Portfolio TRC calculation, the Company believes the Portfolio energy savings benefits are higher than reported.

FEI's DSM activities include a number of specified demand side measures as defined the DSM Regulation. Specified demand-side measures within FEI's Portfolio include the Innovative Technologies programs (see Section 8), education and community engagement programs (see Section 10), and Codes and Standards related DSM activity (see Section 11). The DSM Regulation defines how the Commission must consider these specified measures. Section 4(4) of the DSM Regulation stipulates that the cost effectiveness of specified measures must be determined by the cost effectiveness of the Portfolio as a whole. These measures are therefore not subject to the 40 percent 'MTRC Cap' (see Section 2.1). Additionally, these measures cannot be determined to be not cost-effective under the Utility Cost Test.

In summary, FEI's 2017 DSM expenditures, including specified DSM, are cost-effective as defined under the DSM Regulation.

## 2.1 Portfolio Level MTRC Calculation and Results

In 2017, FEI met the conditions of the DSM Regulation, achieving a Portfolio MTRC value of 1.2 with 24 percent of the Portfolio enabled by the MTRC cost-effectiveness test (see Table 2-2). While FEI strives for TRC test results that approach or exceed 1.0 within each program and across all programs, there are benefits to implementing programs that do not meet this threshold. Some of these benefits include making programs available to those customers that would otherwise be underserved (such as low income and residential customers), water savings, increased human health and comfort, and economic benefits such as job creation. These benefits were recognized in the 2011, 2014 and 2017 amendments to the DSM Regulation, which enable the use of an MTRC in determining program and Portfolio cost effectiveness. The MTRC uses the long-run marginal cost of acquiring electricity generated from clean or renewable resources in British Columbia as a proxy for the avoided cost of natural gas and allows for the inclusion of non-energy benefits (NEBs).<sup>3</sup>

Utilities can implement DSM with TRC values less than 1.0 but that meet an MTRC threshold of 1.0<sup>4</sup> as long as expenditures on these activities do not exceed 40 percent of the total Portfolio

<sup>3</sup> The DSM Regulation was amended in July 2014 to allow for the whole cost of the long-run marginal cost of acquiring electricity generated from clean or renewable resources in British Columbia to be used as a proxy for the avoided cost of natural gas in the MTRC cost-effectiveness test. As the DSM Regulation stipulates, the updated value that FEI has used in 2017 for the avoided cost of gas in the MTRC calculation is \$102/MWh, or \$28.34/GJ, as indicated in BC Hydro's F2017 to F2019 Revenue Requirements Application, Appendix X, Table X-1, Exhibit B-1-2: Avoided Cost of Electric Energy. Further, the MTRC Cap was increased from 33% to 40% in the March 24, 2017 amendments to the DSM Regulation.

<sup>4</sup> The Commission approved the assessment of the cost effectiveness using an MTRC of 1 or greater on an overall portfolio basis as part of its Decision and Order G-44-12 on FEI's 2012-2013 Revenue Requirements Application (2012-13 RRA), page 174. While this approval was not explicitly stated in the most recent 2014-2018 PBR Plan Decision and Order G-138-14, FEI interprets this approval to be implicit in the acceptance of the 2014-2018 DSM Plan.

expenditure. FEI refers to this 40 percent as the “MTRC Cap”. Table 2-3 shows both the TRC and MTRC of those programs to which the MTRC cost effectiveness test is applied and confirms that these programs make up 24.4 percent of FEI’s 2017 DSM Portfolio spending.

**Table 2-3: Programs Subject to MTRC and the Relative Proportion of 2017 Portfolio Spending**

Program	Program TRC	Program MTRC	Expenditure (\$000s) subject to cap	% of Portfolio Spending
Energy Star Domestic Hot Water	0.3	1.6	2,834	8.3%
Furnace Replacement	0.4	1.4	3,325	9.8%
New Home	0.3	1.7	220	0.6%
Energy Efficiency Home Performance (Home Renovation Rebate Program)	0.5	2.4	1,925	5.7%
<b>Total</b>			<b>\$8,303</b>	<b>24.4%</b>

## 2.2 Meeting Approved Spending Levels

FEI’s 2017 DSM expenditure limit of \$35.4 million was accepted on September 12, 2014, pursuant to the Decision on FEI’s 2014-2018 PBR Plan.<sup>5</sup> The Company’s 2017 DSM expenditures were within accepted levels for 2017 and have increased from 2016 spending of just over \$32 million.

As part of the Commission’s decision, FEI was granted approval to add \$15 million of the requested annual DSM budget to rate base each year of the PBR period, with any additional DSM spend being captured in a DSM non-rate base deferral account attracting AFUDC. Any new amounts accumulated in the non-rate base DSM deferral account are then transferred to the FEI rate base DSM deferral account in the following year. The Commission also approved the amortization of these amounts over 10 years. In accordance with the Commission’s decision, \$19.039 million was placed in the non-rate based DSM deferral account in early 2018.

FEI has managed its 2017 DSM activity within the funding limits approved by the Commission. Section 3 discusses funding transfers between program areas in 2017 within the overall DSM funding envelope and within rules for transferring funds between program areas as set out by the Commission.

## 2.3 Meeting Adequacy Requirements of the DSM Regulation

The adequacy requirements set out in the DSM Regulation at the time the 2014 – 2018 DSM Plan was accepted are as follows:

<sup>5</sup> BCUC Order G-138-14, page 277 of the Decision.

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

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

Section 6 provides details regarding FEI's DSM programs for low income customers. FEI also continues to deliver the Rental Apartment Efficiency Program (RAP) through its Residential, Low Income and Commercial programs as discussed in each of the respective Program Area sections (Sections 5, 6 and 7) and a full program overview for RAP is presented in Section 7.3.1. Section 7 of the Report provides details on a number of other Commercial and Low Income energy efficiency programs intended for use by owners of rental buildings, including the Energy Specialist Programs. In terms of education programs, FEI's School Education Program, Commercial and Residential customer education programs, and other energy efficiency and conservation outreach initiatives are presented in Section 10.

## **2.4 Addressing BCUC Directives from the FEI 2014-2018 PBR Plan Application Decision**

FEI filed for acceptance of its 2014-2018 DSM Plan and associated funding request as part of the 2014-2018 PBR Plan. The Decision on the 2014-2018 PBR Plan set out a number of Directives for the 2014-2018 DSM Plan. The following section addresses the Directives relevant to the overall 2017 DSM Portfolio. Program specific Directives are addressed in the applicable Program Area sections of the Report.

### **2.4.1 LABOUR COSTS**

Pursuant to Directive 145<sup>6</sup> of the Decision, labour costs are included in the "Administration" expenditures for each program in the specific Program tables included in the applicable Program Area sections (Sections 5-11). FEI notes that the 2014-2018 DSM Plan as accepted by the Commission was not re-cast with labour included at the program level. This change therefore impacts the direct comparison of actual program and Program Area spending to plan spending. The inclusion of labour costs at the program level can cause program area expenditures to appear higher than the accepted amounts even though non-

<sup>6</sup> Decision, page 273.



labour costs are within accepted amounts. Actual spending in the “Enabling Activities” program area will also be lower than planned since a substantial amount of labour costs planned for this program area are being reported within other program areas. This issue is also discussed in Section 3 on funding transfers.

## 2.5 Collaboration & Integration

The Company continues to collaborate and integrate DSM programming among BC’s largest energy utilities, as well as with other entities such as governments and industry associations. The Company recognizes that doing so will maximize program efficiency and effectiveness. Collaborative activity is captured in the individual Program Area sections and program descriptions found in Sections 5 through 11.

FEI, FortisBC Inc. (FBC) and BC Hydro and Power Authority (BC Hydro) (the BC Utilities) continued to collaborate on various programs and projects through their voluntary Memorandum of Understanding (MOU), the purpose of which is to develop enhanced utility integration in support of government legislation, policy and direction. The MOU currently covers 2016 through to August 2018. The BC Utilities also continue to experience cost efficiencies from their collaboration efforts, including streamlined application processes for customers, extended program reach and consistent and unified messaging resulting in improved energy literacy.

## 2.6 Summary

The Company’s DSM Portfolio met the goal of cost effectiveness with a Portfolio MTRC value of 1.2 in 2017. The Company is of the view that both energy savings accounted for in the Portfolio and the resulting TRC remain conservative. Benefits from additional activities, such as CEO, play a very important role in supporting the development and delivery of programs, while creating a culture of conservation in British Columbia.



### 3. FUNDING TRANSFERS

Three Program Areas – Residential, Commercial and CEO – incurred actual program expenditures that appeared to be greater than their respective accepted Program Area funding amounts.<sup>8</sup> In the case of CEO and Commercial, however, exceedance of the accepted Program Area funding level was the result of reporting labour expenditures at the program level as directed by the Commission.<sup>7</sup> The accepted 2014-2018 DSM Plan was based on labour being reported at the Portfolio level, and planned Program Area expenditure levels were not re-stated subsequent to the Commission's decision regarding the reporting of labour costs at the program level. Therefore, the "accepted" or "plan" Program Area funding limits do not include labour. The expenditures for Commercial and CEO, as shown in Table 2.2, do not exceed planned values if labour costs are removed, therefore no funding transfer is required.

For the Residential Program Area, expenditures other than labour costs exceeded the accepted funding level by close to \$1.0 million as a result of the success of the residential programs. To accommodate these additional expenditures in the Residential Program Area, \$800,000 from the Industrial Program Area and \$200,000 from the Innovative Technologies Program Area were moved into the Residential Program Area without exceeding 25% of approved expenditures within the respective Program Areas.<sup>8</sup>

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<sup>8</sup> Order G-138-14.

<sup>7</sup> Directive 145, Order No. G-138-14

<sup>8</sup> As part of Order G-138-14, the Commission directed FEI to continue following the rules for funding transfers that were set by the Commission for the 2012-2013 test period. In Order G-44-12 the Commission determined that funding transfers greater than 25% from one approved Program Area to another required prior approval by the Commission. That limit has not been exceeded in 2017.

## 4. ADVISORY GROUP ACTIVITIES

### 4.1 Overview

The Energy Efficiency and Conservation Advisory Group (EECAG) provides insight and feedback on FEI's Portfolio of DSM activities and related issues. This includes DSM program and Portfolio performance, development and design, funding transfers, policy and regulations that may impact DSM activities, and other issues and activities as they arise.

EECAG members may be appointed based on their relevant subject matter expertise, representation of a common interest shared by stakeholders, or representation of a particular organization/group and/or interest. This includes, but is not limited to, governments, regions, First Nations organizations, customers, suppliers, industries, non-governmental organizations, research institutes and other groups that have historically intervened in FEI's regulatory proceedings.

Since the formation of the EECAG in 2009, FEI has gained valuable insight on DSM program design and implementation and developed positive working relationships with stakeholders. EECAG input continues to be instrumental as FEI moves forward with DSM activities, helping to ensure that efforts are aligned with the interests and suggestions of stakeholders.

In recent years, including 2017, FEI's DSM Portfolio has been stable in terms of overall funding and program activities, and therefore meetings with EECAG members have been less frequent than during the early years of program development and ramp-up. A single EECAG workshop late in the year was sufficient to inform EECAG members of the latest developments in DSM activities and to gain their feedback on Portfolio results and planning. EECAG members are also invited to take part in any of FEI's planning design workshops that bring together stakeholders who have an interest in a particular Program or Program Area. In 2017, a number of EECAG members took part in consultations, other than the EECAG workshop, that were designed to gather input into overall Portfolio planning.

### 4.2 Summary of the 2017 Workshop

The 2017 EECAG workshop was held on November 28 in Vancouver and was well attended by EECAG members or their alternate delegates. The primary objective of the 2017 workshop was to engage EECAG members on development of the next DSM Plan for the 2019-2022 period. The EECAG Independent Facilitator was engaged in workshop design and facilitation of the workshop. Copies of materials and minutes for these meetings were distributed to EECAG members and other workshop attendees.

The November 2017 EECAG Workshop used a group breakout format to:

- Provide an update on the current (2014-2018) DSM Plan;
- Set the context and seek input for the next DSM Plan and expenditure application for the 2019-2022 time period; and

- Explain the next steps and timing for the DSM expenditure plan for 2019-2022, including additional opportunities for review and input by stakeholders.

Participants were provided with a draft version of the 2019-2022 DSM Plan in advance of the meeting and the group sessions were designed and facilitated to gather feedback on the Plan for each of the Program Areas. The FEI and FBC Conservation & Energy Management (C&EM) department presented both the gas and electric DSM Plans, however this section focuses on the feedback and input provided with respect to the natural gas DSM Plan.

EECAG members provided substantial feedback on the overall draft DSM Plan as well as each of the Program Areas. Overall impressions of the draft DSM Plan were that it is “going in the right direction”. General feedback was positive with some areas identified as needing additional information. EECAG member ideas for strengthening the draft DSM Plan were noted for further investigation and consideration in finalizing the plan. A number of positive aspects of the draft DSM Plan were also noted, and additional opportunities for EECAG engagement on the development of the plan were outlined.

FEI continues to value the input from EECAG members. The 2017 workshop and additional consultation efforts with EECAG members that followed have been effective in improving the delivery of DSM activities and in improving the preparation of the 2019-2022 DSM Plan.

## 5. RESIDENTIAL ENERGY EFFICIENCY PROGRAM AREA

### 5.1 Overview

The Residential Energy Efficiency Program Area reduced annual natural gas consumption by 137,161 GJ, achieving an overall combined TRC/MTRC of 1.7. Over \$12.2 million was invested in Residential Energy Efficiency programs in 2017, and 79 percent of this investment was customer incentive spending. Table 5-1 summarizes the expenditures for the Residential Energy Efficiency Program Area in 2017, including incentive and non-incentive spending, annual and NPV gas savings, as well as TRC/MTRC and other cost-effectiveness test results.

Residential programs serve over 912,000 customers in the FEI service territories. For DSM purposes, these customers predominantly include those living in single-family homes, row houses, townhomes or mobile homes.<sup>9</sup> Some in-suite measures, such as low flow fixtures and a small number of fireplaces and water heaters in multi-unit residential buildings are also included in this funding envelope. Residential programs serve retrofit and new home applications. In combination with the Company's education and outreach activities, these programs play an important role in driving a culture of conservation in British Columbia.

**Table 5-1: Residential Energy Efficiency Program Area Results Summary**

Program	Annual Gas Savings (GJ/yr.)		Actual NPV Gas Savings (GJ)	Utility Expenditures (\$000s)						Benefit/Cost Ratios				
	2014-2018 DSM Plan	2017 Actual		Incentives		Non-Incentives		All Spending		TRC	MTRC	Utility	Participant	RIM
				2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual					
Non Program Specific Expenses														
Total	No Direct Savings			0	0	540	768	540	768			No Direct Savings		
Energy Efficiency Home Performance (Home Renovation Rebate Program)														
Total	47,131	15,846	208,584	1,228	1,391	423	534	1,651	1,925	0.5	2.4	0.9	1.1	0.5
Furnace Replacement Program														
Total	31,104	37,821	424,456	2,984	3,035	356	290	3,340	3,325	0.4	1.4	1.1	0.8	0.5
EnerChoice Fireplace Program														
Total	9,779	30,039	300,977	657	1,730	244	256	901	1,986	2.5	n/a	1.3	6.8	0.5
Appliance Service Program														
Total	No Direct Savings			356	385	100	62	456	447			No Direct Savings		
ENERGY STAR® Domestic Hot Water "DHW" Technologies														
Total	12,464	28,331	311,164	1,025	2,549	95	285	1,120	2,834	0.3	1.6	0.9	0.7	0.5
Domestic Hot Water Conservation Program /Low Flow Fixtures														
Total	12,825	3,157	30,151	190	269	100	-1	290	269	1.8	n/a	0.7	3.4	0.4
New Home Program														
Total	7,320	1,012	13,542	666	109	118	111	784	220	0.3	1.7	0.5	1.3	0.3
New Technologies Program														
Total	1,798	No Direct Savings		237	0	99	0	335	0			n/a		
Rental Apt Efficiency (RAP) Residential Portion														
Total	0	20,955	157,745	0	221	0	156	0	377			n/a		
Customer Engagement Tool for Conservation Behaviours														
Total	No Direct Savings			0	0	1,006	54	1,006	54			n/a		
On-Bill Financing														
Total	14250	No Direct Savings		143	0	133	0	276	0			n/a		
ALL PROGRAMS														
Total	136,672	137,161	1,446,618	7,486	9,688	3,214	2,515	10,700	12,203	0.5	1.7	1.0	1.1	0.5

Notes:

- \* RAP includes a combination of residential and commercial measures for both low income qualified and the able-to-pay rental apartment market, each funded from their respective Program

<sup>9</sup> Programs for Multifamily Dwellings served under Rate Schedule 2 or 3 are included in the Commercial Energy Efficiency Program Area (please refer to Section 7) with a few exceptions as noted.

Areas. RAP expenditures shown here are related only to the residential portion of RAP. Full RAP details are provided in Section 7.3.1, Table 7-10;

- \* Cost effectiveness values for the *Residential Portion* of RAP are not provided as they do not represent a complete program view. Please refer to Table 7-10 for RAP's cost effectiveness results.

## 5.2 Residential TRC and MTRC Results

FEI's DSM Program Principles state that programs should be universal, offering access to programs for all residential and commercial customers. Although many Residential programs are challenged in meeting a conventional TRC test where gas costs are relatively low, these programs, with their broad reach, are cost-effective when considering broader societal benefits such as water savings, increased human health and comfort, economic benefits such as job creation and greenhouse gas emissions reductions. This is recognized in the DSM Regulation which enables the inclusion of lower TRC programs through the application of the MTRC as discussed in Section 2.1. The overall 2017 Residential Program Area TRC was 0.5 with a combined TRC/MTRC result of 1.7.

## 5.3 2017 Residential Energy Efficiency Programs

Tables 5-2 through 5-8 outline the specific Residential Energy Efficiency programs undertaken in 2017, including program and measure descriptions and a breakdown of non-incentive spending.

**Table 5-2: Energy Efficient Home Performance Program - Home Renovation Rebate**

Program Description	This collaborative program, administered by the Utility Partners, promotes energy-efficiency home upgrades, while educating homeowners on the value of whole home performance. Federal, provincial and local governments co-promote this program and other related initiatives, including consumer education, capacity building for the trades, home labeling, and NRCan's Home Energy Rating System.					
Target Market	Residential customers					
New vs Retrofit	Retrofit					
Partners	BC Hydro, FortisBC (Electric), BC Ministry of Energy, Mines and Petroleum Resources, Natural Resources Canada, and local governments.					
Eligible Measures	Draftproofing	Attic Insulation	Basement Insulation	Wall Insulation	\$750 Bonus Offer	
Incremental Measure Cost	\$989	\$1,147	\$1,463	\$1,953	N/A	
Incentive Amount	Up to \$500	Up to \$600	Up to \$1,000	Up to \$1,200	\$750	
Savings Per Participant	6.6 GJ	8.9 GJ	6.1 GJ	5.6 GJ	N/A	
Measure Life	6 years for draftproofing; 25 years for insulation					
Free Rider Rate	20%					
Sources of Assumptions	Dunskey Energy Consulting Analysis, 2013, 2015 - 2016 Analysis of installation costs from participant data, FEI, November 2016 Consultations with BC Hydro, 2010 Conservation Potential Review, ICF Marbek, 2010 and Dunskey Energy Consulting. Review of 2017 participant data and Analysis of Net-to-gross Survey Results for the ecoENERGY Retrofit for Homes program, Bronson Consulting Group, August 2010					
Participants	2017 Total	Projected 3,780	Actual 2,505			
Expenditures (\$,000s)	2017 Total	Incentives 1,391	Industry Support 78	Admin 277	Non-Incentives Communication 15	Research & Evaluation 164 Total 1,925

**Notes:**

- This program is a collaboration between FEI, FBC, and BC Hydro, with support from MEM, and Natural Resources Canada.
- The "\$750 Bonus Offer" also includes the Municipal Partner Offer (MPO), where eligible participants from participating municipalities received a \$500 top-up. In 2017, there were 15 eligible MPO participants.
- Industry support includes FEI's application support fees to Energy Advisors and contribution to the Home Performance Stakeholder Council (HPSC). The HPSC is an industry led group comprised of key industry players tasked with addressing the fragmented interests, opportunities and challenges that exist in BC's continuously evolving home performance industry. Funding for the HPSC is supported by FEI, FBC, BC Hydro, and MEM.
- Administration expenditures include FEI's contribution to the development of an online application form with BC Hydro to enable an enhanced customer experience and faster rebate processing times.
- Research & Evaluation includes the development of a Program Registered Contractor framework for insulators, training for contractors, and site visits to assess program compliance.

**Table 5-3: Furnace and Boiler Replacement Program**

Program Description	The Furnace and Boiler Replacement program targets customers with functioning furnaces (standard or mid-efficiency) or boilers. Through a combination of marketing, incentives and industry outreach, the program encourages customers to replace the equipment immediately, rather than waiting for it to fail at some point in the future.						
Target Market	Residential customers						
New vs Retrofit	Retrofit						
Partners	N/A						
Eligible Measures	Standard efficiency	Mid - efficiency	Boilers				
Incremental Measure Cost	\$1,840	\$1,840	\$3,540				
Incentive Amount	\$500	\$500	\$500				
Contractor Incentive	\$50	\$50	\$50				
Savings Per Participant	6.9 GJs	5.0GJs	8.7GJs				
Measure Life	Furnace & boilers - 18 years						
Free Rider Rate	Early Replacement Methodology						
Sources of Assumptions	Documentation of FortisBC Furnace and Boiler Early Replacement Program, FEI, February 2018 Furnace Replacement Pilot Program – Preliminary Evaluation Results, Sampson Research, May 2014 Furnace Early Replacement Program – Preliminary Evaluation Year 1 Pilot, Habart & Associates Inc. May 2013 MEASURES AND ASSUMPTIONS FOR DEMAND SIDE MANAGEMENT (DSM) PLANNING, Appendix C: Substantiation Sheets by Navigant Consulting, High Efficiency (Condensing) Furnace – Residential” KEMA Measure Life Study: HVAC, 4.1697.190 Furnace (90% AFUE or greater)						
Participants	2017	Projected	Actual				
	Total	3,730	5,951				
Expenditures (\$,000s)	2017	Incentives	Non-Incentive Expenditures				Total
			Dealer Incentives	Admin	Communication	Research & Evaluation	
	Total	3,035	91	94	20	85	
							3,325

**Notes:**

- Based on industry feedback, the 2017 Furnace and Boiler Replacement program involved reducing the incentive from \$800 to \$500 in order to leave the program in market for a longer duration, which drove higher quality installations and allowed a greater number of customers to participate in the program.
- A greater emphasis was placed on Quality Installation. To be eligible for the rebate, the program required the installation of a two-pipe direct vent system. Contractors were required to sign a set of terms and conditions, pass site verification and agree to complete installations according to the best practices outlined in the *High-efficiency furnace installation guide for existing houses*. This guide was developed in collaboration with industry associations including the Thermal Environmental Comfort Association (TECA) and the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI), and was co-funded by FEI and MEM.
- Contractor incentives of \$50 per participant are allocated to the administration portion of non-incentive spend.

**Table 5-4: EnerChoice Fireplace Program**

Program Description	This program promotes the purchase and installation of energy-efficient EnerChoice fireplaces for zone heating. The program educates consumers and dealers about the EnerChoice label and the benefits of selecting natural gas fireplaces based on energy-efficiency and heating attributes, rather than just decorative features. Program awareness and participation was promoted through a combination of customer and dealer incentives, and promotional activities.					
Target Market	Residential customers					
New vs Retrofit	Both					
Partners	N/A					
Eligible Measures	EnerChoice Fireplace					
Incremental Measure Cost	\$132					
Customer Incentive	\$300					
Contractor Incentive	\$50 (Retrofit only)					
Savings Per Participant	EnerChoice Fireplace (Retrofit): 7.8GJ EnerChoice Fireplace (New Construction): 5.0GJ					
Measure Life	15 years					
Free Rider Rate	37%					
Spillover	14% (Retrofit only)					
Sources of Assumptions	2010 Conservation Potential Review, ICF Marbek, 2010 Fireplace Impact Evaluation, Sampson Research, 2015 AFER Study, Apartment Fireplace Efficiency Retrofit (AFER) Project, Building Energy Solutions, April, 2017 Regulatory Proposal (Sept 2016), Prepared by: Energy Efficiency Branch, BC Ministry of Energy and Mines Pre-Feasibility Study: Upgrades for Decorative Fireplaces-Ref: P132144JGW Analysis of 2017 Participant Data John Sampson Analysis, February 2017					
Participants			Actual			
	2017	Projected Total	Retrofit	New Construction	Total	
	Total	2,190	4,214	1,553	5,767	
Expenditures (\$,000s)			Non-Incentives			
	2017	Incentives	Dealer Incentives	Admin	Communication	Research & Evaluation
	Total	1,730	197	52	7	0
						1,986

**Notes:**

- The FortisBC eligible EnerChoice fireplace directory must be direct-vented, temperature modulating and not have a standing pilot. These requirements support the BC Building Code and provincial policy.
- Contractor incentives of \$50 per participant are allocated to the administration portion of non-incentive spend.
- In 2016, the Energy Efficiency Branch of the B.C. Government introduced a regulatory proposal to increase the standard of efficiency for fireplaces sold in B.C., which is currently expected to take effect on January 1, 2019. The regulatory change in increasing the fireplace minimum efficiency standards presents an opportunity for FEI to claim attribution savings, pursuant to the DSM Regulation, as a result of FEI's efforts towards advancing fireplace standards. FEI has estimated the current attributed savings is 133,000 GJ/yr as of 2017. Once the fireplace regulation is in effect, FEI will claim the attributed savings, make appropriate adjustments to program design, and note changes to the cost effectiveness inputs. The approach to reporting code and standards attribution savings, similar to reporting DSM program savings, will be done through the annual DSM report for each respective measure.



**Table 5-5: Appliance Service Program**

Program Description	This program provides customer education related to the importance of regular appliance maintenance to ensure efficient operation of natural gas appliances. This program also creates opportunities for contractors to dialogue with customers about upgrading appliances to more efficient models.					
Target Market	Residential customers					
New vs Retrofit	Retrofit					
Partners	N/A					
Eligible Measures	Furnace Service (61%), Fireplace Service (33%), Boiler (6%)					
Incremental Measure Cost	N/A					
Incentive Amount	\$25 incentive per service; Average of \$31 per participant					
Savings Per Participant	N/A					
Measure Life	N/A					
Free Rider Rate	N/A					
Participants (no. of services)	2017 Total	Projected 14,250	Actual 15,394			
Expenditures (\$,000s)	2017	Incentives	Admin	Non-Incentives Communication		Total
				Research & Evaluation		
Total		385	25	21	15	447

**Table 5-6: ENERGY STAR® Water Heater Program**

Program Description	This program promotes the replacement of standard efficiency water heaters with efficient ENERGY STAR® models. As part of a longer term market transformation strategy, the program introduced 0.67 EF storage tank water heaters and new technologies with energy factors (EF) greater than 0.80. Additional technologies include condensing and non-condensing tankless water heaters, and condensing storage tanks. The program is available to both retrofit and new construction markets. The program supports upcoming federal and provincial Minimum Efficiency Act Standards for natural gas- and propane-fired water heaters.									
Target Market	Residential customers									
New vs Retrofit	Both									
Partners	N/A									
Eligible Measures	ESTAR 0.67 EF Storage Tank	Non-Condensing Tankless	Condensing Tankless		Condensing Storage Tank					
Incremental Measure Cost										
Retrofit	\$416	\$1,877	\$2,837		\$2,666					
New Construction	\$250	\$1,130	\$1,700		\$1,600					
Incentive Amount	\$200	\$400	\$500		\$1,000					
Savings Per Participant	3.0 GJ	6.9 GJ	9.5 GJ		6.9 GJ					
Measure Life	17.2 years									
Free Rider Rate	27%									
Sources of Assumptions	Energy Savings Assumptions Review (of multiple energy savings data sources), FEI, November 2014, revisited February 2018 including Final Report 0.67 Energy Star Water Heater Pilot Project, June 12, 2014 Deemed savings review of other jurisdictions Review of program participant data from 2017, FEI, February 2018 Review of Technical Reference Manuals from other jurisdictions applied to actual program measure installation data from 2017. FEI, February 2018 including BC Hydro Powersmart F13 Effective Measure Life and Persistence									
Participants	2017	Projected Total	Actual							
			ESTAR 0.67 EF Storage Tank		Non-Condensing Tankless		Condensing Tankless		Condensing Storage Tank	
			Retrofit	New	Retrofit	New	Retrofit	New	Retrofit	New
	Total	1,950	2,613	173	95	253	1,643	1,000	275	256
Expenditures (\$,000s)	2017	Incentives	Non-Incentives				Total			
			Dealer Incentives	Admin	Comm.	Research & Evaluation				
			Total	2,549	225	60	0	0	2,834	

**Table 5-7: Domestic Hot Water Conservation - Low Flow Fixtures and Washer Promotions**

Program Description	The objective of this program is to reduce hot water consumption in houses, row houses and MURBS through partnerships with utilities or government. Initiatives include the installation of low-flow fixtures and ENERGY STAR® washers and dryers.					
Target Market	Residential customers					
New vs Retrofit	Retrofit					
Partners	BC Hydro, FBC, and Municipalities					
Eligible Measures	Low-Flow Fixtures; ENERGY STAR® Washers and Dryers					
ENERGY STAR Washers:						
Incremental Measure Cost	\$77					
Incentive Amount	<b>Partnership with BC Hydro:</b> <ul style="list-style-type: none"><li>• \$50 rebate (FEI contributes \$25) on qualifying ENERGY STAR® clothes washers - IMEF of 2.82 to 2.91, and WF of 3.50 or less</li><li>• \$100 rebate (FEI contributes \$75) on qualifying ENERGY STAR® clothes washers - IMEF of 2.92 or higher, WF of 3.20 or less</li></ul> <b>Partnership with FBC:</b> <ul style="list-style-type: none"><li>• \$50 rebate (FEI contributes \$25) on qualifying ENERGY STAR® clothes washers - IMEF of 2.74 to 2.91, and IWF of 3.50 or less</li><li>• \$100 rebate (FEI contributes \$75) on qualifying ENERGY STAR clothes washers - IMEF of 2.92 or higher, IWF of 3.20 or less</li></ul>					
Savings Per Participant	1.0 GJ Natural Gas plus 0.25 GJ electric - BC Hydro					
Measure Life	14 years					
Free Rider Rate	20%					
ENERGY STAR Dryers:						
Incremental Measure Cost	\$50					
Incentive Amount	<b>Partnership with BC Hydro:</b> <ul style="list-style-type: none"><li>• \$100 rebate (FEI contributes \$100) on qualifying ENERGY STAR® gas dryers - CEF of 3.93 or higher</li></ul> <b>Partnership with FBC:</b> <ul style="list-style-type: none"><li>• \$100 rebate (FEI contributes \$100) on qualifying ENERGY STAR Natural gas dryers</li></ul>					
Savings Per Participant	0.7 GJs					
Measure Life	12 years					
Free Rider Rate	20%					
Low Flow Fixtures:						
Incremental Measure Cost	100 showerheads were provided to the City of Vancouver for piloting their water conservation initiative.					
Incentive Amount						
Savings Per Participant						
Measure Life						
Free Rider Rate						
Sources of Assumptions	Review of Clothes Washer Technology Analysis, BC Hydro, 2010, 2010 Conservation Potential Review, ICF Marbek, 2010 and Technical Reference Manuals from other jurisdictions. Market Review, ESource, December 2014 and High Efficiency Natural Gas Laundry Dryers, Posterity Group and Sampson Research, December 2014 Consultation with program partners Ontario Power Authority "2010 Prescriptive Measures and Assumptions: Release 1" BC Hydro and FortisBC based on market share of eligible washers					
Participants	2017	Projected	Actual			
	Total	N/A	3,959			
Expenditures (\$,000s)	2017	Incentives	Non-Incentives		Total	
			Admin	Communication	Research & Evaluation	
	Total	269	6	1	-7	269

**Notes:**

- The Washer promotion was a collaboration with BC Hydro for a spring promotion in May-June and fall promotion in October-November. In addition, FEI collaborated with FBC from January to December.

**Table 5-8: New Home Program**

Program Description	This program provides education and financial incentives to support energy-efficient building practices for the Residential sector. This program supports efficiency updates to the BC Building Code (effective Dec. 2014). In June 2015, the utilities launched ENERGY STAR® for New Homes as the new whole home performance standard.				
Target Market	Builders of residential properties – single family homes and townhomes and homeowner builders				
New vs Retrofit	New Construction				
Partners	BC Hydro and FBC				
Eligible Measures	ENERGY STAR® Single Family Dwellings		ENERGY STAR® TH/RH/Duplex		
Incremental Measure Cost	\$3,238		\$1,873		
Incentive Amount	\$2,000		\$700		
Savings Per Participant	20.7 GJs		10.4 GJs		
Measure Life	25 years				
Free Rider Rate	15% for ENERGY STAR				
Sources of Assumptions	New Construction Costs and Savings and Life Cycle Costs, First published in 2011 and updated in 2014, Cooper and Habart, and Dunskey Energy Consulting ISE Consulting Group Analysis, March 2014 Analysis of program participants and data				
Participants	2017	Projected	Actual		
	Total	1,338	SFD 52	Row/Townhome 9	Duplex 2 Total 63
Expenditures (\$,000s)	2017	Incentives	Non-Incentives		Total
	Total	109	Program Administration 90	Communication 3	Research & Evaluation 18 220

**Notes:**

- FEI collaborates with BC Hydro and FBC on this program. As of January 2016, BC Hydro no longer offers incentives, although they continue to provide education to builders and energy advisors, and support policy regarding High Performance Homes in BC.
- The participant counts in this table are for the ENERGY STAR component of the program. Incentives for natural gas water heaters and fireplaces installed in new home construction are noted under their respective program tables.
- In 2017, FEI initiated plans to provide support for the adoption of the BC Energy Step Code within the New Home Program, as directed in the 2017 Amendment to the DSM Regulation, which supports utilities' ability to provide incentives for builders who adopt and comply with the Energy Step Code in municipalities across BC.

## **5.4 2017 Residential Energy Efficiency Programs Planned But Not Launched**

### **5.4.1 CUSTOMER ENGAGEMENT TOOL**

In Q4 of 2017, FEI and FBC conducted a Request for Information process for the Customer Engagement Tool (CET), in preparation for a 2018 Request for Proposal process to begin CET development.

### **5.4.2 ON-BILL FINANCING**

On-bill financing initiatives have been found to be expensive and administratively burdensome, with low uptake rates. Partnerships with third party financial organizations supporting this initiative ended in 2017.

### 5.4.3 NEW TECHNOLOGIES

FEI continues to explore new technologies through the Innovative Technologies Program. There were no new technologies deployed in 2017.

## 5.5 Summary

Residential Energy Efficiency Program Area activity in 2017 resulted in over 137,000 GJ/year of natural gas savings. These programs enabled customers to upgrade appliances and capture energy savings, and continued to build on relationships with the trades for education and program awareness. The combination of financial incentives, policy support, contractor outreach, and effective marketing in these programs is instrumental to the ongoing success of these programs in generating natural gas savings and fostering market transformation in the residential sector.

## 6. LOW INCOME ENERGY EFFICIENCY PROGRAM AREA

### 6.1 Overview

During 2017, DSM investments in the Low Income Program Area grew by over 10% relative to 2016. This equates to 47,263 GJ in annual gas savings which is considerably higher than the 27,768 GJ in the 2014-18 DSM Plan.

Table 6-1 summarizes the planned and actual expenditures for the Low Income Program Area in 2017, including incentive and non-incentive spending, annual and NPV gas savings, as well as the cost-effectiveness test results. The TRC and MTRC for Low Income programs use a value of 140% of the benefits in accordance with the DSM Regulation.

**Table 6-1: 2017 Low Income Program Results Summary**

Program	Annual Gas Savings (GJ/yr.)		Actual NPV Gas Savings (GJ)	Utility Expenditures (\$000s)						Benefit/Cost Ratios				
	2014-2018 DSM Plan	2017 Actual		Incentives		Non-Incentives		All Spending		TRC	MTRC	Utility	Participant	RIM
				2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual					
Non Program Specific Expenses														
Total	No Direct Savings			0	0	305	255	305	255	No Direct Savings				
Energy Saving Kit (ESK)														
Total	7,554	29,019	218,451	70	234	46	134	116	368	5.5	n/a	6.4	9.4	1.0
Energy Conservation Assistance Program (ECAP)														
Total	9,161	8,251	71,004	1,333	1,193	901	427	2,234	1,620	0.4	1.8	0.5	1.5	0.3
Residential Energy Efficiency Works (REnEW)														
Total	No Direct Savings			0	0	81	184	81	184	n/a				
Low Income Space-Heat Top Up														
Total	2,261	1,883	22,454	63	80	13	0	76	80	2.8	n/a	3.2	3.5	0.9
Low Income Water-Heating Top Up														
Total	661	353	3,036	10	9	5	0	15	9	3.2	n/a	3.7	4.1	0.9
Non-Profit Custom Program														
Total	8,131	0	0	302	0	119	34	421	34	n/a				
Rental Apt Efficiency (RAP) <i>Low Income Portion</i>														
Total	0	7,757	28,127	0	76	0	18	0	94	n/a				
ALL PROGRAMS														
Total	27,768	47,263	343,071	1,778	1,592	1,469	1,052	3,247	2,644	1.2	2.1	1.4	2.9	0.7

#### Notes:

- RAP includes a combination of residential and commercial measures for both low income-qualified and the able-to-pay rental apartment market, each funded from their respective Program Areas. RAP expenditures shown here are related only to the Low Income portion of RAP. Full RAP details are provided in Section 7.3.1, Table 7-10
- Cost effectiveness values for the *Low Income Portion* of RAP are not provided as they do not represent a complete program view. Please refer to Table 7-10 for the program's cost effectiveness results.

### 6.2 2017 Low Income Programs

Tables 6-2 through 6-7 outline the specific Low Income programs undertaken in 2017, including program and measure descriptions and a breakdown of non-incentive spending.

**Table 6-2: Energy Saving Kit (ESK) Program**

Program Description	<p>The goal of this program is to reach a broad audience of Low Income customers and enable them to take some simple steps towards saving energy by installing a bundle of easy-to-install items that are delivered to their door.</p> <p>Promotional activities include bill inserts, event promotions such as food banks, targeted digital campaigns and partnerships with government ministries and non-profits that serve the low income population.</p>					
Target Market	Low Income Residential Customers					
New vs Retrofit	Retrofit					
Partners	BC Hydro and FortisBC Inc. (FBC)					
Eligible Measures	Bundle of measures including high efficiency water fixtures, draft proofing tape, outlet gaskets, window film, etc.					
Incremental Measure Cost	\$ 21.61 Average based on the full cost of the gas measures included in the ESK.					
Incentive Amount	\$ 21.61 Since the program is free to participants, the incentive equals the incremental cost.					
Savings Per Participant	2.7 GJ per year					
Measure Life & Source	10 years - Average based on the individual gas measures included in the Energy Saving Kit					
Free Rider Rate & Source	0% - E Source Review of Low Income Net to Gross in other Jurisdictions : Low-income, Income Assisted Customers or Charitable Programs Oct. 30, 2017; BC Hydro, Oct. 30, 2017					
Participants	2017 Total	Projected 5,174	Actual 10,828			
Expenditures (\$,000s)	2017 Total	Incentives 234	Admin 38	Communication 96	Research & Evaluation 0	Total 368

**Notes:**

- Participation in the ESK Program is above the 2014-2018 DSM Plan and is aligned with recent years' participation although not quite as high as 2016.

**Table 6-3: Energy Conservation Assistance Program (ECAP)**

Partners	BC Hydro and FortisBC Inc. (FBC)					
Eligible Measures	Bundle of customized measures, which may include low-flow fixtures, water heater pipe wrap, professional draft proofing, outlet gaskets, window film, insulation, improved ventilation, CO detectors, and furnaces.					
Incremental Measure Cost	\$627 Based on average cost of the customized bundle of measures installed. Includes the full cost of the gas measures installed in gas heated homes.					
Incentive Amount	\$627 Since the program is free to participants, the incentive equals the incremental cost.					
Savings Per Participant	3.72 GJ per year					
Measure Life & Source	12 years - Average based on the individual gas measures installed.					
Free Rider Rate & Source	0% - E Source Review of Low Income Net to Gross in other Jurisdictions : Low-income, Income Assisted Customers or Charitable Programs Oct. 30, 2017; BC Hydro, Oct. 30, 2017					
Participants	2017 Total	Projected 1,645	Actual 2,218			
Expenditures (\$,000s)	2017 Total	Incentives 1,193	Admin 158	Communication 142	Research & Evaluation 127	Total 1,620

**Notes:**

- Participation in ECAP is above the 2014-2018 DSM Plan and saw the strongest participation in the Program since launch.
- In 2017 ECAP piloted furnace installations and duct sealing for the first time in manufactured homes.

**Table 6-4: Residential Energy Efficiency Works (REnEW) Program**

Program Description	The goal of this program is to enhance the energy efficiency trade sector in BC in a manner that also enhances communities. This program targets individuals facing barriers to employment and provides training in energy efficiency retrofitting. The training is delivered by industry experts at no cost to participants.					
Target Market	Low income individuals facing barriers to employment					
New vs Retrofit	N/A					
Partners	Ministry of Energy and Mines, FortisBC Inc. (FBC)					
Eligible Measures	N/A					
Incremental Measure Cost	N/A					
Incentive Amount	N/A					
Savings Per Participant	N/A					
Measure Life & Source	N/A					
Free Rider Rate & Source	N/A					
Participants	2017	Projected	Actual			
	Total	20	12			
Expenditures (\$,000s)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	0	148	4	32	184

**Table 6-5: Low Income Space Heat Top Up**

Program Description	The existing Commercial Space Heat Program offers rebates to commercial customers for the installation of high efficiency space heating equipment in commercial applications. The Low Income Space Heat Top Up Program is an add-on to the existing Commercial Space Heat Program and offers an additional rebate over and above the commercial rebate if the customer meets the eligibility criteria.  Promotional activities include partnerships with BC Housing, BC Non-Profit Housing Association (BCNPHA), and the provincial and regional BCNPHA conferences, trade shows and educational seminars.					
Target Market	The Low Income Space Heat Top Up Program is primarily focused on apartment buildings that are owned or operated by a First Nations band, a non-profit housing provider, or a housing co-operative.					
New vs Retrofit	Both					
Partners	N/A					
Eligible Measures	Condensing boilers and mid-efficiency boilers.					
Incremental Measure Cost	\$7,683 per appliance - Analysis of 2016 Program Participant Data, FEI, November, 2017 for Efficient Boiler, and Vendor Costing Survey, FEI, 2015 for Base Efficiency Boiler					
Incentive Amount	Condensing: \$6/MBH Mid-efficiency: \$3/MBH					
Savings Per Participant	129 GJ/yr - EBP Deemed Savings Analysis by FEI applying results from Update of Energy Savings Analysis From FortisBC Efficient Boiler Program – Final Report, August 2013, Prism Engineering.					
Measure Life & Source	20 years - Review of Technical Reference Manuals from other jurisdictions, FEI, 2017 including KEMA: Boilers & Burners 1.2796.040 High Efficiency Modulating Hot Water Boiler ASHRAE Equipment Life Tables					
Free Rider Rate & Source	0% - E Source Review of Low Income Net to Gross in other Jurisdictions : Low-income, Income Assisted Customers or Charitable Programs Oct. 30, 2017; BC Hydro, Oct. 30, 2017					
Participants	2017	Projected	Actual			
	Total	22	15			
Expenditures (\$,000s)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	80	0	0	0	80

Note:

- 2017 was the first full year with this program in market.

**Table 6-6: Low Income Water Heating Top Up**

Program Description	<p>The existing Commercial Water Heater Program was launched in 2010 and it offers rebates to commercial customers for the installation of high efficiency water heating equipment in commercial applications. The Low Income Water Heater Top Up Program will piggyback on the existing Commercial Water Heater Program and offer an additional incentive over and above the commercial rebate if the customer meets the eligibility criteria.</p> <p>Promotional activities will include partnerships with BC Housing, BC Non-Profit Housing Association (BCNPHA), and the provincial and regional BCNPHA conferences, trade shows and educational seminars.</p>					
Target Market	<p>The existing Commercial Water Heating Program offers rebates to commercial customers for the installation of high efficiency water heating equipment in commercial applications. The Low Income Water Heating Top Up Program is an add-on to the existing Commercial Water Heating Program and offers an additional rebate over and above the commercial rebate if the customer meets the eligibility criteria.</p> <p>Promotional activities include partnerships with BC Housing, BC Non-Profit Housing Association (BCNPHA), and the provincial and regional BCNPHA conferences, trade shows and educational seminars.</p>					
New vs Retrofit	Both					
Partners	N/A					
Eligible Measures	High Efficiency Storage Tanks, High Efficiency Domestic Hot Water Boilers, High Efficiency Tankless Domestic Hot Water					
Incremental Measure Cost	\$4890 per appliance - Analysis of 2016 Program Participant Data, FEI, November, 2017 for Efficient Boiler, and Vendor Costing Survey, FEI, 2016 for Base Efficiency Boiler					
Incentive Amount	<p>Storage tank water heater: \$2/MBH  Hot water supply boiler (84%-89.9% thermal efficiency): \$1/MBH  Hot water supply boiler (90%+ thermal efficiency): \$2/MBH  High-efficiency tankless water heater: \$1/MBH</p>					
Savings Per Participant	<p>34 GJ/year per appliance - Energy Savings Assumptions Review (of multiple energy savings data sources), FEI, November 2014, revisited February 2018 including  Final Report 0.67 Energy Star Water Heater Pilot Project, June 12, 2014  Deemed savings review of other jurisdictions  A Canadian High-Efficiency Natural Gas Water Heater Pilot Project, Natural Gas Technologies Centre, July 2014</p>					
Measure Life & Source	12 years -Review of Technical Reference Manuals from other jurisdictions applied to actual program measure installation data from 2017. FEI, February 2018, including BC Hydro Powersmart F13 Effective Measure Life and Persistence and MEASURES AND ASSUMPTIONS FOR DEMAND SIDE MANAGEMENT (DSM) PLANNING, Appendix C: Substantiation Sheets by Navigant Consulting					
Free Rider Rate & Source	0% - E Source Review of Low Income Net to Gross in other Jurisdictions : Low-income, Income Assisted Customers or Charitable Programs Oct. 30, 2017; BC Hydro, Oct. 30, 2017					
Participants	2017	Projected	Actual			
	Total	18	11			
Expenditures (\$,000s)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	9	0	0	0	9

Note:

- 2017 was the first full year with this program in market.



**Table 6-7: Non-Profit Custom Program**

Program Description	<p>This program is designed to encourage social housing apartment buildings to replace inefficient equipment and systems with high-efficiency solutions. The program is built around three components:</p> <p>1) An energy study: Currently there are two avenues available to non-profit housing providers to receive a free energy audit and study. Most participants are having their energy study performed by BC Non-Profit Housing Association (BCNPHA). Some participants are opting to go through the RAP Low Income program for these services.</p> <p>2) Implementation support: Currently the implementation support is available through the RAP Low Income program. There is additional work still under development for this component of the program. Future implementation support could be offered to housing providers that have used BCNPHA for their energy study.</p> <p>3) Incentives for Measures: At this point, it is only the Space Heat Top Up and the Water Heater Top Up measures that are available. Analysis is currently being performed on additional measures to offer additional incentives for.</p>					
Target Market	The Non-Profit Custom Program is primarily focused on apartment buildings that are owned or operated by First Nations bands, non-profit housing providers, or housing co-operatives.					
New vs Retrofit	Both					
Partners	N/A					
Eligible Measures	Eligible measures include boilers and water heaters. Additional measures may in the future include items such as heating controls (i.e. zone controls, temperature set back controls, etc.) and potentially building envelope measures.					
Incremental Measure Cost	N/A					
Incentive Amount	N/A					
Savings Per Participant	N/A					
Measure Life & Source	N/A					
Free Rider Rate & Source	N/A					
Participants	2017 Total	Projected 12	Actual 2,347			
Expenditures (\$,000s)	2017 Total	Incentives 76	Admin 44	Communication 0	Research & Evaluation 7	Total 127

Note:

- In 2017 the Low Income Rental Efficiency Program (RAP Low Income) continued to address several of the objectives of the Non-Profit Custom Program. As well, additional development was completed including multiple meetings with key stakeholders to identify gaps, gaining clarity on the needs of the non-profit housing sector, and expanding the scope of the Non-Profit Custom Program to include more electrical measures by partnering with BC Hydro and FBC.

### 6.3 Summary

The Low Income Program Area has been an important priority for the Company since the initial creation of the DSM Program Principles. In 2017 all historical Low Income programs were operating at some of their highest participation levels to date and programs continue to evolve to include more energy efficiency opportunities for low income customers.

## 7. COMMERCIAL ENERGY EFFICIENCY PROGRAM AREA

### 7.1 Overview

In 2017, Commercial Energy Efficiency programs continued to encourage commercial customers to reduce their overall consumption of natural gas and associated energy costs. The Commercial Energy Efficiency Program Area reduced annual natural gas consumption by approximately 238,688 GJs and achieved an overall TRC of 0.8. \$10.834 million was invested in Commercial Energy Efficiency, of which 82% was incentive spending. Table 7-1 summarizes expenditures for the Commercial Energy Efficiency Program Area in 2017, including incentive and non-incentive spending, annual and NPV gas savings, as well as TRC and other cost-effectiveness test results.

**Table 7-1: 2017 Commercial Energy Efficiency Program Results Summary**

Program	Annual Gas Savings (GJ/yr.)		Actual NPV Gas Savings (GJ)	Utility Expenditures (\$000s)						Benefit/Cost Ratios				
	2014-2018 DSM Plan	2017 Actual		Incentives		Non-Incentives		All Spending		TRC	MTRC	Utility	Participant	RIM
				2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual					
Non Program Specific Expenses														
Total	No Direct Savings			0	0	1,100	554	1,100	554	No Direct Savings				
Space Heating Program														
Total	61,825	73,264	873,565	2,053	3,041	75	289	2,128	3,330	1.6	n/a	2.3	2.4	0.8
Water Heating Program														
Total	16,946	11,703	126,897	269	301	38	127	307	428	0.9	n/a	2.5	1.3	0.8
Commercial Food Service Program														
Total	17,802	10,078	86,723	392	287	108	147	500	434	1.0	n/a	1.7	2.1	0.7
Customized Equipment Upgrade Program														
Total	51,817	51,383	512,567	2,226	2,242	272	435	2,498	2,677	0.6	n/a	1.2	1.0	0.5
EnerTracker Program														
Total	0	0	0	0	0	0	0	0	0	n/a	n/a	n/a	n/a	n/a
Continuous Optimization Program														
Total	88,276	47,472	202,568	1,215	781	173	6	1,389	788	1.0	n/a	2.0	1.8	0.7
Commercial Energy Assessment Program														
Total	0	14,671	14,671	379	61	81	38	460	99	0.9	n/a	1.0	3.0	0.5
Energy Specialist Program														
Total	0	7,549	7,549	1,890	1,567	144	129	2,034	1,696	n/a	n/a	n/a	n/a	n/a
Commercial EDX/Portfolio Manager														
Total	0	0	0	0	0	0	79	0	79	n/a	n/a	n/a	n/a	n/a
Rental Apt Efficiency (RAP) Commercial Portion														
Total	0	22,569	82,264	0	568	0	183	0	751	n/a				
ALL PROGRAMS														
Total	237,665	238,688	1,906,805	8,424	8,847	1,992	1,987	10,416	10,834	0.8	n/a	1.4	1.4	0.6

Notes:

- FEI has not used the MTRC for Commercial programs as the low TRC value observed in the Customized Equipment Program is due in large part to timing between energy study payments and recording of implemented measures and thus recording of savings. Also see notes to Table 7-5.
- RAP includes a combination of residential and commercial measures for both low income-qualified and the able-to-pay rental apartment market, each funded from their respective Program Areas. RAP expenditures shown here are related only to the commercial portion of RAP. Full RAP details are provided in Section 7, Table 7-10.

- Cost effectiveness values for the Commercial portion of RAP are not provided as they do not represent a complete program view. Please refer to Section 7.3.1, Table 7-10 for the program's cost effectiveness results.

## 7.2 2017 Commercial Energy Efficiency Programs

The following tables outline the specific Commercial Energy Efficiency programs undertaken in 2017, including program and measure descriptions and a breakdown of non-incentive spending.

**Table 7-2: Space Heat Program**

Program Description	This program provides rebates for the installation of high efficiency space heating equipment in commercial applications. Currently only rebates for high efficiency boilers are offered. Rebates for condensing rooftop units may also be offered via the program in 2018.					
Target Market	Commercial					
New vs Retrofit	Both					
Partners	N/A					
	Retrofit		New Construction			
Incremental Measure Cost	\$24,227		\$21,541			
Incentive Amount	\$13,641		\$23,429			
Savings Per Participant	407 GJ		639 GJ			
Measure Life	20 years					
Free Rider Rate	18%					
Source of Inputs	EBP Deemed Savings Analysis by FEI applying results from Update of Energy Savings Analysis From FortisBC Efficient Boiler Program – Final Report, August 2013, Prism Engineering Analysis of 2016 Program Participant Data, FEI, November, 2017 for Efficient Boiler, and Vendor Costing Survey, FEI, 2015 for Base Efficiency Boiler Review of Technical Reference Manuals from other jurisdictions, FEI, 2017 including KEMA: Boilers & Burners 1.2796.040 High Efficiency Modulating Hot Water Boiler ASHRAE Equipment Life Tables Efficient Boiler Program Impact Evaluation, June 12, 2003					
Participants	2017	Projected	Actual			
	Total	204	203			
Expenditures (\$,000)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	3,041	289	0	0	3,330

**Table 7-3: Water Heating Program**

Program Description	This program provides rebates for the installation of high-efficiency commercial water heaters with thermal efficiencies greater than or equal to 84%.					
Target Market	Commercial					
New vs Retrofit	Both					
Partners	N/A					
	Retrofit		New Construction			
Incremental Measure Cost	\$7,582		\$15,065			
Incentive Amount	\$1,824		\$3,813			
Savings Per Participant	140 GJ		167 GJ			
Measure Life & Source	17 years					
Free Rider Rate & Source	38%					
Input Sources	Efficient Commercial Water Heater Evaluation – Final Report, Prism Engineering, February 2017. Analysis of 2016 Program Participant Data, FEI, November, 2017 for Efficient Boiler, and Vendor Costing Survey, FEI, 2016 for Base Efficiency Boiler. Review of Technical Reference Manuals from other jurisdictions, FEI, 2017 including MEASURES AND ASSUMPTIONS FOR DEMAND SIDE MANAGEMENT (DSM) PLANNING, Appendix C: Substantiation Sheets by Navigant Consulting. KEMA Measure Life Study. Efficient Commercial Water Heater Evaluation – Final Report, Prism Engineering, February 2017					
Participants	2017	Projected	Actual			
	Total	141	128			
Expenditures (\$,000)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	301	127	0	0	428

**Table 7-4: Commercial Food Service Program**

Program Description	This program offers a suite of rebates for the installation of high-efficiency cooking appliances and it may also provide other incentives relevant to commercial food service participants such as low-flow pre-rinse spray valve or faucet aerator installations.					
Target Market	Commercial					
New vs Retrofit	Both					
Partners	N/A					
	Retrofit		New Construction			
Incremental Measure Cost	\$4,831		\$5,461			
Incentive Amount	\$2,695		\$3,175			
Savings Per Participant	52 GJ		135 GJ			
Measure Life & Source	Food Service - 12 Years; Pre-Rinse Spray Valve - 5 Years; Aerator - 10 Years					
Free Rider Rate & Source	20%					
Input Sources	Commercial Food Service Incentive Program Evaluation, Final Report, Fish and River Consultants, February 2018. Food Service Incentive Program Study, Fisher_Nickel, Inc. (FNI), November 2011. Review of actual program data 2010- 2016, FEI, February 2018. Program Cost Data Review, FEI, 2017 and Vendor costing survey 2017-2018. Review of TRMs from other jurisdictions, FEI, 2017 including KEMA Measure Life Study. Ontario Energy Board: OEB-2015-0344 New and Updated DSM Measures - Joint Submission from Union Gas Ltd. and Enbridge.					
Participants	2017	Projected	Actual			
	Total	490	103			
Expenditures (\$,000)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	287	101	1	45	434

## Notes:

- In 2017 as part of the Commercial Food Service Program, FEI, in partnership with The City of Vancouver, offered a program to install low-flow pre-rinse spray valves (PRSV) and faucet aerators in food service establishments. Installation of 163 pre-rinse spray valves and 291 faucet aerators in the City of Vancouver occurred in 2017, however FEI has not paid any of the incentives and therefore is only claiming the associated GJs.
- The GJ savings from the PRSV and Food Service Program are blended and included in the average values for the retrofit market. The Incentive Amount and Incremental Measure Cost include the Food Service Program only as FEI was not billed for any PRSV installations in 2017.

**Table 7-5: Customized Equipment Upgrade Program**

Program Description	This program provides eligible customers with funding towards the completion of a detailed Energy Study, to identify energy saving opportunities specific and customized to their facilities, and subsequent capital incentive funding to encourage the implementation of any cost effective measures identified therein. The program seeks to capture energy savings associated with measures that are otherwise difficult to incent as part of a prescriptive program because they are complex, and one project may include multiple measures with interactive effects. The expected energy savings, measures, capital cost, incentives etc., will necessarily vary depending on the customer, though each project is submitted to a TRC test and must be approved by the utility.					
Target Market	Commercial customers					
New vs Retrofit	Both					
Partners	BC Hydro (New Construction) FortisBC (New Construction and Retrofit programs - Program development/testing stage)					
Eligible Measures	Utility funded energy study, and utility incented Energy Saving Measures as identified in the energy study and approved by the utility. Energy Saving Measures are variable.					
Incremental Measure Cost	Variable. Dependent upon participant's proposed Energy Saving Measures.					
Incentive Amount	If TRC $\geq$ 1.0 then \$5 / discounted GJ saved over 50% of the Energy Measure Life (EML), up to 10 yrs.					
Savings Per Participant	Variable. Dependent upon participant's proposed Energy Saving Measures.					
Measure Life & Source	Variable. Dependent upon participant's proposed Energy Saving Measures.					
Free Rider Rate & Source	Variable. Dependent upon participant's proposed Energy Saving Measures.					
Participants	2017	Projected	Actual			
	Total	78	69			
Expenditures (\$,000s)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	2,242	430	0	6	2,677
Expenditures (\$,000s)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
New Construction	Total	340	54	0	6	400
Expenditures (\$,000s)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
Retrofit	Total	1,902	375	0	0	2,277

## Notes:

- The Customized Equipment Upgrade Program is complex in nature and has variable measure savings, costs, incentives and/or cash flows that, unlike in prescriptive programs, occur over a period of years. Consequently, providing results for this program within an annual report format is challenging. In general, the savings in this program occur in later years after the participants have had the time to implement customized Energy Conservation Measures, while some program incentives and costs are payable at the outset. As a result, the TRC in 2017 appears low when considering only costs and savings in a single year. Please refer to the notes provided below for additional details.

- New Construction Program:

- Participation in this program can last for approximately five years. This is broken down into approximately 24 months to prepare the required whole building energy simulation, followed by up to 36 months to build the proposed building. The program incurs incentive expenditures upon the successful completion of the energy simulation, as well as upon completion of the building, while natural gas savings are only obtained upon completion of the proposed building.
- This program is in partnership with BC Hydro. Participants are recorded when the energy simulations or the new buildings are complete, and the incentive becomes payable.
- The '2017 Actual' participants include 12 completed energy simulations, and two completed buildings with implemented measures. The associated natural gas savings from these two projects is approximately 9,912 GJ/year.

- Retrofit Program:

- Participation in this program can last for approximately two years. This is broken down into approximately 6 months to prepare the required energy study, followed by 18 months to implement the proposed Energy Conservation Measures. The program incurs incentive expenditures upon the successful completion of the energy study, as well as upon installation of the approved Energy Conservation Measures, while natural gas savings are only obtained upon installation of the approved Energy Conservation Measures.
- The '2017 Actual' participants includes 23 completed energy studies, and 21 projects where Energy Conservation Measures were installed. The associated natural gas savings from these 21 projects is approximately 65,652 GJ/year.

**Table 7-6: Continuous Optimization Program**

Program Description	<p>The Continuous Optimization Program (C.Op) is designed to help commercial building owners identify and correct energy wasting operation faults, and continuously monitor building performance to help maintain and improve energy efficiency, resulting in reduced operating costs. C.Op is offered in partnership with BC Hydro. In the FortisBC electric service territory, C.Op is offered in partnership with FortisBC Inc. as the Building Optimization Program (B.Op).</p> <p>The program funds re-commissioning services to study the participant's building and recommend energy efficiency improvements, as well as access to an energy management information system (EMIS) to assist in tracking the building's performance after the re-commissioning work is complete. In return, participants must implement, at their costs, measures identified by the re-commissioning study that when combined have a payback period of two years or less.</p>					
Target Market	Commercial customers with buildings >50,000 ft <sup>2</sup> who consume an average of 7,500 GJ of natural gas per year or natural gas is 40% of their building's total energy consumption.					
New vs Retrofit	Retrofit					
Partners	BC Hydro FortisBC					
Eligible Measures	RE/Retro-commissioning study, employee training, and "near time" energy consumption monitoring.					
Incremental Measure Cost	Average nominal program duration incremental cost (7 years): \$41,275 2016 observed average implemented incremental cost: \$31,303					
Incentive Amount	Average nominal program duration incentive amount (7 years): \$15,915 2016 observed average implemented incentive amount: \$19,527					
Savings Per Participant	Average expected annual natural gas savings: 1,465 GJ/year 2016 observed average implemented natural gas savings: 1,187 GJ/year					
Measure Life & Source	5 years - the duration of utility support for the energy management information system, plus one year.					
Free Rider Rate & Source	0% - BC Hydro					
Participants	2017	Projected	Participants Implementing in 2017	Cumulative Program Participants		
	Total	567	40	373		
Expenditures (\$,000s)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	781	6	0	0	788

**Notes:**

- The Continuous Optimization Program is conducted in partnership with BC Hydro. BC Hydro acts as the primary administrator of program activities, with FEI providing financial and process support for gas customer participants.
- Participation in this program lasts for approximately seven years for a typical participant. The seven years are composed of approximately 12 months of baseline data collection, 24 months of re-commissioning study work plus the implementation of a recommended bundle of energy conservation measures, and 48 months of monitoring and continuous improvement.
- Participants are recorded as soon as they are accepted into the program, however natural gas savings do not occur until they have completed the implementation of a recommended bundle of energy conservation measures, approximately 36 months later. As such, the program incurs incentive expenses (for the upgrading of meter equipment, re-commissioning costs and EMIS costs) before natural gas savings are obtained.

- The average nominal program duration incremental cost represents the total incremental cost expected to be incurred when an average participant completes the full 7 year run in the program. The 2017 observed average implemented incremental cost represents the incremental costs incurred specifically in 2017 divided by the total number of participants who implemented in 2017.
- The average nominal program duration incentive amount represents the total incentive expected to be paid when an average participant completes the full seven year run in the program. The 2017 observed average implementation incentive amount represents the incentive paid specifically in 2017 divided by the total number of participants who implemented in 2017. Due to the nature of the program, the incentive amount paid is not solely attributable to those who implemented in 2017.
- The average expected annual natural gas savings represent the expected annual natural gas savings per participant after they have completed the implementation of a recommended bundle of energy conservation measures. The 2017 observed average implemented natural gas savings represent natural gas savings attributed to customers who have completed the implementation of a recommended bundle of energy conservation measures specifically in 2017 divided by the total number of participants who implemented in 2017.

Participant count clarification:

- "2017 Actual" represents the number of new participants who were approved in 2017. There were no new participants because the current program is fully subscribed and closed to new participants.
- "Participants implementing in 2017" represents the number of participants who have successfully completed implementing the bundle of energy conservation measures in 2016.
- "Cumulative Program Participants" represent the total number of approved program participants from the entire multi-year duration. Program participants have the option to discontinue participation in the program during the multi-year duration. A number of program participants chose to discontinue participation in 2017 which, combined with the program being closed to new participants, resulted in a lower cumulative participation number than the previous year.



**Table 7-7: Commercial Energy Assessment Program**

Program Description	This program identifies inefficiencies at the participant's facilities via an on-site walkthrough assessment by an energy-efficiency consultant. The consultant then produces a report that describes the observed inefficiencies, outlines proposed solutions, and identifies any applicable incentive programs. FortisBC then forwards the report to the participant. Simple measures, such as low-flow faucet aerators and pre-rinse spray valves, are provided to the participant at no charge.					
Target Market	Medium commercial and small industrial customers with an average annual consumption between 1,500 and 10,000 GJ.					
New vs Retrofit	Retrofit					
Partners	FortisBC Inc.					
Incremental Measure Cost	\$1,529					
Incentive Amount	\$1,328					
Savings Per Participant	491.0 GJ					
Measure Life & Source	<p><b>Energy Assessment</b> - 1.17 Years - Conservative estimate based on the implementation of low-cost, simple recommendations (such as operational adjustments) from the energy assessment report, past spray valve program data and database for Energy Efficiency Resources (DEER). San Francisco, CA, California Public Utilities Commission, 2011. <b>Pre-Rinse Spray Valve</b> - 5 Years - KEMA – State of Wisconsin Public Service Commission of Wisconsin, Focus on Energy Evaluation, Ontario Energy Board, Measures and Assumptions for DSM Planning, February 6, 2009</p> <p><b>Aerator</b> - 10 Years - Terasen Gas TRC Model RES (3/4/2013) &amp; Navigant Consulting, Measures and Assumptions For Demand Side Management Planning (April 16, 2009; Page C-102)</p>					
Free Rider Rate & Source	35% - 2010 Friuch Energy Assessment Evaluation, past spray valve program data					
Participants	2017	Projected	Actual			
	Total	524	46			
Expenditures (\$,000s)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	61	38	0	0	99

Notes:

- At the time of writing the 2014-2018 DSM Plan, FEI was unsure whether the Provincial Government's Business Energy Advisor (BEA) program would continue or not. A contingency measure was planned for this program to ensure small businesses had access to energy analysis if the BEA program was discontinued. Participation from small business customers was foreseen in the 2014-2018 DSM Plan. As the BEA program was continued, the scope of the Commercial Energy Assessment Program was not expanded to include small businesses and the number of participants in 2017 is significantly less than was estimated in the 2014-2018 DSM Plan. In addition, a significant number of multi-family apartment customers now receive their energy assessments through the RAP Program.

**Table 7-8: Energy Specialist Program**

Program Description	This program funds Energy Specialist positions within customers' organizations, up to \$60,000 based on an annual contract. Funded Energy Specialists' key priority is to identify and implement opportunities for their organization to participate in FortisBC's DSM programs, while also identifying and implementing non-program specific opportunities to use natural gas more efficiently. This program is funded as an enabling program.					
Target Market	Large Commercial and Institutional Customers					
New vs Retrofit	Retrofit					
Partners	BC Hydro, FortisBC Inc.					
Eligible Measures	Energy Specialist position					
Incremental Measure Cost	\$60,000					
Incentive Amount	\$60,000					
Savings Per Participant	Total 2017 (non-C&M program) annual natural gas savings = 7,549 GJ/ year					
Measure Life & Source	N/A					
Free Rider Rate	29% - Based on an evaluation study conducted in 2015 by Prism on projects that were outside of the incentive funding.					
Participants	2017	Projected	Actual			
	Total	32	31			
Expenditures (\$,000s)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	1,567	114	0	15	1,696

**Notes:**

- The Energy Specialist Program continues to experience success as an enabling program. In 2017, organizations with Energy Specialists were responsible for 45% of the natural gas savings and 48% of the incentives paid out by Commercial C&EM programs. This is in addition to the Conservation Education and Outreach, Innovative Technologies, Low Income, and Residential programs and incentives that Energy Specialists promoted and used in 2017.
- Some organizations had Energy Specialists for part of the year only as their funding agreements concluded and were not renewed.
- The energy savings listed only apply to natural gas projects completed by Energy Specialists in 2017 that did not directly receive incentive funding from another C&EM program. These energy savings are only reported and have not been included in the calculations for the benefit/cost tests, as the required inputs are not available.
- The energy savings of 7,549 GJs / year is an estimation submitted by Energy Specialists for savings that are not captured by C&EM programs. A third party review was undertaken on projects that claimed over 100 GJs saved. At the time of filing, only a portion of the evaluation study had been completed. Therefore, the savings that are claimed are partially verified by a third party, and projects that had not been fully reviewed yet were vetted for accuracy by FEI's internal engineering team at a high level.

## **7.3 2017 Programs with Joint Program Area Budgets**

### **7.3.1 RENTAL APARTMENT EFFICIENCY PROGRAM (RAP)**

RAP includes a combination of residential and commercial measures for both the low income and the able to pay rental apartment market, each funded from their respective Program Areas. This program is

specifically designed to overcome barriers to adopting energy efficiency measures otherwise experienced by rental building owners and their tenants, and includes expenditures from each of the Residential, Low Income and Commercial Program Areas. The expenditures and related savings for this program attributable to each program area are provided in Table 7-9 and correspond to the RAP expenditures shown in the Program Area Summary Tables for each of the three program areas.

**Table 7-9: Rental Apartment Efficiency (RAP) – Full Program Summary**

Program	Annual Gas Savings (GJ/yr.)		Actual NPV Gas Savings (GJ)	Utility Expenditures (\$000s)						Benefit/Cost Ratios				
				Incentives		Non-Incentives		All Spending						
	2014-2018 DSM Plan	2017 Actual		2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	TRC	MTRC	Utility	Participant	RIM
Rental Apt Efficiency (RAP) - Commercial Portion														
Total	0	22,569	82,264	0	568	0	183	0	751	0.9	n/a	0.9	2.9	0.8
Rental Apt Efficiency (RAP) - Low Income Portion														
Total	0	7,757	28,127	0	76	0	18	0	94	0.8	2.1	3.2	1.1	0.7
Rental Apt Efficiency (RAP) - Residential Portion														
Total	0	20,955	157,745	0	221	0	156	0	377	2.7	n/a	3.4	7.3	0.7
Overall Program														
Total	0	51,281	268,136	0	864	0	357	0	1,221	1.4	n/a	1.9	3.4	0.8

**Table 7-10: Rental Apartment Efficiency (RAP)**

Program Description	There are three components to the RAP program. The first component is to provide direct install in-suite energy efficiency upgrades. These devices will be installed by an agent of FortisBC into each individual rental suite. The second component is to provide those participants with energy assessments recommending building-level energy efficiency upgrades such as condensing boilers, high efficiency water heaters and control upgrades. The last component is to provide participants with support in implementing those energy efficiency recommendations and applying for rebates. Expenditures for RAP are budgeted within 3 program areas based on the in-suite versus the common area expenses. All the in-suite related expenses are budgeted in the Residential Program Area, while the common area related expenses are budgeted in the Commercial Program Area. This includes expenditures associated with the energy assessment, implementation support common area upgrades. For the low income rental customer all expenditures related to both the in-suite and common area expenses are budgeted in the Low Income Program Area.				
Target Market	Purpose-Built Rental Apartment Buildings				
New vs Retrofit	Retrofit				
Partners	FortisBC Inc.				
Eligible Measures	1.5 GPM Showerheads, 1.5 GPM Handheld Showerheads, 0.8 GPM Bathroom Aerators, 0.8 GPM Kitchen Aerators Walkthrough Energy Audits, Implementation Support, Condensing Boilers, Energy Efficiency Water Heaters				
Incremental Measure Cost	Varies				
Incentive Amount	Varies				
Savings Per Participant	Varies				
Measure Life & Source	Varies				
Free Rider Rate & Source	Varies				
Participants	2017	Total	Commercial	Low Income	Residential
	Projected	0			
	Actual	24206	183	2347	21676
Participants by Measure Type			Commercial	Low Income	Residential
	Non-SST 1.5 Showerhead			645	6056
	Non-SST 1.5 GPM Handheld			86	1172
	Non-SST 1.5 GPM Bathroom Aerator			818	7329
	Non-SST 1.5 GPM Kitchen Aerator			769	7119
	Energy Assessment Reports			25	
	Implementation Support Partial	130			
	Implementation Support Full	24		2	
	Boiler Top Ups (40% of the rebate)			2	
	Water Heaters	4			
	Condensing Boilers	22			
	Total		183	2,347	21,676
Expenditures (\$,000s)	2017	Incentives	Non-Incentives		Total
			Admin	Communication	Research & Evaluation
	Commercial	568	121	51	11
	Low Income	76	18	0	0
	Residential	221	97	45	14
	Total	864	235	96	25
					1,221

## 7.4 Summary

Commercial Energy Efficiency Program Area activity in 2017 achieved approximately 238,688 GJ of annual natural gas savings and a TRC of 0.8. All programs continue to maintain steady performance in terms of participation, incentive expenditures and natural gas savings. Of particular note are the Space Heat Program and Commercial Custom Design Program, which remain cornerstone programs for the Commercial Program Area. These programs invested over \$3 million and \$2.2 million respectively in customers' natural gas efficiency projects in 2017. The programs continue to focus on generating natural gas savings and fostering market transformation in the commercial sector.

## 8. INNOVATIVE TECHNOLOGIES PROGRAM AREA

### 8.1 Overview

A primary objective of the Innovative Technologies Program Area is to identify market-ready technologies that are not yet widely adopted in British Columbia, and which are suitable for the development of or inclusion in the Portfolio of ongoing DSM programs in other Program Areas. This is accomplished through pilot and demonstration projects, pre-feasibility studies and the use of Industry Standard Evaluation, Measurement and Verification (EM&V) protocols to validate manufacturers' claims related to equipment and system performance. Results from Innovative Technologies activities are used in making future DSM programming decisions and technology inclusions.

Just as important as identifying new technologies that should be incorporated into the DSM Portfolio are findings that indicate which technologies should not. Section 8.3 summarizes how the activities and processes for the Innovative Technologies Program Area were successful in identifying proposed projects that should not proceed to full pilot phase or further.

All 2017 activities undertaken in this Program Area meet the definition of technology innovation programs as set out in the DSM Regulation. It should be noted that Innovative Technologies are considered a "specified demand-side measure"<sup>10</sup>, meaning that the Program Area or the measures therein are not subject individually to a cost-effectiveness test. Instead the cost-effectiveness of these expenditures will be evaluated as part of the DSM portfolio as a whole.<sup>11</sup> Innovative Technologies expenditures are also not subject to the 40 percent cap on programs for which the MTRC is utilized as a cost-effectiveness measure according to Section 4 (4) of the DSM Regulation.<sup>12</sup>

Table 8.1 summarizes expenditures for the Innovative Technologies Program Area in 2017, including incentive and non-incentive spending, annual and NPV gas savings, as well as TRC and other cost-effectiveness test results where applicable.

<sup>10</sup> BCUC Log No. 36730, Request for Clarification of Order G-44-12 and Decision on the 2012 – 2013 Revenue Requirements Application and Natural Gas Rates Application

<sup>11</sup> Subsection 4(4) of the Demand-Side Measures Regulation, and the Decision on the 2012 – 2013 Revenue Requirements Application and Natural Gas Rates Application, page 175.

<sup>12</sup> BCUC Log No. 36730, Request for Further Clarification of Order G-44-12 and Decision on the 2012 – 2013 Revenue Requirements Application and Natural Gas Rates Application and the Commission's May 11, 2012 letter.

**Table 8-1: 2017 Innovative Technologies Program Area Results Summary**

Program	Annual Gas Savings (GJ/yr.)		Actual NPV Gas Savings (GJ)	Utility Expenditures (\$000s)						Benefit/Cost Ratios				
				Incentives		Non-Incentives		All Spending						
	2014-2018 DSM Plan	2017 Actual		2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	TRC	MTRC	Utility	Participant	RIM
Non Program Specific Expenses														
Total	No Direct Savings			n/a	0	n/a	375	n/a	375	No Direct Savings				
Pilot/Demonstration Projects														
Total	5,343	4,910	65,687	574	95	644	342	1,218	437	1.1	n/a	1.3	7.1	0.6
Studies														
Total	No Direct Savings			n/a	0	n/a	117	0	117	No Direct Savings				
ALL PROGRAMS														
Total	5,343	4,910	65,687	574	95	644	833	1,218	928	0.5	n/a	0.6	7.1	0.4

## 8.2 2017 Innovative Technologies Activities

Tables 8-2 outlines the specific Innovative Technologies Pilot activities undertaken in 2017, including program and measure descriptions and a breakdown of non-incentive spending.<sup>13</sup>

<sup>13</sup> As Innovative Technologies activities are considered pilots rather than DSM programs, they were not presented in individual program tables as in other Program Area sections in the Report.

**Table 8-2: Pilots**

Program Description	The Pilot Program focused on evaluating market-ready technologies and conducting small scale pilots to gather data to validate manufacturers' claims about measure system performance and energy savings. The data from pilots can also be used to help improve the quality and installation of future systems, and to understand and reduce market barriers. Technologies that successfully emerge from the Innovative Technologies Program will be considered for inclusion in the various program areas within the larger C&EM portfolio.					
Target Market	Variable					
New vs Retrofit	Retrofit					
Heat Reflector (HRP) Pilot	To assess energy savings, costing and customer acceptance data related to the installation of a Reflector Panel behind a perimeter heating system in rental MURBs. Energy saving details will be achieved through analysis of billing consumption data on a building level, costing data from the completion of 30 installations and customer acceptance from surveying all building managers at the end of the heating season. Results handed off to program area team Q2 2017.					
	2017 Total	Participants 30				
Smart Learning Thermostat Pilot	This joint pilot between FortisBC Energy Inc. and FortisBC Inc. is designed to gauge the customer acceptance and energy savings associated with smart learning thermostats where the results will inform future Demand Side Management (DSM) and Demand Response (DR) program offerings. Smart Learning Thermostat ("SLT") pilot focuses on the Nest, Ecobee3 and Honeywell Lyric products. The objectives of the pilot are to fill the information gaps identified with customer acceptance, costing and savings for SLTs for both natural gas and electric residential customers. The overall end goal is to provide usable results to the appropriate program teams for them to make a decision for next steps. Results are expected Q3 2019.					
	2017 Total	Participants 0				
Combination Space and Water Heating System (CURP) Pilot	Objectives of the pilot are to identify field-validated energy performance of each combination system type, technical issues, field-validated incremental costs, customer acceptance and the effective marketing channels for promoting a combination system retrofit rebate. The results will provide insight into a cost-effective rebate program for residential customers to upgrade their existing space and water heating equipment to combination systems. Results handed off to program area team Q2 2017.					
	2017 Total	Participants 0				
Participants	2017 Total	Projected n/a	Actual 30			
Expenditures (\$,000s)	2017 Total	Incentives 95	Non-Incentive Expenditures Admin      Communication      Research & Evaluation			Total 437

**Notes:**

- HRP Pilot participants were enrolled and reported in 2016, therefore no (new) participants reported in 2017.
- Participants and savings in the Smart Learning Thermostat Pilot will be attributed when final incentive payments are provided. No final incentive payments made in 2017, therefore no participants reported.
- CURP pilot wrapped up in 2017, therefore no (new) participants reported in 2017.

Tables 8-3 outlines the specific Innovative Technologies Study activities undertaken in 2017, including program and measure descriptions and a breakdown of non-incentive spending.

**Table 8-3: Studies**

Description	Studies are used to assess the market opportunity, technical characteristics and projected energy savings of commercially available DSM technologies. The results can be used to determine the feasibility of launching a pilot or to make future program area inclusion decisions.				
Target Market	Variable				
New vs Retrofit	N/A				
<i>Direct Vent Wall Furnace Study Feasibility Study</i>	Direct Vent Wall Furnaces are compact self-contained combustion units that are installed on exterior walls so that combustion by-products are discharged outside through a vent. Direct Vent Wall Furnaces can be a good alternative to central heating systems, especially if a home does not have existing ducting or is built on a concrete slab. The objective of the study was to investigate Direct Vent Wall Furnaces that can be installed to replace lower efficiency space heating systems and lower efficiency fireplaces in both new construction and retrofit applications for all suitable residential building types. The study was completed in Q3 2017.				
<i>Web Enabled Thermostats Feasibility Study</i>	Web-enabled programmable thermostats allow users to control temperature setbacks as well as HVAC controls remotely using the internet. A large number of thermostats can be controlled and programmed through a central portal. This allows commercial building owners to optimize the heating and cooling energy usage of their buildings without having to physically be at the property and/or without having to physically interact with each thermostats in their facility. The objective of the study was to assess the market opportunity, technical characteristics and projected energy savings for web-enabled programmable thermostats that can be installed in both new construction and existing commercial buildings for all suitable commercial building types across FortisBC's service territory. The study was completed in Q3 2017.				
<i>Commercial Boiler Controls Feasibility Study</i>	Boiler load controls can reduce the energy consumption of existing boiler systems, and are generally applied to hydronic building heating systems, although they can also be used for DHW systems and combination boilers. The control systems fall broadly into two categories, Boiler cycling controls which reduce the energy consumption of the boiler through a reduction in boiler cycling and Building zoning controls which is an automation systems that controls the quantity of heat provided to different zones within the building to reduce the overall heating energy provided. The objective of this study was to investigate combination of space heating boiler operation or set point adjustment controls, hot water distribution controls and occupied space heating controls for central gas fired boiler systems in commercial building. The study was completed in Q2 2017.				
Expenditures (\$,000s)	2017	Incentives	Non-Incentive Expenditures		
			Admin	Communication	Research & Evaluation
	Total	0	117	0	0
					Total
					117

### 8.3 Summary

Innovative Technologies represent a key component of FEI's overall commitment to DSM activities by identifying viable technologies and projects that have the potential to support the development of new programs within the larger DSM Portfolio.

Overall, the Innovative Technologies initiatives successfully achieved results in evaluating the feasibility of new technologies and providing insights used towards the design of future DSM programs. The Innovative Technologies Program Area continues to use consistent criteria to ensure the greatest potential for screening technologies for further development as full programs in other areas of the DSM Portfolio.



## 9. INDUSTRIAL ENERGY EFFICIENCY PROGRAM AREA

### 9.1 Overview

In 2017, the Industrial Energy Efficiency Program Area continued to encourage industrial customers to consume natural gas more efficiently and achieved an overall TRC of 1.3, with a combined net natural gas savings of 105,516 GJ/yr. Table 9-1 summarizes expenditures for the Industrial Energy Efficiency Program Area in 2017, including incentive and non-incentive spending, annual and NPV gas savings, as well as TRC and other cost-effectiveness test results.

**Table 9-1: 2017 Industrial Energy Efficiency Program Results Summary**

Program	Annual Gas Savings (GJ/yr.)		Actual NPV Gas Savings (GJ)	Utility Expenditures (\$000s)						Benefit/Cost Ratios				
				Incentives		Non-Incentives		All Spending		TRC	MTRC	Utility	Participant	RIM
	2014-2018 DSM Plan	2017 Actual		2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual					
Non Program Specific Expenses														
Total	No Direct Savings			n/a	n/a	262	150	262	150	No Direct Savings				
Industrial Optimization Program														
Total	122,474	103,429	982,135	1,609	1,558	447	330	2,056	1,888	1.3	n/a	4.9	0.7	2.2
Specialized Industrial Process Technology Program														
Total	67,826	2,086	24,875	584	56	81	5	665	61	1.1	n/a	3.9	1.3	0.9
ALL PROGRAMS														
Total	190,300	105,516	1,007,011	2,193	1,614	789	485	2,983	2,099	1.3	n/a	4.5	0.7	2.0

Note:

- For the purpose of cost-effectiveness tests, 105,516 GJ in savings has been claimed for 2017. As a project's total incentive can be made across multiple years, the annual natural gas savings are pro-rated based on the proportion of the project's incremental cost that is reported in that year. Please refer to the Industrial Optimization Program description below for further details on this methodology.

### 9.2 2017 Industrial Energy Efficiency Programs

Tables 9-2 and 9-3 show the Industrial Energy Efficiency Program Area activity undertaken in 2017, including program and measure descriptions and a breakdown of non-incentive spending.

**Table 9-2: Industrial Optimization Program**

Program Description	The program includes measures that allow customers to identify, assess, and implement customized cost-effective energy efficiency projects for industrial processes using natural gas as process heat or an energy source.					
Target Market	Medium and large industrial facilities					
New vs Retrofit	Both					
Eligible Measures	Variable. Natural gas measures with a TRC $\geq$ 1.0					
Incremental Measure Cost	Dependent upon participant's proposed energy conservation measures.					
Incentive Amount	Variable. Dependent on project characteristics.					
Savings Per Participant	Variable. Dependent on project characteristics.					
Measure Life & Source	Variable. Dependent upon participant's proposed energy conservation measures					
Free Rider Rate & Source	10% Technology Implementation; 20% Industrial Energy Audit, Plant Wide Audit, Feasibility Study. Source: Preliminary determination based on Commercial Performance Program: FEI (2010), Review of Technical Reference Manuals from Other Jurisdictions (Updated on a Project by Project Basis) and best judgment.					
Participants	2017	Projected	Actual			
	Total	31	24			
Expenditures (\$,000s)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	1,558	276	0	53	1,888

**Notes:**

- Participation in the program can span multiple years due to the timescales associated with completing an energy study, procuring and installing an energy conservation measure, and multi-year measurement and verification analysis.
- Measures include Industrial Energy Audit, Plant Wide Audit, Feasibility Study, and Technology Implementation. FEI is no longer accepting applications for the Energy Audit measure as this was replaced by the Plant Wide Audit and Feasibility Study measures in 2015. Energy Audit participants that completed energy studies and received incentives in 2017 are reported herein.
- The net natural gas savings reported in 2017 under the Industrial Optimization Program are solely attributable to projects implemented through the Technology Implementation measure. Natural gas savings from energy conservation measures identified, installed, but not receiving incentives through the Technology Implementation measure of the Industrial Optimization Program are not claimed at this time.
- In 2017, two Plant Wide Audits and thirteen Feasibility Studies were completed. Eleven projects progressed to Technology Implementation measure and are expected to save 290,792 GJ/yr. of natural gas once installed.
- Depending on the size of the incentive, Technology Implementation project incentive payments are either paid fully on project commissioning or are paid across several years after commissioning and based on the natural gas saving performance. Hence, for larger incentives, only a portion of the incentive is paid on project commissioning. For consistency in performing cost benefit analyses, only a prorated portion of the natural gas savings and project costs are included in the determination of the cost benefit ratios. In 2016, FEI reviewed and revised the proration methodology adopted in 2013. The revised methodology results in a more accurate reflection of program cost effectiveness by mitigating the risk of not fully reporting a project's incremental cost and more accurately presenting natural gas savings in a given year. The revised approach is used for the 2017 reporting period.

- In 2017, FEI worked to align the incentive and M&V approach for Technology Implementation projects signed between 2013 and 2016 with the approach adopted in 2016. This alignment was done to simplify the payment structure and condense the program participation period.

**Table 9-3: Specialized Industrial Process Technology Program**

Program Description	This program provides prescriptive incentives to Industrial customers to encourage the implementation of specific technologies and best practices targeted at particular industrial processes using natural gas as process heat or an energy source.					
Target Market	Small, Medium and Large Industrial Facilities					
New vs Retrofit	Both					
Incremental Measure Cost	Variable. Dependent on measure.					
Incentive Amount	Variable. Dependent on measure.					
Savings Per Participant	Variable. Dependent on measure.					
Measure Life & Source	Variable. Dependent on measure.					
Free Rider Rate & Source	20% - steam trap audit and replacement; 18% - hot water process boilers; 20% - steam boiler upgrades; 20% pipe insulation; 20% other measures. Sources: Preliminary determination based on Commercial Prescriptive Program (to be formalized in 2018). Efficient Boiler Program Impact Evaluation (2003). Specialized Industrial Process Technology Program business case					
Participants	2017 Total	Projected 18	Actual 3			
Expenditures (\$,000s)	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	56	5	0	0	61

#### Notes:

- Applications for this measure are administered through the Commercial Program Area's Space Heating Program for efficiency, however participation counts, incremental costs, and natural gas savings are reported under the Specialized Industrial Process Technology Program.
- Incentive structure, natural gas savings methodology, and free ridership rates used for the hot water process boiler measure are sourced from the Commercial Program Area's Space Heating Program.
- FEI launched the steam trap audit and replacement, pipe and tank insulation, air curtains and direct contact water heater prescriptive measures in Q4 2017. Applications for these measures are administered under the Industrial Program Area. Due to the timing of the program release to market no applications were received in 2017.

### 9.3 Summary

The Industrial Energy Efficiency Program Area activity in 2017 resulted in 105,516 GJ/yr. of net natural gas savings and a TRC of 1.3. Enhancements to the Industrial Optimization Program have resulted in increased participation and greater natural gas savings in 2017 relative to 2016. Launching the Specialized Industrial Process Technology Program into market was a significant milestone as it represents the first time FEI has been able to support a customer consuming less than 10,000 GJ/yr. to implement high efficiency equipment for their industrial processes.

## 10. CONSERVATION EDUCATION AND OUTREACH INITIATIVES

### 10.1 Overview

The CEO Program Area continues to support the DSM Portfolio goals of energy conservation in a variety of ways. In order to foster a culture of conservation, several programs and campaigns were undertaken in 2017, providing new information about behaviour change and customer attitudes on efficiency. Educating all types of customers including residential, commercial and students – remains a strong priority and FEI is continuing to ensure steps are taken to make the information relevant and timely for these customers.

Continued collaboration with FBC was ongoing in 2017 to maximize efficiencies across both teams. Costs continue to be shared on school, residential and commercial outreach as applicable. The fourth annual Efficiency in Action awards were held recognizing natural gas commercial organizations that have most effectively utilized C&EM programs and achieved natural gas savings. FEI's partnership with BC Hydro continued in 2017. This included collaboration on the Energy Wise Network Program for commercial customers that led to over 80 natural gas behavior change projects being submitted in 2017 with a completion date of March 31, 2018. The multi-lingual outreach program, Empower Me, continued to reach new Canadians in nine languages through a community based social marketing approach. Empower Me received City of Surrey's Clean Energy City Award: Innovation in Energy Conservation & Efficiency, Community Category. A pilot initiative was also undertaken in 2017 using the Empower Me approach to reach multi-lingual small businesses.

CEO continued to provide information to customers and the general public on natural gas conservation and energy literacy and sought out new opportunities to reach customers face-to-face. In collaboration with FBC a new initiative was successfully piloted with small businesses in the shared service territory focused on face-to-face efficiency education. The development and testing phase for the curriculum-connected on-line resource initiative "Energy Leaders" for BC elementary and secondary school teachers was completed and the initiative moved to a full offering for teachers. Discovery for Grade 10-12 curriculum was completed. FEI also continues to support various training seminars and educational workshops in collaboration with such organizations as the Greater Vancouver Home Builders Association and other industry associations.

As these are not incentive-based programs, FEI has not attributed direct savings to them in 2017. The following tables do not contain information about eligible measures, incentive amounts, savings levels, free-ridership, spillover or participation levels. CEO costs are included at the Portfolio level and incorporated into the overall DSM Portfolio cost-effectiveness results. Although there were no energy savings attributed to the CEO Program Area in 2017, FEI continues to focus on behavioural change opportunities that lead to potential energy savings.

Table 10-1 summarizes expenditures for the CEO Program Area in 2017. The approved spending for 2017 was \$2.400 million and actual spending in 2017 was \$2,590 million.

**Table 10-1: 2017 CEO Initiative Results Summary**

Program	Annual Gas Savings (GJ/yr.)		Actual NPV Gas Savings (GJ)	Utility Expenditures (\$000s)						Benefit/Cost Ratios				
				Incentives		Non-Incentives		All Spending						
	2014-2018 DSM Plan	2017 Actual		2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	TRC	MTRC	Utility	Participant	RIM
Non-Program Specific Expenses														
Total	No Direct Savings			0	0	240	99	240	99			No Direct Savings		
Residential Education Program														
Total	No Direct Savings			0	0	990	1,480	990	1,480			No Direct Savings		
Commercial Education Program														
Total	No Direct Savings			0	0	450	449	450	449			No Direct Savings		
School Education Program														
Total	No Direct Savings			0	0	720	562	720	562			No Direct Savings		
ALL PROGRAMS														
Total	No Direct Savings			0	0	2,400	2,590	2,400	2,590			No Direct Savings		

## 10.2 2017 CEO Programs

Tables 10-2 through 10-4 outline the CEO initiatives undertaken in 2017. This includes program descriptions as well as a breakdown of spending, all of which is classified as “non-incentive spending”.

**Table 10-2: Residential Education Program**

Program Description	<p>This program provides information to Residential customers and the general public on natural gas conservation and energy literacy by seeking opportunities to engage with customers broadly and directly. This audience also included low income and multi-lingual customers.</p> <p>Promotional activities in 2017 included a multimedia general rebates awareness campaign, engagement campaigns as well as educational seminars and participation in home shows and community events. The Program also included the cost of production of materials for events and prizing for audience engagement that are utilized at events targeting Residential customers and children.</p> <p>In addition, continuing partnerships with the regional Canadian Home Builders' Associations and local sports organizations expanded outreach opportunities to engage with Residential customers.</p> <p>Furthermore, FEI continues to focus on behavioural change opportunities that lead to energy savings however we currently do not verify and report on those savings.</p> <p>Collaborations between internal departments and with other utilities and partners were sought to achieve cost efficiencies in the budget, particularly for advertising and for outreach events.</p>					
Target Market	Residential customers and general public					
New vs Retrofit	Both					
Expenditures (\$,000s)	Non-Incentive Expenditures					
	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	0	876	604	0	1,480

**Table 10-3: Commercial Education Program**

Program Description	<p>This program provides ongoing communication and education about energy conservation initiatives as well as encourages behavioural changes that help Commercial customers reduce their organization's energy consumption. The Commercial sector is made up of small and large businesses in a variety of sub sectors such as retail, offices, multi-family residences, schools, hospitals, hospitality services and municipal/institutions.</p> <p>Promotional activities for 2017 included print and online communications, industry association meetings and tradeshow, award and development of face-to-face engagement opportunities specific to small businesses. Our fourth annual Efficiency in Action Awards, which recognizes Commurecial customers for their innovation in energy efficiency also took place.</p> <p>In addition, continuing partnerships with the Business Improvement Associations of BC (BIABC) and Climate Smart expanded outreach to small to medium-sized businesses.</p> <p>This program area continued to guide and support behaviour education campaigns delivered by energy specialists (or an energy manager) in their respective organizations. Collaborations between internal departments, FortisBC Inc. as well as with other utilities, were pursued to achieve cost efficiencies such as the Energy Wise Network joint initiative with BC Hydro.</p>																						
Target Market	Commercial customers, multi-family, energy specialists, energy management staff																						
New vs Retrofit	Retrofit																						
Expenditures (\$,000s)	<table><tr><td></td><td></td><td colspan="3">Non-Incentive Expenditures</td><td></td></tr><tr><td>2017</td><td>Incentives</td><td>Admin</td><td>Communication</td><td>Research &amp; Evaluation</td><td>Total</td></tr><tr><td>Total</td><td>0</td><td>190</td><td>250</td><td>9</td><td>449</td></tr></table>							Non-Incentive Expenditures				2017	Incentives	Admin	Communication	Research & Evaluation	Total	Total	0	190	250	9	449
		Non-Incentive Expenditures																					
2017	Incentives	Admin	Communication	Research & Evaluation	Total																		
Total	0	190	250	9	449																		

**Table 10-4: School Education Program**

Program Description	This is an education program for students enrolled in [K-12] schools and post secondary schools in the Company's service area. This program now has an online resource for teachers directly linking to the K-9 curriculum.					
	Other activities include assembly style presentations related to conserving energy for K-7 students, delivered internally through our Energy is Awesome presentations and externally through our BC Lions Energy Champions initiative. These activities also include distribution of energy efficient fixtures and colouring books. Partnerships and funding support for post-secondary activities included on-campus education campaigns.					
Target Market	Students and teachers					
New vs Retrofit	Retrofit					
Expenditures (\$,000s)	Non-Incentive Expenditures					
	2017	Incentives	Admin	Communication	Research & Evaluation	Total
	Total	0	328	111	123	562

## 10.3 Summary

All of the initiatives described in CEO are designed to foster a culture of energy conservation in BC. This Program Area is important to deliver overall conservation messaging, support energy efficiency literacy and assist with increasing program awareness. By changing attitudes and behaviours, the Company will help communities reach their goals, help customers save energy and money, increase participation in DSM programs and ultimately support the shared goals of FEI and the Provincial Government. This Program Area continues to explore new ways and seek out new opportunities and channels to connect with customers to ultimately grow the culture of energy conservation.

## 11. ENABLING ACTIVITIES

### 11.1 Overview

In 2017, Enabling Activities continued to support and supplement FEI's DSM program development and delivery, advancing energy efficiency in British Columbia. This included:

- the ongoing Trade Ally Network Program;
- work completed in advancing national and provincial building codes, appliance/equipment standards, and regulations;
- maintenance of the Company's DSM program tracking system;
- completion of the Conservation Potential Review; and
- continued funding to support post-secondary energy management programs.

While these activities play a very important role in FEI's Portfolio of DSM activities by advancing the delivery of all Program Areas, the Company has not claimed any energy savings in 2017 for work completed in this area.

While no energy savings will be claimed for Enabling Activities in 2017, FEI identified energy efficiency savings from Codes and Standards advancement as part of the EnerChoice Fireplace Program. As discussed in Section 5.2, the BC government will implement the new standard for ensuring minimum fireplace efficiency in January of 2019. As such, FEI expects to claim these energy savings in 2018 when the new standard implementation is confirmed. No other opportunities to identify attribution savings were identified in 2017. FEI will continue to examine and, where appropriate, adopt methodologies for claiming energy savings from Codes and Standards for future programs. Table 11-1 summarizes the projected and actual expenditures for the Enabling Activities in 2017.

**Table 11-1: 2017 Enabling Activities Results**

Program	Annual Gas Savings (GJ/yr.)		Actual NPV Gas Savings (GJ)	Utility Expenditures (\$000s)						Benefit/Cost Ratios				
	2014-2018 DSM Plan	2017 Actual		Incentives		Non-Incentives		All Spending		TRC	MTRC	Utility	Participant	RIM
				2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual	2014-2018 DSM Plan	2017 Actual					
Trade Ally Network														
Total	No Direct Savings			n/a	n/a	500	723	500	723			No Direct Savings		
Codes and Standards														
Total	No Direct Savings			n/a	n/a	35	184	35	184			No Direct Savings		
TrakSmart Maintenance														
Total	No Direct Savings			n/a	n/a	80	107	80	107			No Direct Savings		
Conservation Potential Review														
Total	No Direct Savings			n/a	n/a	0	54	0	54			No Direct Savings		
Commercial End-Use Study														
Total	No Direct Savings			n/a	n/a	30	0	30	0			No Direct Savings		
New Homes Study														
Total	No Direct Savings			n/a	n/a	30	0	30	0			No Direct Savings		
Home Energy Efficiency Web Portal														
Total	No Direct Savings			n/a	n/a	100	0	100	0			No Direct Savings		
Energy Management Education Funding														
Total	No Direct Savings			n/a	n/a	150	114	150	114			No Direct Savings		
ALL PROGRAMS														
Total	No Direct Savings			n/a	n/a	925	1,181	925	1,181			No Direct Savings		

## 11.2 2017 Enabling Activities by Program

The following tables outline the specific Enabling Activities undertaken in 2017 by activity, including activity descriptions and a breakdown of spending. Note that all expenditures under Enabling Activities are considered non-incentive spending.

**Table 11-2: Trade Ally Network**

Program Description	This program develops and manages a contractor network to promote DSM programs and energy-efficiency messaging. FEI identifies trade allies as equipment manufacturers, service contractors, and distributors, and recognizes the influence these industry groups have with the end-use Residential and Commercial customers who make energy-efficiency decisions. This program also supports funding energy efficiency training as outlined in the DSM Regulation.				
Expenditures (\$,000s)	2017	Admin	Communication	Research & Evaluation	Total
	Total	178	523	22	723



1

**Table 11-3: Codes and Standards**

Program Description	Utilities have a unique understanding of energy supply and customer demand cycles, which can be of assistance in the development of codes and standards. The content and timing of code implementation directly affects market transformation in all program areas. FEI's level of regulatory involvement typically includes one of three involvement classifications: monitoring, stakeholder engagement and developing regulations. The Codes & Standards area "supports the development of or compliance with specified standard or a measure respecting energy conservation or the efficient use of energy" as referred to in the definition of "specified demand-side measures" in the DSM Regulation.				
Policy Initiatives consultation process	Evaluation, analysis and review of national, provincial and municipal initiatives for energy efficiency.				
Industry consultation process	Collaboration with entities like BC Hydro and the Home Owner Protection Office (HPO) for the development of industry training and guidelines on implementation of new energy efficiency measures. Participation with the BC Safety Authority Gas Technology Committee industry stakeholder group.				
Involvement with supporting projects	Active participation for supporting projects like: the Natural Resources Canada new EnerGuide rating system and Leadership in Energy Efficiency Partnerships (LEEP).				
Codes and Standards Strategy	Active participation on the Canadian Standards Association (CSA) Strategic Steering Committee on Fuel Burning Equipment. This committee is the highest level committee in the fuel sector at CSA and oversees all committees and sub-committees in the fuel burning sector. Consultation with the Canadian Gas Association (CGA), Canadian Institute of Plumbing and Heating (CIPH), Heating Refrigeration and Air-conditioning Institute (HRAI) and the Canadian Home Builders Association (CHBA) on codes and regulations that are common to our industries. Research on the new provincial performance path for residential and commercial buildings i.e. the BC Energy Step Code was conducted. The research study focused on understanding technical changes to traditional building approaches, along with the economic impacts of building to the step code tiers including choices of mechanical and HVAC systems.				
Codes and Standards Maintenance	Active participation on the CSA Technical Committee on Energy Efficiency and Related Performance of Fuel-Burning Appliances and Equipment. This committee oversees all of the eleven existing performance standards for gas-fired equipment and is looking to develop new needed standards for equipment. Participation in the Standards Council of Canada, committee on Domestic gas cooking appliances ISO/TC 291.				
Internal awareness of Code and Regulatory changes	Development of internal documents and updates for relevant program areas and personnel.				
Standards library	Purchase of up to date testing standards and up to date building codes for reference.				
Expenditures (\$,000s)	2017	Admin	Communication	Research & Evaluation	Total
	Total	78	2	104	184

2

**Table 11-4: TrakSmart Maintenance**

Program Description	Ongoing IT license and maintenance costs related to the portfolio DSM tracking system.				
Expenditures (\$,000s)	2017	Admin	Communication	Research & Evaluation	Total
	Total	107	0	0	107

**Table 11-5: Conservation Potential Review**

Program Description	FEI considers the CPR to be an important tool for use in developing, supporting, and assessing current and future DSM expenditure applications, as well as for directional input into program development. The purpose of a CPR study is to examine available technologies and determine their conservation potential, which includes the amount of energy savings that can be achieved through energy-efficiency and conservation programs over the study period. This project was worked on in collaboration with BC Hydro, Pacific Northern Gas and FortisBC Electric. Core work on the CPR began in 2015 and continued through 2016. The CPR economic potential and market potential reports were completed in 2017.				
Expenditures (\$,000s)	2017	Admin	Communication	Research & Evaluation	Total
	Total	54	0	0	54

**Table 11-6: Energy Management Education Funding**

Program Description	Funding to support post-secondary energy management programs such as the UBC Master of Engineering Leadership Program in Clean Energy Engineering and the BCIT Sustainable Energy Management Advanced Certificate.				
Expenditures (\$,000s)	2017	Admin	Communication	Research & Evaluation	Total
	Total	114	0	0	114

## 11.3 2017 Enabling Activities Planned But Not Launched

### 11.3.1 HOME ENERGY EFFICIENCY WEB PORTAL

FEI's vision for the Home Energy Efficiency Web Portal has changed over time. In 2017, through Innovative Clean Energy (ICE) funds provided by the BC government, the BC Home Energy Coach service was established. BC residents can phone or email this free service to receive information on how to improve energy efficiency in their home. A database of province-wide incentives are included as part of this initiative, which fulfils the original objectives of the

Home Energy Efficiency Web Portal project.<sup>14</sup> Given the Province's implementation of the Home Energy Coach service, FEI will no longer be pursuing the Home Energy Efficiency Web Portal.

### 11.3.2 RESIDENTIAL END USE STUDY (REUS)

The REUS provides a snapshot of the FEI Residential customer base. It provides information about the building characteristics, the fuel choice for heating, cooling and cooking, the types and ages of installed appliances, energy-use behaviours, and customer attitudes towards energy issues. The REUS also includes a billing analysis to determine natural gas consumption by appliance type. The study was originally forecast to take place in 2016. Initial scoping for the study was started in 2016. The questionnaire was drafted and the study was fielded in 2017. The report will be delivered in 2018. C&EM's portion of the costs will be incurred upon the report being delivered in 2018.

### 11.3.3 COMMERCIAL END USE STUDY (CEUS)

The CEUS provides a snapshot of the FEI Commercial customer base including multi-family residential buildings. The survey collects information about the building, the business(es) occupying the building, the fuel choice for heating, cooling and cooking, the types and ages of appliances installed, energy-use behaviours, and customer attitudes towards energy issues. The CEUS was originally forecast to take place in 2017 but that timing was changed and the study was conducted in 2014. Reporting of the CEUS expenditures were included in the FortisBC Energy Utilities 2014 Energy Efficiency and Conservation Annual Report. The next CEUS is expected to be conducted in 2019.

### 11.3.4 NEW HOMES STUDY

The New Homes study was not completed in 2017 as the objectives for New Homes research changed over time. In 2017, significant resources supported the introduction and adoption of the BC Energy Step Codes, which remove the need for the New Homes Study as originally intended.

## 11.4 Summary

Enabling Activities are critical initiatives that support and supplement DSM program development and delivery. The success of the Residential Furnace Replacement Program (see Section 5.3, Table 5-3), which was promoted through the contractor network, demonstrates the value of the Trade Ally Network Program. Communications were immediate and responsive through the network and at the end of the program, 72 percent of the program's participants used contractors who were members of the Trade Ally Network.

FEI's involvement in codes and standards work in 2017 continued to encompass varying degrees of activities including monitoring, reviewing and responding to existing and proposed

<sup>14</sup> More information can be found at [www.BCEnergyCoach.ca](http://www.BCEnergyCoach.ca).

- 1 regulatory changes and direct participation in various working groups that explore the
- 2 development of future targets, codes and standards. The Conservation Potential Review
- 3 Economic and Market Potential reports were finalized in the first half of 2017. This project
- 4 involved a collaboration between BC Hydro, Pacific Northern Gas, FEI and FBC.

## 12. EVALUATION

In alignment with the Company's EM&V Framework and industry standard practice, program evaluation activities are assessed at different stages of each program's lifecycle.<sup>15</sup> Based on this ongoing assessment, all programs are evaluated when appropriate. The 2017 evaluation activities presented here reflect the number of programs in market, the different stages of their lifecycle, and the type of evaluation activities required to provide program feedback.

### 12.1 2017 Program Evaluation and Evaluation Research Activities

In 2017, FEI's various evaluation activities included quantifying energy savings, assessing participant awareness and satisfaction, identifying barriers to participation, assessing customer usability and engagement with various FEI DSM outreach activities, and conducting industry research. Measurement and Verification (M&V) activities focused on identifying and verifying project and measure level savings assumptions and understanding any issues associated with equipment installation in the field.

Table 12-1 provides a summary of all program evaluation and evaluation research related activities undertaken in 2017. Expenditures for these activities have been accounted for within the applicable program or Program Area non-incentive costs included in previous sections, but are also reported here in order to provide a concise, easy-to-view summary of evaluation activities. Included in the table are: a list of all the 2017 evaluation activities; the Program Area each activity occurred in; the general type of evaluation activity undertaken; the Company's actual 2017 evaluation expenditures; and a status update on each activity. The total expenditure for program evaluation and research activities in 2017 is approximately \$703,000.

<sup>15</sup> Types of evaluation activities include: Communications evaluations, which focus on advertising and media outreach; Evaluation studies, where quality assurance or inspection is conducted to gain more insight on the incented measure; Market studies, research and interviews with industry stakeholder to assess market penetration; Process evaluations, where surveys and interviews are used to assess customer satisfaction and program success; Impact evaluations, to measure the achieved energy savings attributable from the program; Market Analysis, to characterized the industry and the program's effect on market penetration and, Measurement & Verification, to monitor real time energy savings associated with energy conservation measures.

**FORTISBC ENERGY INC.**
**NATURAL GAS DEMAND-SIDE MANAGEMENT PROGRAMS 2017 ANNUAL REPORT**
**1**
**Table 12-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2017<sup>18</sup>**

Evaluation Name	Program Area	Type of Evaluation	Years the program has been running <sup>19</sup>	Evaluation Partnership	Actual Evaluation Expenditure (000's)	Evaluation Status <sup>20</sup>
FortisBC Communication Tracking: Energy Efficiency Conservation	C&EM Portfolio	Communication	ongoing	none	\$3	Customer engagement and awareness of C&EM activities. <b>Completed October 2017 by Sentis Research</b>
C&EM Rebates UX Testing	C&EM Portfolio	Communication	ongoing	none	\$7	Usability testing of the rebates section of FortisBC.com website. <b>Completed July 2017 by FortisBC</b>
Review of Net-to-Gross Assumptions (FEI & FBC Energy Efficiency Programs)	C&EM Portfolio	Evaluation Study	none	FortisBC Energy Inc. & FortisBC Inc.	\$13	Review of net-to-gross (NTG) methods, data sources, and assumption used by FortisBC to ensure alignment with the industry best practices. <b>Completed December 2017 by Sampson Research</b>
Contractor Research Survey	Residential	Process	Ongoing	FortisBC Energy Inc. & FortisBC Inc.	\$37	Survey with program participants and non-participants within the Contractor community. <b>Completed May 2017 by Participant Research and Sentis Research Inc.</b>
Appliance Maintenance Rebate Program -Evaluation 2017	Residential	Process	8	none	\$15	Quantitative research study among 2017 program participants to assess the program and gather feedback for future program design. <b>Expected completion by Q2 2018</b>
Evaluation & Contractor Outreach	Residential	Evaluation Study	1	none	\$1	Educating contractors on best practices based on learnings from the Home Energy Rebate Offer (HERO) Quality Study of Insulation evaluation study completed May 2016 and reported in the 2016 Annual Report.
Home Renovation Rebate Program - Insulation & Program Compliance Site Visits	Residential	Evaluation Study	3	none	\$56	Ongoing site visit of homes with insulation and draft proofing measures with a focus on quality assurance and program compliance.
Program Registered Contractor Training	Residential	Evaluation Study	Ongoing	none	\$17	Ongoing contractor training to provide installation best practices and ensure quality workmanship.
Furnace Replacement Program - Participant Survey	Residential	Process	5	none	\$28	Quantitative research study among 2016 program participants to assess customer satisfaction and gather feedback for future program design. <b>Completed July 2017 by Sentis Research Inc.</b>
Furnace Replacement Program - Market Evaluation for Quality Installation	Residential	Market Study	5	none	\$8	Market assessment to gather feedback and recommendations for furthering quality installation of furnaces. <b>Expected completion by Q2 2018</b>

**2**

<sup>18</sup> Table 12.1 does not include Prefeasibility Studies. Please refer to the Innovative Technologies section (Section 8) for details.

<sup>19</sup> Measurement & Verification studies require time to conduct activities which include, but are not limited to, project commissioning, installing and removal of monitoring equipment, data collection and, data analysis and reporting. The column 'Years the program has been running' will refer to the time required to conduct the M&V activities. M&V activities align with the International Performance Measurement and Verification Protocol (IPMVP). Concepts and Options for Determining Energy and Water Savings. Prepared by the Efficiency Valuation Organization: [www.evo-world.org](http://www.evo-world.org). January 2012.

<sup>20</sup> M&V completion refers to the time period where the actual monitoring and data collection ends. Analysis and reporting will require additional time

**FORTISBC ENERGY INC.**
**NATURAL GAS DEMAND-SIDE MANAGEMENT PROGRAMS 2017 ANNUAL REPORT**
**1 Table 12-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2017 (continued)**

Evaluation Name	Program Area	Type of Evaluation	Years the program has been running <sup>19</sup>	Evaluation Partnership	Actual Evaluation Expenditure (000's)	Evaluation Status <sup>20</sup>
Furnace Replacement Program - Quality Assurance & Program Compliance Site Visits	Residential	Evaluation Study	5	none	\$48	Ongoing site visit of homes with furnace/boiler upgrades with a focus of quality assurance and program compliance.
Rental Apartment Efficiency Program (RAP) - Evaluation 2016	Residential / Commercial	Process	2	FortisBC Energy Inc. & FortisBC Inc.	\$3	Building owner and Tenant survey for program evaluation with 2015 and 2016 program participants. <b>Completed December 2016 by Cohesium Research. Results reported in 2016 Annual Report</b>
Rental Apartment Efficiency Program (RAP) - Evaluation 2017	Residential / Commercial	Evaluation Study	2	none	\$3	Ongoing performance testing for RAP participants.
Rental Apartment Efficiency Program (RAP) - Evaluation 2017	Residential / Commercial	Process	2	FortisBC Energy Inc. & FortisBC Inc.	\$19	Building owner and Tenant survey for program evaluation with 2017 program participants. <b>Expected completion by Q1 2018</b>
Low Income General Survey	Low Income	Process	ongoing	none	\$60	Survey and interviews were conducted to gather feedback for low income program design and marketing strategies. <b>Completed February 2017 by Participant Research and Sents Research Inc.</b>
Energy Conservation Assistance Program (ECAP)	Low Income	Evaluation Study	6	FortisBC Energy Inc. and BC Hydro	\$60	Ongoing Quality Assurance to ensure products are installed according to program policies and procedures.
Energy Conservation Assistance Program (ECAP) - Overall Program Evaluation 2017	Low Income	Process & Impact	6	FortisBC Energy Inc. and FortisBC Inc.	\$28	Participant survey and monthly consumption usage conducted for the program. <b>Expected completion by Q2 2018</b>
Energy Conservation Assistance Program (ECAP) - Ongoing Feedback Survey	Low Income	Process	6	FortisBC Energy Inc. and BC Hydro	\$3	Ongoing survey with program participants to gather frequent and ongoing feedback on customer experience, satisfaction with the program and its program evaluators.
Energy Specialist Program - Evaluation 2017	Commercial	Process & Impact	8	FortisBC Energy Inc. & FortisBC Inc.	\$15	The evaluation study includes program and industry stakeholder surveys and an energy savings audit on a subset of completed 2017 projects. <b>Expected completion by Q2 2018.</b>
Commercial Food Service Incentive Program - Evaluation 2017	Commercial	Process & Impact	6	none	\$45	The evaluation consisted of a participant survey and energy impact analyses of the program from 2012 to 2016 <b>Completed December 2017 by Fish+River Consultants</b>

**Table 12-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2017 (continued)**

Evaluation Name	Program Area	Type of Evaluation	Years the program has been running <sup>19</sup>	Evaluation Partnership	Actual Evaluation Expenditure (000's)	Evaluation Status <sup>20</sup>
Combination Space/Water Heating Units Pilot	Innovative Technologies	Process & Impact	3	none	\$51	Combination of surveys with program participants and contractors, and analysis of the monthly consumption usage pre and post installation. <b>Completed July 2017 by Sampson Research</b>
Smart Learning Thermostat Pilot	Innovative Technologies	Measurement & Verification	1	FortisBC Energy Inc. & FortisBC Inc.	\$54	Gauging customer acceptance and energy savings associated with smart learning thermostats. <b>Expected completion Q3 2019</b>
Heat Reflector Pilot (HRP)	Innovative Technologies	Evaluation Study & Measurement & Verification	2	none	\$76	Customer survey, thermal imaging, equipment recording, and analysis of the consumption usage pre and post installation. <b>Completed November 2017 by RDH Building Science</b>
Industrial Optimization Program	Industrial	Measurement & Verification	6	none	\$53	M&V was conducted on 14 projects in 2017 of which 2 completed its M&V requirements. The M&V activities include the completion of an M&V plan, commissioning validation site visits, and M&V reports.



1 Table 12-2 contains a summary of all program evaluation studies and pilot program reports completed in 2017 and includes a brief  
2 description of the methodologies and key findings.

3 **Table 12.2: Summary of Key Findings and Methodology for 2017 Completed DSM Program Evaluation Studies and Pilot Program**  
4 **Reports**

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
FortisBC Communication Tracking: Energy Efficiency Conservation	C&EM Portfolio	Communications	Online interviews conducted with 800 British Columbia adults living within the FortisBC service territory.	<p><b>Results:</b> The percentage of participants had aided awareness of at least one of the three main energy efficiency activities undertaken by FortisBC trended upward from 66% in 2016 to 78% in 2017.</p> <p>The engagement index was redefined to provide greater differentiation between levels of engagement. Overall, nearly three-quarters of participants were at least moderately engaged, four-in-ten were extremely or highly engaged.</p> <p><b>Outcome of Key Findings:</b> Continue to emphasize the overarching energy efficiency activities rather than individual programs to build awareness.</p>
C&EM Rebates UX Testing	C&EM Portfolio	Communications	One-on-one user testing sessions with both Commercial and Residential customers.	<p><b>Results:</b> Improvements identified for the web page particularly in regard to search functionality and the use of imagery to guide customers.</p> <p><b>Outcome of Key Findings:</b> As a results of the study, improvements were made to the rebates section of the corporate website.</p>
Review of Net-to-Gross Assumptions (FEI & FBC Energy Efficiency Programs)	C&EM Portfolio	Evaluation Study	Interviews with FortisBC program managers and evaluation specialists, review of program evaluations, market research, and other FortisBC internal documents and industry literature review.	<p><b>Results:</b> Net-to-Gross methods were identified and best practice methods were recommended.</p> <p><b>Outcome of Key Findings:</b> The results of the study will help inform future program evaluations.</p>

**Table 12-2: Summary of Key Findings and Methodology for 2017 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)**

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
Contractor Research Survey	Residential	Process	Telephone surveys were conducted with 119 program participants and 100 non-participant contractors between March 16 to April 7, 2017. Six focus groups sessions were held in Coquitlam, Kelowna and Prince George. 13 program participants and 13 non-participants attended the sessions between April 12 to April 20, 2017. The research assisted in gathering feedback regarding; FortisBC, its various DSM initiatives, the Trade Ally Network and the Electrical Contractor Program.	<p><b>Results:</b> Overall, contractors are highly satisfied with the DSM program rebate application process. 71% of contractors rated the current program rebate amount as "Good deal/saves money" and "Good selling tool/incentive". Two-thirds (67%) of contractors who considered the timing of the furnace/boiler replacement rebate offer important would like the rebate to be offered all year round. 88% of TAN Members and 61% of non-participant gas contractors helped the customer complete the rebate application form.</p> <p><b>Outcome of Key Findings:</b> Results were taken under consideration for 2018 program design and 2019-2022 DSM Plan development.</p>
Furnace Replacement Program - Participant Survey	Residential	Process	3,554 program participants were contacted by telephone to participate in an online survey and to take photos of their installed furnace. A total of 422 participants completed the survey between June 1 to June 23, 2017.	<p><b>Results:</b> The survey results showed an overall program satisfaction rating of 88%. Over half the participants who completed the survey (57%) were satisfied with the rebate amount. 77% of the participants survey indicated "excellent" or "very good" with the overall satisfaction with the contractors who installed their furnace.</p> <p><b>Outcome of Key Findings:</b> Feedback from the survey was taken into account for the new program design and offer.</p>

**Table 12-2: Summary of Key Findings and Methodology for 2017 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)**

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
Rental Apartment Efficiency Program (RAP) - Evaluation 2017	Residential/Commercial	Process	This study is an ongoing evaluation conducted annually for the program. Two separate surveys were conducted; a building owner survey and tenant survey. A telephone survey was completed for 45 property owners/managers and an online survey was completed for 166 tenants.	<p><b>Results:</b> The survey results continue to show positive feedback with 93% of the building owners and 70% of the tenants surveyed indicating "very" or "somewhat satisfied" with the overall program. Owners/managers continue to view the program's communications positively with approximately 9 in 10 owners/managers "very" or "somewhat satisfied" with the accessibility of the program information, the ease of understanding the information, knowing how/who to contact regarding the program, and the level of communications throughout the entire program process.</p> <p><b>Outcome of Key Findings:</b> Continue to conduct ongoing tenant and building owner surveys to provide feedback to program design.</p>
Low Income General Survey	Low Income	Process	The evaluation study consisted of; an online survey with 1,483 BC residents (842 low income and 641 non-low income households), and follow-up interviews with 16 low income households. The evaluation objectives were to understand the low income population as a function of their demographics, impression of FortisBC, concerns regarding finances, and their attitudes and actions toward energy savings.	<p><b>Results:</b> Four key segment groups were identified within the low income participants group. Insights were garnered on considerations for marketing communications geared to each of the segments.</p> <p><b>Outcome of Key Findings:</b> The study will inform future program communications and marketing strategies.</p>

**Table 12-2: Summary of Key Findings and Methodology for 2017 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)**

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
Commercial Food Service Incentive Program - Evaluation 2017	Commercial	Process & Impact	The evaluation consisted of a participant survey and energy impact analyses of the program from 2012 to 2016. A combination of an online survey and telephone survey approach was used to gather feedback from a total of 328 participants. Program deemed savings analysis was conducted using data from the program application forms and from the participant survey.	<p><b>Results:</b> 197 out of the 328 program participants responded to the survey (60% response rate) with an average program satisfaction rating of 70%. A review of the 328 program participants which included 548 appliances that had been installed through the program resulted in a deemed savings of approximately 33,840 GJ per year.</p> <p><b>Outcome of Key Findings:</b> Results from the study will inform future program design.</p>
Combination Space/Water Heating Units Pilot	Innovative Technologies	Process & Impact	The study was conducted over a one year period and consisted of surveys (online and telephone) with program participants and contractors, and a billing consumption analysis at the building level. The pilot was comprised of 97 participants that installed either a boiler and tankless water heater, boiler and an indirect tank or a hydronic fan coil and tankless water heating system.	<p><b>Results:</b> Approximately 68% of participants installed a Type 1 combined system. Contractors believed the driver is due to higher customer demand for Type 1 and suitability for homes with boilers. The customer survey results indicated a 94% of participants were satisfied with the installed combined space and water heating system and over 75% reported that their homes were more comfortable than their previous system. Energy savings were derived from conducting a billing consumption analysis and varied across different combination types ranging between 18 to 20 GJ/yr.</p> <p><b>Outcome of Key Findings:</b> Results from the study will inform future program design.</p>

**Table 12-2: Summary of Key Findings and Methodology for 2017 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)**

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
Heat Reflector Pilot (HRP)	Innovative Technologies	Evaluation Study & Measurement & Verification	<p><b>M&amp;V Plan:</b> Complies with the International Performance Measurement &amp; Verification Protocol. The selected IPMVP option and measurement boundary was Option B<sup>21</sup>.</p> <p><b>M&amp;V:</b> The M&amp;V study was conducted over a one year period. 20 participant buildings (19 in Lower Mainland, 1 in Kamloops) with heat reflectors installed, boiler set point adjustments made, and baseboard convectors cleaned were monitored and reviewed using; thermal imaging, equipment recording, customer survey, and analysis of billing consumption data on a building level.</p>	<p><b>Results:</b> Surveys conducted with building managers showed tenants felt value in the cleaning of the baseboard convectors but reported higher incidents of tenant complaints after the HRP installation, though this may have been due to the uncharacteristically cold winter. The results showed that there is a difference in energy savings compared to buildings with non-condensing boilers and ones with condensing boilers. Buildings with non-condensing boilers saved 79 GJ/yr while buildings with condensing boilers increase their consumption by 23 GJ/yr.</p> <p><b>Outcome of Key Findings:</b> Results from the study will inform future program design.</p>
Industrial Optimization Program	Industrial	Measurement & Verification	<p><b>M&amp;V Plan:</b> Complies with the International Performance Measurement &amp; Verification Protocol. The selected IPMVP option and measurement boundary was Option B<sup>21</sup>.</p> <p><b>M&amp;V:</b> M&amp;V was conducted on ITRP006 Agropur (Victoria Plant) for steam boiler upgrade in a dairy processing plant.</p>	<p><b>Results:</b> Three year M&amp;V completed with a total verified natural gas savings of 9,544 GJ. The plant reduced their natural gas consumption by 9,544 GJ by upgrading their main steam boiler along with upgrades of their steam and condensate distribution system. The achieved savings were well aligned with the expected target savings and exceed the minimum savings to achieve cost effectiveness of the project.</p> <p><b>Outcome of Key Findings:</b> M&amp;V project completed with the full incentive payment issued to the participant as the natural gas savings met target savings.</p>

<sup>21</sup> IPMVP Option B - Measurement of all parameters governing energy use to assess consumption. [www.evo-world.org](http://www.evo-world.org)

**Table 12-2: Summary of Key Findings and Methodology for 2017 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)**

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
Industrial Optimization Program	Industrial	Measurement & Verification	<p><b>M&amp;V Plan:</b> Complies with the International Performance Measurement &amp; Verification Protocol. The selected IPMVP option and measurement boundary was Option A<sup>22</sup></p> <p><b>M&amp;V:</b> M&amp;V was conducted on ITRP008 BA Blacktop for installation of stock feed covers</p>	<p><b>Results:</b> Three year M&amp;V completed with a total verified natural gas savings of 14,165 GJ. The plant reduced their natural gas consumption by 14,165 GJ by installing covers over their stock feed to reduce the moisture content of the feed going into the processing plant. The achieved savings were well aligned with the expected target savings and exceed the minimum savings to achieve cost effectiveness of the project.</p> <p><b>Outcome of Key Findings:</b> M&amp;V project completed with the full incentive payment issued to the participant as the natural gas savings met target savings.</p>

<sup>22</sup> IPMVP Option A - Measurement of key parameters governing energy use to assess consumption. [www.evo-world.org](http://www.evo-world.org)

## 12.2 Evaluation Collaboration

In 2017, FEI continued to seek opportunities to increase collaboration activities with FBC, BC Hydro, and other entities to conduct program evaluation for DSM programs. The number of collaboration activities depends on the timing of the activity, program participants, legal and privacy concerns, and available budget to conduct the study. Table 12-1 provides information on program evaluation activities conducted in partnership with other organizations. In keeping with the MOU on collaboration discussed in Section 2.5, FEI and BC Hydro held update meetings to review the evaluation plans and discuss future evaluation activities. FEI, FBC and BC Hydro continue to hold update meetings and explore opportunities for future collaboration on program evaluations.

## 13. DATA GATHERING, REPORTING AND INTERNAL CONTROLS PROCESSES

### 13.1 Overview

The following section outlines FEI's business practices to ensure DSM activities and associated spending are in compliance with the Company's internal control processes and Commission Decision and Order G-36-09, which directed the Company to include a discussion in the DSM Annual Report of the Company's internal data gathering, monitoring and reporting control practices.

### 13.2 Program Tracking, Evaluation and Reporting Functions

FEI staff responsible for tracking, evaluation and reporting of DSM activities continue to report to a different Director than staff responsible for program development and implementation in order to:

- conduct independent evaluation activities;
- maintain an independent library of inputs into cost effectiveness calculations; and
- centralize tracking and reporting processes.

### 13.3 Robust Business Case Process Applied to All Programs

Before a new DSM pilot or program can be implemented, a business case must first be developed. FEI is committed to putting each pilot or program through the appropriate level of internal scrutiny before moving ahead, and believes doing so ensures an increased chance of pilot or program effectiveness.

Business cases include information about program rationale and purpose, as well as a description of the target audience, assumptions, cost-benefit tests and proposed evaluation methods. Cost effectiveness analysis is performed using the California Standard Tests (CST) as outlined in the California Standard Practice Manual. FEI uses an in-house cost-benefit modeling tool developed in partnership with expert industry consultants<sup>23</sup> to apply the program costs and benefits in each of the four standard cost-effectiveness tests based on the California Standard Practice Manual (Rate Impact Measure ["RIM"], Utility, Participant, and TRC) and the MTRC in accordance with DSM Regulation. The results from this modelling are used as inputs for the business cases, which are approved in accordance with FEI's policy on financial authorization levels.

<sup>23</sup> Willis Energy Services Ltd. and The Cadmus Group Inc. provided input into this in-house cost-benefit modelling.



In addition to the internal business case process, the Decision directed FEI to submit a detailed plan for new programs for approval prior to the expenditure of any funds.<sup>24</sup> No new programs were submitted for approval to the Commission in 2017.

### 13.4 Incentive Applications Vetted for Compliance with Program Requirements

Ensuring that all customer applications are compliant with program eligibility requirements as laid out in program terms and conditions is also part of the internal control process. The Company has a number of mechanisms in place to ensure DSM incentive funding applications are in compliance with program requirements. The verification process is specific to each program and is dependent on the type of program, its complexity, the financial value of the incentive and other parameters. The general principles applied are as follows:

- Each application is reviewed for completeness and accuracy;
- Applications must meet the criteria outlined in the terms and conditions of the program put forward through the approval process;
- Once approved, incentives are distributed to participants; and
- Copies of application and supporting documents are filed and stored for seven years in case of an audit.

### 13.5 Internal Audit Services

FEI regularly engages its own Internal Audit Services (IAS) group to review the internal controls associated with the DSM activities. The IAS utilize the most recently completed year of operation on which to conduct their audit. The 2017 Internal Audit Report, thus covers 2016 DSM operations. The 2017 Internal Audit Report, included in Appendix A, concludes that key controls are in place and operating effectively to mitigate risk around program development, program administration including rebate payments, and program reporting and evaluation to an appropriately low level).

### 13.6 Summary

FEI is committed to strong internal controls in all aspects of the DSM programs. As demonstrated in this section, the Company's business practices related to program development, application processing and ongoing monitoring are all sound and subject to continuous improvement.

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<sup>24</sup> Decision, page 278

## 14. 2017 DSM PROGRAMS ANNUAL REPORT SUMMARY

In 2017, FEI's DSM Portfolio expenditures reached 96 percent of Plan with 64 percent of actual DSM program spending going toward customer incentives. With almost 534,000 GJ of annual savings, DSM programming continued to contribute valuable options for customers to reduce their energy use. FEI cost effectively delivered these programs within the spending limits accepted by the Commission, and in accordance with the DSM Regulation. FEI works to ensure DSM programs are operating in compliance with the Company's DSM Guiding Principles and are meeting Provincial requirements for adequacy. FEI also continues to implement good internal data gathering, monitoring and reporting control practices.

**Appendix A**

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**2017 INTERNAL AUDIT REPORT**

**Date:** October 10, 2017

**To:** **Roger Dall'Antonia**, EVP, Customer Service and Technology

**CC:** **Danielle Wensink**, Director, Conservation and Energy Management

**From:** **Katrina Craig**, Director, Internal Audit

**Re:** Conservation and Energy Management – Internal Control and Process Review

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## **INTRODUCTION**

The Conservation and Energy Management Program ("the Program" or "CEM") is designed to provide customers with tools and incentives to manage their natural gas consumption, reduce their energy costs, and lower their greenhouse gas emissions.

In September 2014, the British Columbia Utilities Commission ("BCUC") granted approval for the Program expenditure of \$35.8 million for 2016 in order G-138-14. The Program includes rebates and incentives on a number of energy efficient appliances, equipment and systems as well as education and outreach initiatives to increase awareness of the energy efficiency and environmental benefits that can be achieved by using clean burning natural gas in high efficiency appliances.

## **SCOPE AND OBJECTIVES**

The objective of the review was to evaluate the design and operating effectiveness of the key internal controls over the 2016 programs, namely those around program development, program administration including rebate payments, and program reporting and evaluation. This was accomplished by:

- Verifying program tracking, evaluation and reporting functions are separate from program development and implementation functions;
- Inspecting that a cost/benefit analysis is developed for each business case by Integrated Resource Planning (IRP);
- Understanding, documenting and obtaining evidence that controls are in place that help ensure program criteria are met for each application;
- Verifying the effectiveness of system-based application controls;
- Ensuring that program metrics and reports are produced and reviewed, on a regular basis, by Management for program monitoring and evaluation purposes; and
- Developing recommendations to address any control deficiencies or opportunities for improvement as identified.

## **OBSERVATIONS & CONCLUSION**

Based on procedures performed, Internal Audit found that key controls are in place and operating effectively to mitigate risk around program development, program administration including rebate payments, and program reporting and evaluation to an appropriately low level.