Doug Slater
Director, Regulatory Affairs

Gas Regulatory Affairs Correspondence
Email: gas.regulatory.affairs@fortisbc.com

Electric Regulatory Affairs Correspondence
Email: electricity.regulatory.affairs@fortisbc.com

FortisBC
16705 Fraser Highway
Surrey, B.C. V4N 0E8
Tel: (778) 578-3874
Cell: (778) 214-3842
Fax: (604) 576-7074
Email: doug.slater@fortisbc.com
www.fortisbc.com

March 31, 2020

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) – 2019 Annual Report

Attached please find the Natural Gas DSM Program 2019 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.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Doug Slater

Attachment

FortisBC Energy Inc.

Natural Gas
Demand-Side Management Programs
2019 Annual Report

March 31, 2020

Table of Contents

List of Tables

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[1] (DSM) measures that address the expectations of customers while meeting the requirements for public utilities to pursue cost-effective DSM. The Company achieved a combined portfolio Modified Total Resource Cost (MTRC)[2] of 1.4 on expenditures of $64.495 million, meeting FEI's goal of cost-effective program delivery.

The FEI DSM Annual Report (the Report) outlines the Company's actual results and expenditures for 2019, under the 2019-2022 DSM Plan approved by BCUC Order G-10-19. The Report compares 2019 actual activity and results to the DSM Plan values for 2019. Where the details of individual programs vary substantially from the 2014-2019 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);
- Utility Cost Test (UCT); and
- Modified Total Resource Cost (MTRC) - 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 pursuant to BCUC Order G-10-19, which continues a number of requirements from prior Orders regarding DSM expenditures. One such mechanism contained in Order G-36-09 was the requirement to file DSM Annual Reports, which states:

[1] Throughout the 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.

[2] 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).

> A requirement that Terasen [now FEI] submit annually to the BCUC, by the end of the first quarter following year-end, for each year of the funding period, a report on all [DSM] initiatives and activities, expenditures and results…

The Report shows that FEI's DSM portfolio meets the cost-effectiveness calculations and adequacy requirements set out in the DSM Regulation, as amended in March 2017.

1.2 ORGANIZATION OF THE DSM ANNUAL REPORT

The following describes how each section of the Report presents the results of 2019 DSM activities:

Section 1: Report Overview

- Provides a high-level background for the Report.

Section 2: Portfolio Overview

- Provides detail regarding the overall actual 2019 expenditures for DSM activities.
- Section 2.5 discusses any new requirements from the BCUC concerning information to be included in the 2019 DSM Annual Report.

Section 3: Funding Transfers

- Provides a discussion on funding transfers between Program Areas and amounts unspent in 2019 in each Program Area and rolled over to 2020 planned expenditures.

Section 4: Advisory Group Activities

- Provides information regarding Energy Efficiency and Conservation Advisory Group (EECAG) activities in 2019.

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 2019, including incentive and non-incentive expenditures, annual and NPV gas savings, as well as TRC and other cost-effectiveness test results. Additional tables outline the individual 2019 programs, including program and measure descriptions, program assumptions and sources for these assumptions, and a breakdown of incentive and non-incentive expenditures.

Section 10: Conservation Education and Outreach Initiatives

- Provides both a summary and details regarding actual 2019 expenditures for the Conservation Education and Outreach (CEO) Program Area.

Section 11: Enabling Activities

- Provides both summary and detail regarding actual 2019 expenditures for the Enabling Activities that support the work of the DSM Portfolio as a whole.

Section 12: Evaluation

- Provides detail regarding pending and actual expenditures for 2019 program evaluation activities, as well as summary results from evaluations and studies completed in 2019.

Section 13: Data Gathering, Reporting and Internal Control Processes

- Provides a summary of the Company's data tracking, process control, and reporting for 2019 DSM activities, and a high-level description of the Company's internal approval process for programs.

Section 14: 2019 DSM Annual Report Summary

- Provides a summary of the Report and FEI's 2019 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 and Program Area level for 2019. A summary of the overall Portfolio results is provided in Table 2-1, demonstrating that the Company achieved a combined Portfolio MTRC of 1.4. FEI achieved DSM expenditures of $64.495 million and recorded annual natural gas savings of 831,959 GJ in 2019. These energy savings resulted in carbon emission reductions of 49,751 tonnes of CO2e in 2019 and total reductions of 462,281[3] tonnes of CO2e over the life of all measures installed or undertaken in 2019[4]. This level of expenditures and energy savings represents an almost $30 million step change in DSM spending over 2018 results, indicating that FEI has successfully ramped up its activity to meet the 2019 expectations contained within the 2019-2022 DSM Plan. All Program Areas contributed to this increase as described in the Report.

Table 2-1: Overall DSM Portfolio Results for 2019

Indicator - 2019 Results		Total
Utility Expenditures, Incentives ($000s)		42,240
Utility Expenditures, Non-Incentives ($000s)		22,255
Utility Expenditures, Total ($000s)		64,495
Net Incremental Annual Gas Savings (GJ/yr.)		831,959
Annual GHG Emission Reductions* (tonnes CO2e/yr)		49,751
NPV of Annual Gas Savings (GJ/yr.)		7,730,460
Measure Lifetime GHG Emission Reductions* (tonnes CO2e)		462,281
Benefit/Cost Ratios	TRC	**0.9**
	MTRC	**1.4**
	UCT	**0.9**
	PCT	**1.8**
	RIM	**0.6**

[3] Emission reduction value based on life cycle (well to burner tip) emission factor of 0.0598 tonnes CO2e/GJ for natural gas. Annual emission reductions are just those attributed to the first year following measure implementation. Lifetime reductions are the total reductions that occur over the life of all measures implemented (based on NPV of gas savings). Emission reductions at the end use (burner tip) only, can be calculated using the end-use emission factor of 0.0516 tonnes CO2e/GJ.

Tables 2-2 and 2-3 provide 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 2019 – Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2019 Plan	2019 Actual	2019 Plan	2019 Actual	2019 Plan	2019 Actual
Residential	20,583	19,104	2,938	2,980	23,521	22,084
Commercial	10,194	9,280	3,643	2,429	13,837	11,709
Industrial	2,261	5,709	842	772	3,103	6,481
Low Income	4,966	5,295	1,664	1,425	6,630	6,719
Conservation Education and Outreach	0	0	7,155	6,059	7,155	6,059
Innovative Technologies	756	1,073	1,287	953	2,043	2,027
Enabling Activities	3,863	1,779	4,563	6,298	8,426	8,077
Portfolio Level Activities	0	0	1,635	1,339	1,635	1,339
ALL PROGRAMS	**42,623**	**42,240**	**23,727**	**22,255**	**66,350**	**64,495**

Table 2-3: Overall DSM Portfolio Level Results by Program Area 2019 – Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2019 Plan	2019 Actual	TRC	MTRC	UCT	PCT	RIM
Residential	238,946	192,534	0.4	1.5	0.7	1.1	0.4
Commercial	280,314	281,205	1.7	1.8	1.6	2.6	0.4
Industrial	280,651	301,668	1.5	--	2.7	3.0	0.6
Low Income	76,022	53,236	3.1	3.1	0.5	1.9	0.3
Conservation Education and Outreach	0	1,184	Savings Not Estimated				
Innovative Technologies	Savings Not Estimated		Savings Not Estimated				
Enabling Activities	0	2,133	Savings Not Estimated				
Portfolio Level Activities	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**875,933**	**831,959**	**0.9**	**1.4**	**0.9**	**1.8**	**0.6**

Note that 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 2014-2019 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 the 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. Where "zero" values occur, they may be a reflection of rounding to the nearest $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 11. 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.
- The expenditures, energy savings and cost effectiveness results presented in this report are exclusive of third party funding such as CleanBC funding from the British Columbia Ministry of Energy, Mines and Petroleum Resources (MEMPR). For measures that also receive third party incentive funding, attribution of energy savings among the parties has been accounted for in both the FEI claimed savings and cost test results.

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 many cases does not include the energy savings benefits of spillover effect.[5] 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 equipment efficiency are claimed by FEI where they can be verified. However, 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 continues to look for opportunities to claim energy savings from the implementation of new standards.
- Conservation Education and Outreach – CEO activities had expenditures of $6.059 million in 2019. FEI has attributed savings to one particular activity within the CEO Program Area (see Section 10.1), yet there are a number of other activities that result in energy savings

[5] 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.

that are not tracked or claimed. Since these savings remain difficult to quantify, FEI is not currently able to track or quantify them and these benefits are not reflected in the TRC.

- Enabling Activities – Enabling Activities similarly had expenditures of $8.077 million in 2019 for work that contributes to energy savings, not all of which can 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 in 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 BCUC 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 2019 DSM expenditures, including specified DSM, are cost-effective as defined under the DSM Regulation.

2.1 *PORTFOLIO LEVEL MTRC CALCULATION AND RESULTS*

The DSM Regulation specifies that utilities can implement DSM with TRC values less than 1.0 but that meet an MTRC threshold of 1.0[6] as long as expenditures on these activities do not exceed 40 percent of the total Portfolio expenditure. FEI refers to this 40 percent as the "MTRC Cap". Table 2-3 shows that in 2019, FEI met the conditions of the DSM Regulation, achieving a Portfolio MTRC value of 1.4 with 28.7 percent of the Portfolio enabled by the MTRC cost-effectiveness test (see Table 2-4). 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 are recognized in the DSM Regulation, which enables 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 (referred to as the Zero Emission Energy Alternative, or ZEEA) as a proxy for the avoided cost of natural gas and allows for the inclusion of non-energy benefits (NEBs).[7]

[6] The BCUC approved the assessment of the cost effectiveness using an MTRC of 1 or greater on an overall portfolio basis for FEI as part of its Decision and Order G-10-19.

[7] As the DSM Regulation stipulates, the updated value that FEI has used for the ZEEA in 2019 in the MTRC calculation is $106/MWh, or $29.45/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.

Table 2-4: Programs Subject to MTRC and the Relative Proportion of 2019 Portfolio Expenditures

Program	Program TRC	Program MTRC	Expenditure ($000s) subject to cap	% of Portfolio Spending
Residential Home Renovation Rebate Program	0.4	1.5	$15,264	23.7%
Residential New Home Program	0.5	1.9	$2,881	4.5%
Commercial RAP	0.8	1.8	$338	0.5%
Total			**$18,483**	**28.7%**

2.2 MEETING APPROVED EXPENDITURE LEVELS

FEI's 2019 DSM expenditure budget of $66.350 million was accepted on January 17, 2019, pursuant to the Decision on FEI's 2019-2022 DSM Plan.[8] The Company's 2019 DSM expenditures were within accepted levels for 2019 and have increased from 2018 expenditures of $35.5 million.

As part of the BCUC's Decision, FEI was granted approval to add $30 million of the requested annual DSM budget to rate base each year of the PBR period, with any additional DSM expenditure being captured in a DSM non-rate base deferral account attracting a weighted average cost of capital (WACC) return. 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 BCUC also approved the amortization of these amounts over 10 years and that approved amounts left unspent in one year of the plan could be rolled over to the next year's approved spending amount. In accordance with the BCUC's Decision, $34.495 million was placed in the non-rate base DSM deferral account during 2019 and transferred to the rate base DSM deferral account in early 2020.

FEI has managed its 2019 DSM activity within the funding limits approved by the BCUC. Section 3 discusses funding transfers between Program Areas in 2019 within the overall DSM funding envelope and within rules for transferring funds between Program Areas as set out by the BCUC. Section 3 also reports rollover amounts for each Program Area.

2.3 MEETING ADEQUACY REQUIREMENTS OF THE DSM REGULATION

The adequacy requirements set out in the DSM Regulation are as follows:

> 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:

[8] BCUC Order G-138-14, page 277 of the Decision.

i. residents of low-income households to reduce their energy consumption; or

ii. to reduce energy consumption in housing owned or operated by

(A) a housing provider that is a local government, a society as defined in section 1 of the *Societies Act*, other than a member-funded society as defined in section 190 of that Act, or an association as defined in section 1 (1) of the *Cooperative Association Act*, or

(B) the governing body of a first nation,

if the benefits of the reduction primarily accrue to

(C) the low-income households occupying the housing,

(D) a housing provider referred to in clause (A), or

(E) a governing body referred to in clause (B) if the households in the governing body's housing are primarily low-income households;

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.

e) one or more demand-side measures to provide resources as set out in paragraph (e) of the definition of "specified demand-side measure", representing no less than

(i) an average of 1% of the public utility's plan portfolio's expenditures per year over the portfolio's period of expenditures, or

(ii) an average of $2 million per year over the portfolio's period of expenditures;

f) one or more demand-side measures intended to result in the adoption by local governments and first nations of a step code or more stringent requirements within a step code.

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 and

Commercial programs as discussed in each of the respective Program Area sections (Sections 5 and 7). Sections 6 and 7 of the Report also provide details on a number of other Low Income and Commercial energy efficiency programs that are available for use by owners of rental buildings, including the Energy Specialist Program. In terms of education programs, FEI's School Education Program, Commercial and Residential customer education programs, and other energy conservation and education outreach initiatives are presented in Section 10.

FEI's DSM activities related to the codes and standards specified demand-side measure that are the subject of paragraph e) above are considered enabling activities by FEI and are discussed in Section 11. Finally, FEI's portfolio has supported the adoption of step codes in the Province in a number of ways, particularly through the Residential and Commercial Program Areas as discussed in Sections 5 and 7 respectively.

2.4 *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 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 intended to improve energy literacy.

FEI, FBC and the Ministry of Energy, Mines and Petroleum Resources (MEMPR) continued to collaborate in 2019. FEI's collaboration with MEMPR on CleanBC includes administering incentives and enabling applications for CleanBC rebates through FEI's application processes to provide a streamlined customer experience. The tables contained throughout this Annual Report include only expenditure and savings information for FEI's expenditure portfolio. They do not include the CleanBC expenditures nor the savings attributed to the CleanBC incentives. In 2019, CleanBC incentives were administered alongside FEI incentives in the Residential Home Renovation Rebate Program, the Low Income - Non-profit Customer Program, and the Commercial Customized Equipment Upgrade Program as noted in Tables 5-2, 6-2 and 7-2 respectively.

2.5 *SUMMARY*

The Company's DSM Portfolio met the goal of cost effectiveness with a Portfolio MTRC value of 1.4 in 2019. 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. FEI continues to develop and maintain strong, collaborative relationships with other BC utilities and government partners in providing its portfolio of DSM programs.

3. FUNDING TRANSFERS

The practice of transferring expenditure amounts within FEI's DSM portfolio applies to the tracking of actual versus approved spending amounts for each of the Program Areas. It acknowledges that the approved expenditure amount is a forecast and that actual spending in each Program Area will inevitably vary from the forecast to some degree. A Program Area in which annual expenditures are somewhat less than plan has availability within its approved program expenditure envelope to balance against a Program Area that might spend somewhat more than its approved amount. This balancing or 'transfer' allows FEI to maximize the use of its total approved portfolio expenditure amount while managing the uncertainties and external factors that can impact program development and delivery. BCUC Order G-44-12 approved the transfer of funding amounts equal to or less than 25 percent of the approved Program Area funding limit without further approval from the BCUC.

Rollover refers to any approved Program Area expenditure amount that was not spent in a given year (after accounting for funding transfers) and can therefore be spent in the following year. These amounts are 'rolled over' to the next year's annual approved spending limit. The ability to roll funds over from one year to the next also provides flexibility for FEI to manage uncertainties and external factors that can impact program development and delivery – in this case by making unspent expenditure amounts in one year available to benefit customers in the next year. BCUC Order G-10-19 approved FEI's request to rollover unspent Program Area amounts during the 2019-2022 DSM Plan.

Final Program Area funding transfers and roll over amounts for 2019 are shown in Table 3-1. The transfer of approved expenditures into the Industrial program exceeded 25 percent of the approved Industrial 2019 expenditure limit, thus requiring approval by the BCUC. FEI sought BCUC approval to transfer funds in the Industrial Program Area in an application filed on September 18, 2019. BCUC Order G-273-19 approved the transfer request on November 5, 2019. After transfers, the amounts rolled over to 2020 total $1.855 million, which is only a small portion (2.8 percent) of the approved 2019 portfolio expenditure, even though the 2019 approved expenditure represents an 87 percent increase over actual 2018 total Portfolio expenditures.

Table 3-1: Funding Transfers for 2019 and Calculation of Rollover Expenditures for 2020

Program Area	2019 Plan Expenditures ($000)	2019 Actual Expenditures ($000)	2019 Plan less Actual ($000)	Variance as a percent of Approved (%)	2019 Funding Transfer Amount In (Out) ($000)	Amount Rolled Over to 2020 (000s)
Residential	23,521	22,084	-1,437	-6%	-1,437	0
Commercial	13,837	11,709	-2,128	-15%	-1,942	186
Industrial	3,103	6,481	3,379	109%	3,379	0
Low Income	6,630	6,719	90	1%	90	0
Conservation Education and Outreach	7,155	6,059	-1,096	-15%	0	1,096
Innovative Technologies	2,043	2,027	-16	-1%	0	16
Enabling Activities	8,426	8,077	-349	-4%	0	349
Portfolio Level Activities	1,635	1,339	-296	-18%	-90	206
ALL PROGRAMS	**66,350**	**64,495**	**-1,855**			**1,855**

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. It should be noted that since 2018 the EECAG has been providing input and feedback on both FEI and FBC demand-side management activities. This section focuses on those activities related to FEI's portfolio. A discussion of those EECAG discussions on FBC's portfolio can be found in FBC's 2019 DSM Annual Report.

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, Indigenous communities, 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 2019, there were two key EECAG engagement activities. The first was a request for feedback on FEI's proposal to transfer expenditure approval amounts into the Industrial Program Area. The second was an in-person workshop in the fall to discuss the implementation of FEI's new 2019-2022 DSM Plan.

4.2 *EECAG REVIEW OF INDUSTRIAL PROGRAM AREA FUNDING TRANSFER*

Success in Industrial Program Area incentives and energy savings exceeded expectations on which the forecast in the DSM Plan were based. As a result, FEI sought (and received) approval to transfer an expenditure amount greater than 25 percent of the original Industrial Program Area approved expenditure. This transfer is also discussed in Section 3. In order to support FEI's application to the BCUC for this transfer, the Company sought input from EECAG members. This was done through an email exchange in which FEI provided background on the need for the transfer as well as details on the transfer amount and an updated year-end expenditure projection for all Program Areas. FEI requested EECAG member feedback on the transfer. Only a few EECAG members provided their thoughts, which were generally supportive. This feedback was included in the application to the BCUC requesting approval of the transfer.

4.3 SUMMARY OF THE 2019 WORKSHOP

EECAG members were brought together for a workshop on November 21, 2019 in Vancouver to discuss and gather input on the challenges and opportunities facing FEI as it moves forward with such a large step change in the DSM activity and funding approved in the 2019-2022 DSM Plan. This EECAG discussion was timely given that the Company was nearing completion of the Plan's first year, providing a balance between having sufficient experience to discuss and ample time to explore and implement any adjustments that might result. The objectives of that workshop were to:

- Provide an update on the current 2019-2022 DSM Expenditure Plan.
- Seek input on challenges and opportunities for increasing participation and savings even further.
- Re-unite and recognize 10 years of work by the EECAG and plan for future EECAG activities.

The workshop topics and format resulted in productive discussions on a range of topics with implications for FEI's DSM activities. Participants rated the workshop highly and provided FEI with valuable feedback and ideas on its program offerings, target audiences, marketing strategies and more. This feedback was documented in more detail in the meeting notes circulated to EECAG members. FEI continues to consider and follow up on the feedback received across all Program Areas. Examples of issues raised by stakeholders include those faced by housing providers that could impact participation in FEI programs and additional opportunities for FEI and municipalities to work together on some key initiatives. Barriers to further increases in participation were examined and ideas put forward for overcoming them.

In regard to planning future EECAG activities, members generally agreed that the in-person workshops are a valued opportunity to discuss energy efficiency and should continue in generally the same format on an as needed basis, at least once per year. Members were also quite interested in the opportunities to meet more frequently to consider issues and provide feedback through an on-line group portal wherein FEI would provide background materials, send surveys and provide a question/answer platform. This was considered a potentially good supporting activity but should not replace the in-person workshops.

On a final note, FEI and EECAG members recognized 10 years of working together to expand energy efficiency in BC through the EECAG initiative. The group was first brought together in November of 2009 and has been providing important input to the Company's DSM activities since that time.

5. RESIDENTIAL ENERGY EFFICIENCY PROGRAM AREA

5.1 *OVERVIEW*

The Residential Energy Efficiency Program Area reduced annual natural gas consumption by 192,534 GJ, achieving an overall combined TRC/MTRC of 1.5. Approximately $22.1 million was invested in Residential Energy Efficiency programs in 2019, and 86 percent of this investment was incentive spending. Tables 5-1 and 5-2 summarize the expenditures for the Residential Energy Efficiency Program Area, including incentive and non-incentive spending and annual gas savings, as well as TRC/MTRC and other cost-effectiveness test results.

Residential programs serve over 928 thousand[9] 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.[10] 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.

For the 2019-2022 DSM Plan, the customer offerings for the Residential Energy Efficiency Program Area consist of consolidating measures within three overarching programs: Home Renovation, New Home and Rental Apartment Efficiency. These programs enable FEI customers to reduce their energy consumption and support industry in improving overall home performance. The combination of rebates, policy support, customer and industry engagement is instrumental in driving a culture of conservation and fostering market transformation in the residential sector.

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

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2019 Plan	2019 Actual	2019 Plan	2019 Actual	2019 Plan	2019 Actual
Home Renovation Program	14,713	16,111	1,587	1,831	16,300	17,942
New Home Program	5,622	2,781	472	663	6,094	3,444
Rental Apartment Efficiency Program	249	212	182	168	432	380
Non-Program Specific Expenses	0	0	696	318	696	318
ALL PROGRAMS	**20,583**	**19,104**	**2,938**	**2,980**	**23,521**	**22,084**

[9] FEI Annual Review for 2019 rates. G-237-18 and G-10-19 Compliance filing

[10] 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.

Table 5-2: Residential Energy Efficiency Program Area Results Summary – Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2019 Plan	2019 Actual	TRC	MTRC	UCT	PCT	RIM
Home Renovation Program	176,340	154,016	0.4	1.5	0.7	1.1	0.4
New Home Program	38,921	22,671	0.5	1.9	0.6	1.5	0.3
Rental Apartment Efficiency Program	23,685	15,847	2.2	2.2	2.2	6.6	0.5
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**238,946**	**192,534**	**0.4**	**1.5**	**0.7**	**1.1**	**0.4**

Notes:

- The Residential Program Area achieved 94 percent of its expenditure target and 82 percent of its energy savings target while achieving a 175 percent increase in expenditure activity over 2018.
- The overall UCT of 0.7 is somewhat lower than anticipated in the 2019-2022 DSM Plan. This result might be attributed to a number of factors including uptake of furnace and tankless water heater rebates performing over plan, as well as non-incentive expenditures (such as communications activities to drive participation) being higher than anticipated in the 2019-2022 DSM Plan.

5.2 2019 RESIDENTIAL ENERGY EFFICIENCY PROGRAMS

This section outlines the specific Residential Energy Efficiency programs undertaken in 2019, including program and measure descriptions and a breakdown of non-incentive expenditures.

Home Renovation Rebate Program

Program Description	The program promotes energy-efficiency home retrofits in collaboration with Utility Partners, as well as federal, provincial, and municipal governments. In addition to rebates, initiatives include capacity building for trades, ensuring high quality installations and providing opportunities to promote home labeling through EnerGuide home evaluations.
Target Sub-Market	Residential
New vs. Retrofit	Retrofit
Partners	BC Hydro, FortisBC Inc., Municipal, Provincial and Federal Government

Expenditures

Home Renovation Rebate Program	Incentives	Administration	Communication	Evaluation	Labour	TOTAL
2019 Plan	14,713	574	100	430	**483**	**16,300**
2019 Actual	16,111	564	685	109	472	**17,942**

Participation

Measure	2019 Plan	2019 Actual
Space Heating		
Furnace	7,000	9,301
Boiler	500	448
Combination System	500	392
Secondary Heating		
EnerChoice Fireplace	6,760	4,828
Direct Vent Wall Furnace	180	0
Water Heating		

0.67 EF Storage Tank Water Heater	3,680	1,907
Condensing Tankless Water Heater	1,700	3,519
Condensing Storage Tank Water Heater	530	113
Building Envelope		
Attic Insulation	2,250	1,781
Wall Insulation	240	182
Crawlspace and Basement Insulation	265	192
Other Insulation	110	119
Bonus Offers	600	1,733
Water Conservation and Retail measures		
Aerators & Showerheads	650	4487
ENERGY STAR Washer	2,250	3,010
ENERGY STAR Dryer	100	95
Other		
Drain Water Heat Recovery	100	0
Communicating Thermostat	2,800	2,271
HVAC Zone Controls	0	0
Appliance Maintenance services	50,000	38,977
Total	**80, 215**	**73,355**

Notes:

- The Home Renovation program encourages customers to take a whole home approach to their energy efficiency upgrades by consolidating space heating, water heating and building envelope measures into on overarching program. This program is a collaboration between the BC Utilities and the Ministry of Energy, Mines, and Petroleum Resources (MEMPR) CleanBC Better Homes program.
- FEI and program partners continue to support the evolving Home Performance industry through trades outreach, training, development of program registered contractor directories, site visits for program compliance quality installation and contractor accreditation initiatives. These activities provide value to customers through increased performance and longevity of installed equipment and improved comfort of their homes. Funding for these activities is outlined in Enabling Activities, Trade Ally Network. The 2019 furnace participation exceeded the DSM Plan to reach 9,300 participants with a large majority of applications received in the final months of the year after increasing the incentive from $500 to $800 due to feedback from the trades.
- Emphasis continued to be placed on Furnace Quality Installation. To be eligible for the rebate, the program required the installation of a two-pipe direct vent system and the completion of a commissioning sheet. FEI launched the ENERGY STAR Verified Installation pilot late in 2019, to provide homeowners with a label that informed them that their installation conformed to best practices.[11] FEI is evaluating energy savings associated with Quality Installation which, when determined, will be incorporated in energy savings estimates in the 2020 Plan Year.
- Almost 39,000 appliance maintenance rebates were provided to 26,016 customers. Of these participants, twenty percent had recently replaced or are planning to upgrade their appliances to higher efficiency models. One in ten participants made additional home energy efficiency upgrades for which they did not receive an incentive.
- Administration expenditures include FEI rebate processing fees, and the enhancement of the existing online application hosted by BC Hydro.
- Communications expenditures are higher than planned to reflect the increased awareness required to drive the increased participation planned for 2019.
- Communicating thermostat energy savings were reduced from 6.5 GJs annually per thermostat in the 2019-2022 DSM Plan to 2.6 GJs as determined by the FortisBC Smart learning thermostat pilot.

[11] Please refer to Section 11, Enabling Activities for more information.

New Home Program

Program Description	The New Home Program will provide financial incentives in support of energy-efficient building practices for the Residential sector. The program supports the BC Energy Step Code, and educates builders and consumers about the benefits of energy-efficient new homes.
Target Sub-Market	Residential
New vs. Retrofit	New
Partners	BC Hydro, FortisBC Inc., Municipal, Provincial and Federal Government

Expenditures						
New Home Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	5,622	144	50	50	**228**	**6,094**
2019 Actual	2,781	96	91	4	472	**3,444**

Participation		
Measure	**2019 Plan**	**2019 Actual**
BC Energy Step Code - Whole Home[12]		
STEP 2 (Single Family Dwelling)	175	17
STEP 2 (Townhome/Rowhome)	55	2
STEP 3 (Single Family Dwelling)	770	177
STEP 3 (Townhome/Rowhome)	330	38
STEP 4 (Single Family Dwelling)	60	40
STEP 4 (Townhome/Rowhome)	25	13
Space and Water Heating Systems		
0.67 EF Storage Tank Water Heater	210	93
Tankless Water Heater	950	1,542
Condensing Storage Tank Water Heater	320	150
Combination System	600	267
Secondary Heating		
EnerChoice Fireplace	1,730	1,878
Direct Vent Wall Furnace	100	0
Other		
Drain Water Heat Recovery	100	0
Communicating Thermostat	500	45
HVAC Zone Controls	0	0
ENERGY STAR Dryer	50	245
TOTAL	**5,975**	**4,507**

Notes:

- FEI, in collaboration with FBC, transitioned its whole home incentives from the ENERGY STAR standard to align with the five tiers of the BC Energy Step Code for Part 9 Buildings, as directed in the 2017 Amendment to the DSM Regulation. The Amendment supports utilities' ability to provide incentives for builders who adopt and comply with the Energy Step Code in municipalities across BC.
- FEI collaborates with FBC, BC Hydro, MEMPR and BC Housing to provide education to builders and energy advisors, and support policy regarding High Performance Homes in BC. These funds are discussed further in Section 11, and shown in Table 11-3 in the Codes and Standards budget.
- Step Code incentives were distributed to 287 units for a total of $0.6 Million.
- Natural gas high efficiency equipment incentives were distributed for 4,220 measures for a total of $2.1 Million.
- Combination system energy savings were adjusted from values used to develop the 2019-2022 DSM Plan to account for new Minimum Efficiency Performance Standards base lines for new construction.

[12] STEP 5 expenditures are allocated to the Innovative Technologies Program Area due to the current lack of industry knowledge and low market adoption of gas-heated net zero ready homes.

- Water heater and combination system savings were adjusted for a small number of incentives issued in City of Vancouver to account for the higher efficiency standards of the Vancouver Building Bylaw.

Rental Apartment Efficiency Program

Program Description	There are three components to this program. To start, participants are provided with direct install of in-suite energy efficiency upgrades completed by an agent of FortisBC. Next, participants are provided with energy assessments, which may recommend building-level energy efficiency upgrades such as condensing boilers, high efficiency water heaters and control upgrades. Lastly, participants are provided with support in implementing the energy efficiency recommendations and applying for rebates. All of the in-suite related expenses are included in the Residential Program Area, while the common area related expenses, including the energy assessment, implementation support, and common area upgrades, are included in the Commercial Program Area.
Target Sub-Market	Rental Apartment Buildings
New vs. Retrofit	Retrofit
Partners	N/A

Expenditures

Rental Apartment Efficiency Program	Incentives	Administration	Communication	Evaluation	Labour	TOTAL
2019 Plan	249	105	39	23	**15**	**432**
2019 Actual	212	141	7	14	5	**380**

Participation

Measure	2019 Plan	2019 Actual
Aerators & Showerheads	24,450	16,064

5.3 *SUMMARY*

Residential Energy Efficiency Program Area activity in 2019 resulted in over 192,000 GJ/year of natural gas savings. These programs enabled customers to increase home performance while saving energy while continuing to build on relationships with the trades for education on energy efficiency and quality installation. The combination of financial incentives, policy support, contractor outreach, and customer education 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*

The Low Income Program Area serves Low Income customers, Indigenous housing, co-operative housing, non-profit housing, and charities that aid Low Income customers. In 2019, DSM investments in the Low Income Program Area were $6.7 million and annual gas savings were more than 53 thousand GJ/yr. Although the Low Income Program Area achieved expenditure objectives, there was some variation relative to the 2019-2022 DSM Plan within individual programs. Tables 6-1 and 6-2 summarize the planned and actual expenditures for the Low Income Program Area in 2019, including incentive and non-incentive expenditures and annual gas savings, as well as the cost-effectiveness test results. The TRC for Low Income programs uses the same inputs as the MTRC without impacting the MTRC Cap in accordance with the DSM Regulation.

Key milestones in 2019 include:

- FEI and FBC (FortisBC) made considerable progress in researching, piloting and developing best practices for retrofits in manufactured homes. There is significant potential for energy savings in manufactured homes and it is anticipated that in 2020 more manufactured homes will be receiving extensive retrofits through the Direct Install program.
- The Prescriptive Program was expanded to include several new measures for Low Income customers and non-profit housing.

Table 6-1: 2019 Low Income Program Results Summary - Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2019 Plan	2019 Actual	2019 Plan	2019 Actual	2019 Plan	2019 Actual
Direct Install Program	1,610	3,667	550	884	2,160	4,551
Self Install Program	325	333	170	95	495	427
Prescriptive Program	2,771	1,204	254	154	3,024	1,358
Support Program	260	92	540	8	800	99
Non-Program Specific Expenses	0	0	150	284	150	284
ALL PROGRAMS	**4,966**	**5,295**	**1,664**	**1,425**	**6,630**	**6,719**

Table 6-2: 2019 Low Income Program Area Results Summary - Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2019 Plan	2019 Actual	TRC	MTRC	UCT	PCT	RIM
Direct Install Program	10,120	10,592	0.9	0.9	0.1	1.3	0.1
Self Install Program	35,100	23,427	17.9	17.9	2.9	6.4	0.6
Prescriptive Program	30,802	19,218	6.7	6.7	1.2	2.7	0.5
Support Program	Savings Not Estimated		Savings Not Estimated				
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**76,022**	**53,236**	**3.1**	**3.1**	**0.5**	**1.9**	**0.3**

The Low Income Program Area achieved 107 percent of its 2019-2022 DSM Plan expenditure target and 70 percent of its energy savings target. Savings were lower than planned due to:

- A larger portion of non-profit housing apartments participated in the Direct Install Program in 2019 relative to 2018. Apartments, relative to single family homes, have less opportunities for direct install measures which results in lower savings per participant.
- Less participation in the Prescriptive Program than was anticipated in the 2019-2022 DSM Plan.
- The Self Install Program includes the re-engagement of past participants for measures that have a shorter measure life (such as window film). This results in a downward trend in average savings per participant because a portion of the participants counted in the program are not receiving the full suite of self install measures included in an Energy Saving Kit.

More details for each of the programs within the Low Income Program Area follow.

6.2 *2019 LOW INCOME PROGRAMS*

This section outlines the specific Low Income programs undertaken in 2019, including program and measure descriptions and a breakdown of non-incentive expenditures.

Direct Install Program

Program Description	Recognizing that some Low Income customers do not have the expertise and/or physical capabilities to install energy efficient measures, these programs aim to remove that barrier by having a program delivery agent/contractor perform the installation
Target Sub-Market	Low Income single family dwellings, row homes, manufactured homes and apartments
New vs. Retrofit	Retrofit
Partners	BC Hydro, FBC, CleanBC

Expenditures

Direct Install Program	Incentives	Administration	Communication	Evaluation	Labour	TOTAL
2019 Plan	1,610	100	175	100	**175**	**2,160**
2019 Actual	3,667	154	300	195	236	**4,551**

Participation

Measure	2019 Plan	2019 Actual
Energy Conservation Assistance	2,300	3,450

Notes:

- The Direct Install Program achieved 152 percent of planned participation. This was due to enhanced outreach initiatives and partially to some pent up demand from 2018 when there was a transition in the program's contractors.

Self Install Program

Program Description	Participants that have the capabilities to perform basic installations on their own can receive a bundle of basic energy efficiency measures delivered to their home address
Target Sub-Market	Low income home owners and renters
New vs. Retrofit	Retrofit
Partners	BC Hydro, FBC

Expenditures						
Self Install Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	325	18	105	4	**44**	**495**
2019 Actual	333	14	59	0	21	**427**

Participation		
Measure	**2019 Plan**	**2019 Actual**
Energy Savings Kit	13,000	14,734

Notes:

- The Self Install Program achieved 113 percent of planned participation. This was partially due to successful marketing tactics and a re-engagement campaign at the beginning of the heating season for participants to receive additional energy savings measures.

Prescriptive Program

Program Description	Enable a straight-forward path towards a rebate for specific residential and commercial energy efficiency measures
Target Sub-Market	Residential Low Income customers and non-profit multi-unit housing
New vs. Retrofit	New construction and retrofit
Partners	CleanBC

Expenditures						
Prescriptive Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	2,771	25	38	16	**175**	**3,024**
2019 Actual	1,204	27	9	0	118	**1,358**

Participation		
Measure	**2019 Plan**	**2019 Actual**
Space Heat Top Up	30	19
Water Heating Top Up	15	24
Furnace Replacement Top Up	665	293
Programmable Thermostat	0	15
0.67 EF Storage Tank Water Heater Top Up	258	58
Tankless Water Heater Top Up	85	53
Condensing Storage Tank Water Heater Top Up	27	0
Boiler Replacement Top Up	0	22
Non-Profit (Bundled) Rebates	25	22
TOTAL	**1,104**	**506**

Notes:

- The Prescriptive Programs achieved 46 percent of planned participation. Many of the measures in the Prescriptive Program were not in market for the entire year and it takes time to build awareness. The Prescriptive Program participation increased considerably towards the end of the year and there are indications that participation will continue to grow in 2020.
- New residential measures were introduced to the Prescriptive Program in 2019 including: Furnace Replacement Top Up, Programmable Thermostat, .67 EF Storage Tank Water Heater Top Up, Tankless Water Heater Top Up, Condensing Storage Tank Water Heater Top Up, and Boiler Replacement Top Up.

Support Program

Program Description	Seek to enhance energy efficiency retrofit skills, provide direction to non-profit housing providers looking at enhancing the energy efficiency of their housing stock and motivate behavioural change through education and engagement
Target Sub-Market	Low Income customers and non-profit housing providers
New vs. Retrofit	New construction and retrofit
Partners	BC Hydro, FBC, CleanBC

Expenditures						
Support Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	260	300	75	65	**100**	**800**
2019 Actual	92	-2	0	0	9	**99**

Participation		
Measure	**2019 Plan**	**2019 Actuals**
REnEW	25	0
Non-Profit Custom Studies and Implementation Support	20	51
TOTAL	**45**	**51**

Note:

Total expenditure in the Support Program was less than planned for the following reasons:

- The REnEW measure in the Support Program was temporarily out of market in 2019 while resources were focused on other key Low Income programs. There was also some turnover at the non-profit program partner organization that led to a disruption in program coordination.
- Although there were a greater number of energy studies performed in non-profit housing apartments than was planned, there were fewer than expected implementation support measures performed.

6.3 *SUMMARY*

The $6.7 million invested in 2019 in the Low Income Program Area represents the highest-ever annual investment for the Program Area. The suite of program offerings continued to grow in 2019 and FEI now has a comprehensive program offering for diverse customers including those who

require the support of full-service programs as well as programs suited for customers who wish to initiate their own retrofit projects.

7. COMMERCIAL ENERGY EFFICIENCY PROGRAM AREA

7.1 OVERVIEW

In 2019, 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 more than 281 thousand GJs and achieved an overall TRC of 1.6. $11.7 million was invested in Commercial Energy Efficiency, of which 79 percent was incentive spending. Tables 7-1 and 7-2 summarize the planned and actual expenditures for the Commercial Program Area in 2019, including incentive and non-incentive expenditures and annual gas savings, as well as the cost-effectiveness test results.

Key highlights include:

- Launch of the new Step Code-aligned Performance – New Buildings program;
- Addition of new measures in the Prescriptive Program including commercial furnaces, unit heaters, and vortex de-aerators.

Table 7-1: 2019 Commercial Energy Efficiency Program Results Summary - Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2019 Plan	2019 Actual	2019 Plan	2019 Actual	2019 Plan	2019 Actual
Prescriptive Program	6,459	5,580	1,959	775	8,418	6,355
Performance - Existing Buildings	1,931	2,212	498	423	2,429	2,635
Performance - New Buildings*	801	901	227	136	1,028	1,037
Rental Apartment Efficiency Program	1,004	587	253	298	1,256	885
Non-Program Specific Expenses	0	0	706	797	706	797
ALL PROGRAMS	**10,194**	**9,280**	**3,643**	**2,429**	**13,837**	**11,709**

Table 7-2: 2019 Commercial Energy Efficiency Program Results Summary – Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2019 Plan	2019 Actual	TRC	MTRC	UCT	PCT	RIM
Prescriptive Program	145,236	147,822	1.5	1.7	1.9	2.9	0.5
Performance - Existing Buildings	53,840	78,819	1.8	1.8	1.6	2.2	0.5
Performance - New Buildings*	43,501	25,564	2.2	2.2	1.7	2.0	0.3
Rental Apartment Efficiency Program	37,738	29,000	0.8	1.8	0.7	2.8	0.4
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**280,314**	**281,205**	**1.7**	**1.8**	**1.6**	**2.6**	**0.4**

7.2 2019 COMMERCIAL ENERGY EFFICIENCY PROGRAMS

This section outlines the specific Commercial Energy Efficiency programs undertaken in 2019, including program and measure descriptions and a breakdown of non-incentive expenditures.

Prescriptive Program

Program Description	This program provides rebates for the installation of high efficiency natural gas burning appliances in various applications including space heating, water heating, and commercial food service. Simple rebates are provided for equipment that meet specific performance standards, as opposed to the Performance Program, which requires more detailed analysis of measures as installed. The program makes use of midstream and downstream rebate delivery approaches, as warranted by the particularities of each appliance type and the market it is intended to serve.
Target Sub-Market	All commercial sub-sectors
New vs. Retrofit	New construction and retrofit
Partners	FBC

Expenditures

Prescriptive Program	Incentives	Administration	Communication	Evaluation	Labour	TOTAL
2019 Plan	6,459	851	351	165	**592**	**8,418**
2019 Actual	5,580	27	5	25	718	**6,355**

Participation

Measure	2019 Plan	2019 Actual
Condensing Boiler	280	208
Mid Efficiency Boiler	15	0
Water Heater	148	181
Deep Fryer	44	47
Large Vat Deep Fryer	5	6
Griddle	19	8
Combination Oven	6	16
Convection Oven	33	27
Rack Oven	2	4
Conveyor Oven	5	17
Steam Cooker	4	0
Low Flow Spray Valve	100	0
Condensing Make Up Air Unit	47	0
Furnace Replacement (Baseline: Std.)	700	18
Furnace Replacement (Baseline: Mid)	700	9
Connected Thermostat	0	2
Roof Insulation	45	0
HVAC Controls	0	0
Condensing Unit Heaters	44	97
Vortex Deaerators	3	9
Gas Underfired Broilers	31	0
Air curtains	0	4
Pipe and Tank Insulation	0	8
Steam Boilers	0	4
TOTAL	**2,232**	**665**

Notes:

The measures with the most significant deviation from the 2019-2022 DSM Plan are the following:

- Furnace Replacement: promotion and marketing of this new rebate offer through the existing Trade Ally Network (TAN) did not yield the participation as expected.

- Addition of roof insulation measure was delayed beyond 2019, pending further study, as a result of new market information acquired by FEI.
- A Gas Underfired Broiler is commercial food service equipment. FEI refers to Energy Star's Commercial Food Service Equipment listing to qualify equipment. Gas underfired broilers were not included as one of the equipment types which can be qualified as an Energy Star qualified measure as anticipated in the 2019-2022 DSM Plan. As such this measure was not released to market in 2019, pending further discussions with Energy Star.
- Steam boilers, air curtains and pipe and tank insulation are measures that can serve both industrial and commercial customers. Although not included in the Commercial Program Area in the DSM Plan (they were included in the Industrial Program Area), these measures were added to the Commercial Prescriptive Program offering due to demand from commercial customers.

Performance Program – Existing Buildings

Program Description	The program provides incentives to encourage participants to pursue a performance based approach to achieving natural gas savings in existing buildings. The program encourages detailed analysis of integrated energy saving measures to help identify all technically feasible and cost effective energy savings, and then follows up by providing support for the implementation of those measures.
Target Sub-Market	Medium to large commercial, institutional and multifamily residential
New vs. Retrofit	Retrofit
Partners	FortisBC Inc.
Notes	

Expenditures						
Performance - Existing Buildings	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	1,931	289	10	40	**159**	**2,429**
2019 Actual	2,212	12	11	133	267	**2,635**

Participation		
Measure	**2019 Plan**	**2019 Actual**
Studies - Retrofit	35	20
Capital Upgrades - Retrofit	19	35
Recommissioning - Studies	9	4
Recommissioning - O&M	4	10
Commercial Energy Assessments	35	17
TOTAL	**102**	**86**

Notes:

- FEI administered CleanBC incentives supporting non-cost-effective commercial natural gas energy efficiency projects, not eligible for existing FEI programs. The costs for administering the additional CleanBC offers are administered separately and are not included program reporting herein.
- FEI continued its partnership with BC Hydro to offer recommissioning incentives to customers under the Continuous Optimization Program. FEI and BC Hydro split the cost of recommissioning incentives for those buildings that used natural gas as a primary space heating fuel. FEI, FBC, and BC Hydro are currently developing a new recommissioning offer, anticipated to launch in 2020.

- FEI and FBC launched a pilot recommissioning offer in the FBC service territory to 13 participants. The results of the pilot will be used to inform the successor FEI, FBC and BC Hydro recommissioning offer.
- The Commercial Energy Assessment was offered in 2019 to customers who enrolled in the program before the end of 2018. These energy assessments were completed and issued to the customers in 2019. The program has two different external vendors under contract to deliver the energy assessments and their contracts expired as of the end of 2018. FortisBC is currently developing a new Commercial Energy Assessment offer, anticipated to launch in 2020.

Performance Program – New Buildings

Program Description	The program provides incentives to encourage participants in pursuing a performance based approach to achieving natural gas savings in new buildings. The program encourages detailed analysis of integrated energy saving measures to help identify technically feasible and cost effective energy savings, and then follows up by providing support for the implementation of those measures. The program provides pathways for both buildings subject and not subject to the BC Energy Step Code.
Target Sub-Market	Medium to large commercial, institutional and multifamily residential
New vs. Retrofit	New construction
Partners	FortisBC Inc.

Expenditures

Performance - New Buildings*	Incentives	Administration	Communication	Evaluation	Labour	TOTAL
2019 Plan	801	112	4	50	**62**	**1,028**
2019 Actual	901	16	0	14	105	**1,037**

Participation

Measure	2019 Plan	2019 Actual
BC Energy Step Code - Whole Building	0	0
Non-BC Energy Step Code - Whole Building	0	0
Early Engagement	20	1
Non-BC Energy Step Code - Engineered	0	0
BC Energy Step Code Capacity Building - Charrettes	0	0
Existing Program Participants	9	7
TOTAL	**29**	**8**

Notes:

- The Performance Program – New Buildings saw lower than anticipated participation due to softening demand for construction of Part 3 buildings and other new construction programs in market.
- FEI launched increased outreach activities to architects, engineers, developers and energy modellers to support awareness of natural gas new construction energy efficiency opportunities and FortisBC DSM programs.
- Incentives continued to be provided to legacy participants in the now, out-of-market joint BC Hydro-FortisBC New Construction Program

Rental Apartment Efficiency Program (RAP)

Program Description	There are three components to this program. To start, participants are provided with direct install of in-suite energy efficiency upgrades completed by an agent of FortisBC. Next, participants are provided with energy assessments, which may recommend building-level energy efficiency upgrades such as condensing boilers, high efficiency water heaters and control upgrades. Lastly, participants are provided with support in implementing the energy efficiency recommendations and applying for rebates. All of the in-suite related expenses are included in the Residential Program Area, while the common area related expenses, including the energy assessment, implementation support, and common area upgrades, are included in the Commercial Program Area.
Target Sub-Market	Rental Apartment Buildings
New vs. Retrofit	Retrofit

Expenditures

Rental Apartment Efficiency Program	Incentives	Administration	Communication	Evaluation	Labour	TOTAL
2019 Plan	1,004	152	56	23	**22**	**1,256**
2019 Actual	587	160	105	12	22	**885**

Participation

Measure	2019 Plan	2019 Actual
Energy Assessments	120	181
Implementation Support Partial	5	8
Implementation Support Full	25	13
Condensing Boilers	25	24
Water Heaters	5	1
Recirculation Controls	100	0
TOTAL	**280**	**227**

Notes:

- Towards the end of 2019 the RAP received two bulk applications from two property management companies which own and operate larger portfolios of buildings. The applications were received and the upgrades in the suites not yet completed. Thus, the RAP exceeded the target participation for the energy assessments yet did not meet the expenditure and natural gas savings.

7.3 *SUMMARY*

Commercial Energy Efficiency Program Area activity in 2019 resulted in more than 281,000 GJ/year of natural gas savings. These programs enabled commercial and institutional customers to conduct both simple and comprehensive energy efficiency upgrades at their buildings. The combination of financial incentives, consultant and 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 commercial sector.

8. INNOVATIVE TECHNOLOGIES PROGRAM AREA

8.1 OVERVIEW

A primary objective of the Innovative Technologies Program Area is to identify technologies that are not yet widely adopted in British Columbia, and which are suitable for the 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.

All 2019 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", 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 is evaluated as part of the DSM Portfolio as a whole. Innovative Technologies expenditures are also not subject to the MTRC cap set out in subsection 4(4) of the DSM Regulation according to Request for Clarification of Order G-44-12.

Table 8.1 summarizes expenditures for the Innovative Technologies Program Area in 2019, including incentive and non-incentive expenditures.

Table 8-1: 2019 Innovative Technologies Program Area Results Summary - Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2019 Plan	2019 Actual	2019 Plan	2019 Actual	2019 Plan	2019 Actual
Technology Screening	0	0	643	172	643	172
Pilot Project Expenditures	756	1,073	524	267	1,280	1,340
Non-Program Specific Expenses	0	0	120	515	120	515
ALL PROGRAMS	**756**	**1,073**	**1,287**	**953**	**2,043**	**2,027**

8.2 2019 INNOVATIVE TECHNOLOGIES ACTIVITIES

This section outlines the specific Innovative Technologies Screening and Pilot activities undertaken in 2019, including program and measure descriptions and a breakdown of non-incentive expenditures.

Technology Screening

Program Description	Technology screening activities includes conducting prefeasibility studies, small demonstrations or lab tests in order to understand the availability of the technology, applicable codes and testing standards, current adoption rate, technical barriers, measure assumption data and to determine the market opportunity. The data is used to determine whether the technology meets the requirements of a technology innovation program as defined in the DSM Regulation and used determine the feasibility of launching a pilot or to make future Program Area inclusion decisions.
Target Market	Variable
New vs. Retrofit	Variable

Vertical Common Venting Prefeasibility Study	The objective of this prefeasibility study is to investigate the achievable potential of energy conservation measures (ECMs) applicable to the installation of in-suite condensing combination systems (providing both space and water heating) utilizing an innovative vertical common venting within a common chase. A vertical common venting system provides the opportunity for multiple gas burning appliances to be connected to a single vent, minimizing the quantity of penetrations in the building's envelope and the space required for venting pipes. The study compared the proposed ECM compared to the baseline scenarios of a central domestic hot water recirculation system and/or central space heat boilers or individual in-suite water heaters. Results of the study were handed off in Q4 2019.
Warm Mix Asphalt Prefeasibility Study	The objective of this prefeasibility study to assess the market opportunity, technical characteristics, and projected energy savings for the production and paving application of warm mix asphalt (WMA) compared to traditional hot mixed asphalt (HMA). Results of the study were handed off in Q4 2019.
Step 5 Homes Prefeasibility Study	The objective of the study was to determine the lowest cost energy conservation measure (ECM) bundles as well as innovative measures that achieve Step 5 compliance for various archetypes while using natural gas as the primary energy source for space heating and domestic hot water (DHW). The ECMs investigated in this study were intended to represent a comprehensive suite of measures commercially available to builders today, and include envelope components (foundation, walls, roof, windows, doors, airtightness) as well as HVAC components (space heating, space cooling, DHW, ventilation). Results of the study were handed off in Q4 2019.
Low Carbon Technologies in Commercial Buildings	FortisBC completed studies that identified strategies for natural gas Emission Reduction Measures (ERMs) for the commercial multifamily buildings while still meeting natural gas Demand Side Management (DSM) regulation requirements. Results of those studies identified building candidates to demonstrate energy efficiency and greenhouse gas (GHG) emission reductions. Studies were completed in Q3 2019.
Vertical Common Venting Prefeasibility Study	The objective of this prefeasibility study is to investigate the achievable potential of energy conservation measures (ECMs) applicable to the installation of in-suite condensing combination systems (providing both space and water heating) utilizing an innovative vertical common venting within a common chase. A vertical common venting system provides the opportunity for multiple gas burning appliances to be connected to a single vent, minimizing the quantity of penetrations in the building's envelope and the space required for venting pipes. The study compared the proposed ECM compared to the baseline scenarios of a central domestic hot water recirculation system and/or central space heat boilers or individual in-suite water heaters. Results of the study were handed off in Q4 2019.

	Expenditures					
Technology Screening	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	216	334	0	0	**93**	**643**
2019 Actual	0	162	0	0	10	**172**

Pilot Project Expenditures

Program Description	The Pilot Program focused on conducting field demonstrations to gather data and validate manufacturer's 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 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	Variable
Carbon Capture Pilot	FEI partnered with Clean02 to test and demonstrate energy efficiency and GHG reduction for 10 carbon capture and conversion technology installations in the Lower Mainland and Vancouver Island. The pilot will test if the Clean02 Carbon Capture Technology can meet the energy conservation and greenhouse gas (GHG) reduction objectives of commercial and small business clients. Pilot results expected Q3 2021. 2019 Participants Total 2
Smart Learning Thermostat Pilot ("SLT")	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 (SLT) where results will inform future Demand Side Management (DSM) and Demand Response (DR) program

	offerings. Smart Learning Thermostat Pilot focuses on the Nest, Ecobee3 and Honeywell Lyric products. The objective 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. Pilot results are summarized in Table 12.2: Summary of Key Findings and Methodology for 2019 Completed C&EM Program Evaluation Studies. 2019 Participants Total 159
On-Demand Recirculation Controls Pilot ("RCP")	Objectives of the pilot is to verify the energy savings, customer acceptance and installation of on-demand recirculation controls for central domestic hot water recirculation systems. The pilot subscribed 19 rental apartment buildings located in the Lower Mainland of British Columbia. Pilot results are summarized in Table 12.2: Summary of Key Findings and Methodology for 2019 Completed C&EM Program Evaluation Studies. 2019 Participants Total 19
New Construction Combo Unit Demo Pilot ("NCCURP")	FEI previously conducted a pilot program for the retrofit specific market on Combination systems. Although the pilot results were promising, they were only indicative of the retrofit market. The New Construction Combination Pilot was conducted to assess the technical characteristics, market opportunity and projected energy savings of combination systems in the new construction market. This project will target two townhome development projects located in FortisBC service territories. Pilot results expected Q2 2020. 2019 Participants Total 34
Gas Absorption Heat Pump Pilot ("GAHP")	This objectives of this pilot is to measure domestic hot water savings of installing two Robur gas absorption heat pump units to cover approximately 75 per cent of the domestic hot water load at up to seven participating commercial buildings in the Lower Mainland of British Columbia. The pilot will help verify the energy savings, customer acceptance and installation of the heat pumps, and the results will help determine the feasibility of offering a rebate program to our customers. Pilot results expected Q2 2020. 2019 Participants Total 7
Gas Technology Demonstration Pilot ("GTD")	The Gas Technology Demonstration ("GTD") pilot provides funding to FortisBC Energy Specialists to explore innovative technologies through three main program offerings: Technology Feasibility Study, Technology Demonstration, Technology Measurement and Verification. In 2019, GTD provided funding for Solar Wall, Kaizen Analytics, Endotherm, Venturi Stream Traps and Steri-Green sterilized water heat recovery system. 2019 Participants Total 16
Participants	2019 Projected Actual Total n/a 237

Expenditures						
Pilot Project Expenditures	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	540	192	0	150	**398**	**1,280**
2019 Actual	1,073	21	0	201	45	**1,340**

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 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.

In 2019, FortisBC received North American wide recognition for its efforts in evaluating energy efficient technologies and accepted an Award of Excellence in Technology Innovation and Advancement from E Source, a North American utility research and development organization.

The completed research from the Innovative Technologies Program Area helped transition eight new measures into C&EM rebate programs, including smart learning thermostats, ice rink vortex deaerators, thermal curtains, industrial steam traps, condensing make-up air units, on-demand recirculation controls, drain water heat recovery and residential combination units for space and water heating.

Furthermore, FortisBC partnered with different technology manufacturers and organizations to determine a holistic pathway to reduce GHG emissions through implementation of gas fired heat pumps. The Company participated in a North American utility collaborative to develop a strategic natural gas heat pump roadmap to identify pathways to commercialize technologies to achieve efficiencies greater than 100% for space and water heating equipment for both residential and commercial customers. Following the completion of the gas heat pump roadmap, FortisBC developed and launched the Gas Absorption Heat Pump Pilot installing 14 Robur-GAHP A units across seven commercial sites, as well as working with manufacturers to design and develop residential grade gas fired heat pumps.

9. INDUSTRIAL ENERGY EFFICIENCY PROGRAM AREA

9.1 *OVERVIEW*

In 2019, the Industrial Energy Efficiency Program Area continued to encourage industrial customers to consume natural gas more efficiently and achieved an overall TRC of 1.5, with a combined net natural gas savings of almost 301,700 GJ/yr. Tables 9-1 and 9-2 summarize expenditures for the Industrial Energy Efficiency Program Area in 2019, including incentive and non-incentive spending and annual gas savings, as well as TRC and other cost-effectiveness test results.

Key highlights include:

- Higher than anticipated participation in all industrial program offerings (see Section 3 regarding BCUC approval to transfer an amount greater than 25 percent of the Industrial Program Area approved spending amount in the Industrial Program Area to address the higher than expected participation in industrial programs);
- Launch of the Strategic Energy Management program with both Cohort and Industrial Energy Manager offerings

Table 9-1: 2019 Industrial Energy Efficiency Program Results Summary

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2019 Plan	2019 Actual	2019 Plan	2019 Actual	2019 Plan	2019 Actual
Performance Program	1,444	1,733	387	393	1,831	2,127
Prescriptive Program	417	3,713	95	132	512	3,845
Strategic Energy Management Program	400	263	210	13	610	275
Non-Program Specific Expenses	0	0	150	235	150	235
ALL PROGRAMS	**2,261**	**5,709**	**842**	**772**	**3,103**	**6,481**

Table 9-2: 2019 Industrial Program Results Summary – Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2019 Plan	2019 Actual	TRC	MTRC	UCT	PCT	RIM
Performance Program	90,189	97,769	1.1	1.1	2.4	2.8	0.5
Prescriptive Program	97,663	178,448	1.8	1.8	3.0	3.0	0.6
Strategic Energy Management Program	92,800	25,450	2.5	2.5	2.6	4.8	0.5
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**280,651**	**301,668**	**1.5**	**1.5**	**2.7**	**3.0**	**0.6**

9.2 2019 INDUSTRIAL ENERGY EFFICIENCY PROGRAMS

Performance Program

Program Description	The Performance Program is a custom program to help industrial customers use natural gas more efficiently for process-related activities. The program provides funding for walkthrough-level plant wide audits, detailed engineering feasibility studies and custom capital incentives to implement cost effective energy conservation measures (ECMs). Formerly submitted as the Industrial Optimization Program.
Target Sub-Market	Industrial Customers
New vs. Retrofit	New construction and retrofit
Partners	FortisBC Inc.

Expenditures						
Performance Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	1,444	54	18	45	270	**1,831**
2019 Actual	1,733	4	4	185	201	**2,127**

Participation		
Measure	**2019 Plan**	**2019 Actual**
Technology Implementation	7	11
Feasibility Study	10	7
Plant Wide Audit	6	2
TOTAL	**23**	**20**

Note:

- The Technology Implementation offer of the Performance Program experienced higher than anticipated levels of participation, owing to increased market demand and referrals from the Strategic Energy Management program.

Prescriptive Program

Program Description	Prescriptive initiatives to encourage the implementation of technologies for specific industrial processes using natural gas as an energy source. Formerly submitted as Specialized Industrial Process Technology Program.
Target Sub-Market	Large, medium and small industrial facilities
New vs. Retrofit	All measures available for both new construction and retrofit, except for the steam trap surveys and steam trap replacement (retrofit only)
Partners	FortisBC Inc.

Expenditures						
Prescriptive Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	417	20	20	5	**50**	**512**
2019 Actual	3,713	8	0	0	123	**3,845**

Participation		
Measure	**2019 Plan**	**2019 Actual**
Process Boiler (Hot Water and Steam)	10	10
Air Curtains - Small Door	2	0
Air Curtains - Medium Door	2	0
Air Curtains - Large Door	2	0
Direct Contact Water Heater	3	1
Steam Traps Survey	10	2

Steam Traps Replacement	10	2
1" insulation 0.5-1" HW pipe	3	5
1" insulation ≥ 1" HW pipe	3	7
1" insulation 0.5-1" LPS pipe	3	0
1" insulation ≥ 1" LPS pipe	3	3
1" insulation 0.5-1" HPS pipe	3	0
1" insulation ≥ 1" HPS pipe	3	0
Tank Insulation 1" Low Temp	1	2
Tank Insulation 1" High Temp	1	0
Tank Insulation 2" High Temp	1	2
Thermal Curtains	0	13
Single Stage Infrared Heater	0	11
Two Stage Infrared Heater	0	93
Other Prescriptive Measures	4	0
TOTAL	**64**	**151**

Notes:

The 2019 participation for the industrial prescriptive rebate offer was significantly higher than planned, primarily driven by the following measures:

- Thermal Curtains in Greenhouses, launched as one of the "Other Prescriptive Measures", supports greenhouses to install thermal curtains. The thermal curtains, also known as energy screens, are thermal barriers installed over the growing area to reduce the substantial heat loss through the roof area. This is a very costly upgrade as greenhouses tend to be fairly large in size and the availability of the rebate offer caused 13 greenhouses to pursue the upgrade.
- Single Stage and Two Stage Infrared Heaters, launched as one of the "Other Prescriptive Measure", experienced a high demand in the poultry industry with farmers raising chickens for meat production. Typical barns are equipped with forced air systems and the upgrade to infrared heaters provides energy savings as the heat is delivered directly to the livestock as well as the ventilation rate can be drastically reduced. The poultry industry is one of the industries with very low profit margin and the availability of the rebate offer caused farmers to upgrade their barns. FEI operated this rebate offer as a mid-stream rebate offer and partnered with equipment suppliers to promote and deliver this rebate. This was a very successful model for this customer segment.
- The 2019 participation for the remainder of the industrial prescriptive rebate offers was relatively aligned with the 2019 plan except for the steam trap survey and replacement. FEI engaged service providers for steam trap surveys to increase participation.

Strategic Energy Management Program

Program Description	A comprehensive approach to energy management to achieve sustainable energy and cost savings over the long term for larger FEI natural gas industrial customers. Components include operation energy analytics, energy expert expertise and support, assistance with applications for other program offers, industry collaboration and support for conservation initiatives. Includes pay-for-performance aspect for verified energy savings at the end of the program period or for achieving identified milestones.
Target Sub-Market	Large and medium industrial facilities
New vs. Retrofit	Retrofit
Partners	BC Hydro

Expenditures

Strategic Energy Management Program	Incentives	Administration	Communication	Evaluation	Labour	TOTAL
2019 Plan	400	75	30	45	**60**	**610**
2019 Actual	263	8	0	0	4	**275**

Participation

Measure	2019 Plan	2019 Actual
Individual, Large Customer	5	3
Cohort, Medium Customers	8	9
TOTAL	**13**	**12**

Notes:

- FEI provides the Cohort and Industrial Energy Manager (IEM) offers under the Strategic Energy Management (SEM) as a supplementary offer to Strategic Energy Management program offerings by BC Hydro. FEI SEM support, focussed on natural gas efficiency, was offered to participants already enrolled in the BC Hydro program and who consumed significant volumes of natural gas such that they could potentially achieve significant and cost-effective natural gas savings.
- FEI offered natural gas support to two cohorts (BC Hydro Cohort 2 and 3) with four and two participants, respectively. FEI provided natural gas support to an existing cohort that completed prior to the FEI offer launch (BC Hydro Cohort 1) as a part of the alumni offer with three participants. Another cohort (BC Hydro Cohort 4) was launched by BC Hydro in 2019 focussing on wastewater facilities, but had no FEI participants due to minimal natural gas consumption. BC Hydro Cohort 5 began recruiting in late 2019.

9.3 *SUMMARY*

Industrial Energy Efficiency Program Area activity in 2019 resulted in over 301 thousand GJ/year of natural gas savings. These programs enabled industrial customers to conduct both simple and comprehensive energy efficiency upgrades at their facilities. The combination of financial incentives, extensive Point-of-Sale trade ally partners, Strategic Energy Management program, 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 industrial sector.

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 initiatives and campaigns were undertaken in 2019, providing information about behaviour change and customer attitudes on energy efficiency. Educating all types of customers and students (who are future customers) remains a strong priority and FEI is continuing to ensure steps are taken to make the information provided relevant and timely.

FEI continued its collaboration with FBC in 2019 to maximize efficiencies across both utilities. Costs continue to be shared on school, residential and commercial outreach as applicable. The sixth annual Efficiency in Action awards were held recognizing natural gas commercial organizations that have most effectively used C&EM programs and achieved natural gas savings. FEI's partnership with BC Hydro continued in 2019. This included collaboration on the Energy Wise Network Program for commercial customers that led to over 21 natural gas behaviour change projects being submitted in 2019 with a completion date of March 31, 2020. The multi-lingual outreach program, EmpowerMe, also in partnership with BC Hydro as of January 2019, continued to reach new Canadians in eleven languages through community events, presentations, workshops and in-home visits. Participants learn about their utility bills, safety, and behaviour change initiatives to help them save energy and money. Participants also received an Energy Savings Kit and 846 kits were distributed in 2019.

The online, curriculum-connected Energy Leaders school program moved to its third year in market and expanded to include grade eleven and twelve lessons. Energy Leaders now provides lesson plans for all grades from kindergarten to grade twelve. To support the construction industry transitioning to the BC Energy Step Code, FEI collaborated with the BC Institute of Technology Zero Energy buildings Learning Centre which offers a full suite of hands on courses. FortisBC continued with its "We've got rebates" general marketing campaign which continued to increase awareness of its rebate programs.

Research and evaluation was conducted by an external consultant, which provided recommendations regarding whether energy savings should be claimed for any of FortisBC's CEO initiatives. Additional research and evaluation conducted in 2019 by an external consultant validated the opportunity to claim energy savings within the CEO Program Area, specifically the distribution of Energy Savings Kits through the Residential multi-lingual program.

For 2019, the FEI CEO Program Area has reported energy savings under the Residential Education Program, through the distribution of 846 Energy Savings Kits as part of the aforementioned EmpowerMe multi-lingual initiative. This initiative is separate from the Low Income Self Install Program that also distributes Energy Savings Kits.

FEI continues to focus on behavioural change opportunities to foster a culture of conservation in British Columbia while driving program awareness and participation. CEO costs are included at the Portfolio level and incorporated into the overall DSM Portfolio cost-effectiveness results.

Tables 10-1 and 10-2 summarize the planned and actual expenditures for the CEO Program Area in 2019, including incentive and non-incentive expenditures and annual gas savings.

Table 10-1: 2019 CEO Initiative Results Summary – Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2019 Plan	2019 Actual	2019 Plan	2019 Actual	2019 Plan	2019 Actual
General Residential Education Program	0	0	2,991	3,594	2,991	3,594
Residential Customer Engagement Tool	0	0	2,434	871	2,434	871
Commercial Education Program	0	0	673	583	673	583
School Education Program	0	0	957	815	957	815
Non-Program Specific Expenses	0	0	100	196	100	196
ALL PROGRAMS	**0**	**0**	**7,155**	**6,059**	**7,155**	**6,059**

Table 10-2: 2019 CEO Initiative Results Summary- Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2019 Plan	2019 Actual	TRC	MTRC	UCT	PCT	RIM
General Residential Education Program	0	1,184	Savings Not Estimated				
Residential Customer Engagement Tool	Savings Not Estimated		Savings Not Estimated				
Commercial Education Program	Savings Not Estimated		Savings Not Estimated				
School Education Program	Savings Not Estimated		Savings Not Estimated				
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**0**	**1,184**	**Savings Not Estimated**				

10.2 *2019 CEO PROGRAMS*

Residential General Education Program

Program Description	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 directly (either face-to-face or through online tools). This audience includes Low Income and multilingual customers. Promotional activities include a multimedia general rebates awareness campaign, engagement campaigns, educational seminars, and participation in home shows and community events. This Program also includes the cost of production of materials for events and prizing for audience engagement such as draft proofing kits that are utilized at events targeting Residential customers and children. In addition, continuing partnerships with Home Builders Association Vancouver and local sports organizations expand outreach opportunities to engage with Residential customers while our Empower Me initiative continues to increase awareness among multilingual customers. Collaborations between internal departments and FortisBC Inc. continue to be sought to achieve cost efficiencies in the budget, particularly for advertising and outreach events. FEI will continue to focus on behavioural change opportunities that may result in energy savings.

Target Sub-Market	Residential, municipal and general public
New vs. Retrofit	New construction and retrofit
Partners	BC Hydro, FortisBC Inc., municipalities
Notes	Communications expenditures were higher than planned. Lower than anticipated participation in the Residential Program Area caused the need for enhanced communications efforts to help drive participation.

Expenditures						
General Residentail Education Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	0	470	2123	98	**300**	**2,991**
2019 Actual	0	403	2,716	0	474	**3,594**

Residential Customer Engagement Tool Program

Program Description	This program will provide customers with an online portal and home energy reports where customers can access targeted energy conservation content. Other engagement measures may be included in future years to foster behavior change.
Target Sub-Market	Residential
New vs. Retrofit	Both
Partners	FortisBC Inc.
Notes	The Residential Customer Engagement Tool expenditure was below planned due to the launch being delayed to 2020 as a result of challenges with supporting systems integration.

Expenditures						
Residential Customer Engagement Tool	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	0	2070	150	34	**180**	**2,434**
2019 Actual	0	734	2	0	136	**871**

Commercial Education Program

Program Description	This program provides ongoing communication and education about energy conservation initiatives as well as encouraging behavioural changes that help Commercial customers reduce their organization's energy consumption. The Commercial sector is made up of small and larger businesses in a variety of sub sectors such as retail, offices, multi-family residences, schools, hospitals, hospitality services and municipal/institutions. Promotional activities included face-to-face, print and online communications, and industry association meetings and tradeshows. FEI hosted its sixth Efficiency in Action Awards, which recognizes Commercial customers for their innovation in energy efficiency and achieved natural gas savings. FEI continued to support behavior education campaigns delivered by energy specialists in their respective organizations. Collaborations between internal departments, FortisBC Inc. as well as other utilities continued to achieve cost efficiencies such as the Energy Wise Network joint initiative with BC Hydro.
Target Sub-Market	Commercial customers, multi-family, energy specialists, energy management staff, municipalities
New vs. Retrofit	New construction and retrofit
Partners	BC Hydro, municipalities, FortisBC Inc.

Expenditures						
Commercial Education Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	0	260	212	51	**150**	**673**
2019 Actual	0	24	479	0	80	**583**

School Education Program

Program Description	This program responds to meeting the "adequacy" component on of the Demand-Side Measures Regulation whereby a utilities' DSM portfolio is considered adequate if it includes an education program for students enrolled in [K-12] schools and post-secondary schools in the Company's service area. Activities included supporting FEI's corporate school initiatives, including but not limited to Energy is Awesome and the kindergarten to grade 12 curriculum-connected resource Energy Leaders. Additionally, the assembly style presentation, Energy Champions, which continued in partnership with the BC Lions. Partnerships and funding support for post-secondary initiatives included in-class presentations, as well as supporting education campaigns delivered by energy specialists (or an energy manager).
Target Sub-Market	Students and teachers
New vs. Retrofit	New Construction and Retrofit
Partners	BC Lions, FortisBC Inc.

Expenditures						
School Education Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	0	520	200	47	**190**	**957**
2019 Actual	0	303	364	0	147	**815**

10.3 *SUMMARY*

The initiatives described in CEO foster a culture of energy conservation in BC through activities designed 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 support public policy objectives to increase energy efficiency and reduce greenhouse gas emissions. In 2019, this Program Area continued 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 2019, Enabling Activities continued to support and supplement FEI's DSM program development and delivery, advancing energy efficiency in British Columbia. This included:

- Ongoing support of the Trade Ally Network, which aims to develop and maintain a contractor network to promote DSM programs, rebates and energy-efficiency messaging;
- Continuing to support the development and expansion of the ENERGY STAR Verified Installation initiative;
- Actively participating in advancing national, provincial, municipal and other relevant building codes, appliance/equipment standards, by-laws and regulations;
- Providing the industry with education and training on a variety of building techniques and products that contribute to high-performance construction with improved energy efficiency;
- Continuing to maintain FEI's current DSM program tracking system, as well as supporting developments for a new replacement DSM program tracking and management system;
- Performing preliminary work on the conservation potential review;
- Continuing to support communications and program activities via ongoing customer research activities;
- Further development of the Commercial Energy Specialist program to enable participation expansion; and
- Further development and full roll out of the Community Energy Specialist program.

These activities play an important role in FEI's Portfolio of DSM activities by advancing the delivery of all Program Areas. As codes and standards advance, FEI examines the impact that its DSM programs have had on that advancement. FEI then claims energy savings in the respective Program Area where appropriate, when a new regulation or standard is adopted. No attribution savings were identified in 2019. FEI will continue to examine and, where appropriate, claim energy savings for Codes and Standards advancement for future programs.

Tables 11-1 and 11-2 summarizes the projected and actual expenditures as well as energy savings for the Enabling Activities in 2019.

Table 11-1: 2019 Enabling Activities Results – Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2019 Plan	2019 Actual	2019 Plan	2019 Actual	2019 Plan	2019 Actual
Trade Ally Network	0	0	2,300	1,896	2,300	1,896
Codes and Standards	713	154	1,148	1,002	1,861	1,156
Reporting Tool & Customer Application Porta	0	0	590	2,845	590	2,845
Conservation Potential Review	0	0	0	29	0	29
Customer Research	0	0	170	165	170	165
Commercial Energy Specialist Program	2,400	1,465	295	220	2,695	1,684
Community Energy Specialist Program	750	160	60	141	810	302
ALL PROGRAMS	**3,863**	**1,779**	**4,563**	**6,298**	**8,426**	**8,077**

Table 11-2: 2019 Enabling Activities Results - Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2019 Plan	2019 Actual	TRC	MTRC	UCT	PCT	RIM
Trade Ally Network	Savings Not Estimated		Savings Not Estimated				
Codes and Standards	Savings Not Estimated		Savings Not Estimated				
Reporting Tool & Customer Application Portal	Savings Not Estimated		Savings Not Estimated				
Conservation Potential Review	Savings Not Estimated		Savings Not Estimated				
Customer Research	Savings Not Estimated		Savings Not Estimated				
Commercial Energy Specialist Program	0	2,133	Savings Not Estimated				
Community Energy Specialist Program	0	0	Savings Not Estimated				
ALL PROGRAMS	**0**	**2,133**	**Savings Not Estimated**				

11.2 *2019 ENABLING ACTIVITIES BY PROGRAM*

Trade Ally Network

Activity Description

The Trade Ally Network develops and manages a contractor network to promote DSM programs, rebates 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. Enabling Activities are critical initiatives that support and supplement DSM program development and delivery.

The Trade Ally Network provides FEI the opportunity to quickly and efficiently communicate new programs or revisions to existing programs. 78 percent of the 2019 Residential Furnace and Boiler Replacement Program participants used contractors who were members of the Trade Ally Network. Development work was undertaken in 2019 to expand the Trade Ally Network to include commercial point of sale partners, previously known as Commercial Partners. In addition, to better equip the trades with influencing homeowners to make informed energy efficient decisions, focused sales training took place in October on Vancouver Island to further support Trade Ally Network members.

	Expenditures					
Trade Ally Network	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	0	600	700	600	**400**	**2,300**
2019 Actual	0	313	1,079	262	242	**1,896**

Notes:

- FEI continues to support the industry, including FEI's 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 MEMPR. Only the FEI contribution is reported here.
- There has also been continued development of the Program Registered Contractor process for insulators, training for contractors, and site visits to assess program compliance. FEI has continued to support the development of ENERGY STAR Verified Installation (ESVI) pilot for furnace installation (see also Section 5). ESVI is an online commissioning software that provides real-time feedback at the time of the furnace install based on contractor inputs. By making suggested amendments, the software is intended to ensure that the furnaces are running at optimal levels due to additional checks and modifications. ESVI pilot was launched in late 2019. FEI is the first utility in Canada to make this software available for contractors to utilize.

Codes and Standards

Activity 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. The Codes and 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, supports implementation and adoption of such measures and aims to educate and provide training to the industry. With respect to codes and standards development, FEI continued to evaluate, analyze and review the municipal, provincial and national codes and standards initiatives for energy efficiency and participated in various code amendment processes by way of providing comments. In terms of implementation and adoption of new codes and standards, FEI collaborated with entities, such as Building Officials' Association of BC (BOABC) and various municipalities in promoting the implementation and adoption of the BC Energy Step Code. At the national level, FEI continued its active participation with Natural Resources Canada in supporting Leadership in Energy Efficiency Partnerships (LEEP) and promotion and adoption of the efficient use of energy in buildings. In the residential sector, FEI continued to provide support for energy compliance and testing of new homes through the provision of incentives for energy advisor services as required by the BC Energy Step Code. Incentives encouraged builders to work with an energy advisor to validate the energy performance of their home through energy modelling, on-site airtightness testing, completion of the Step Code compliance reports and receipt of an EnerGuide label. With respect to codes and standards education and training, FEI continued to sponsor BC Energy Step Code educational and training sessions throughout the year and initiated the BUILT*better* initiative to provide the industry with education and training on a variety of building techniques and products that contribute to high-performance construction with improved energy efficiency.

Expenditures						
Codes and Standards	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	713	868	100	105	**75**	**1,861**
2019 Actual	154	218	680	25	78	**1,156**

Notes:

- With respect to codes and standards development activities, FEI maintained its involvement in various national, provincial and municipal code amendment processes and continued its active participation in various codes and standards development work involving the CSA, such as CSA standard for Fuel Burning Equipment, Thermal Bridging Calculation Methodology and Building Energy Systems for both residential and commercial sectors. FEI also continued to provide input to DSM program design and development within the Company from a codes and standards perspective.
- FEI collaborated with several entities and municipalities in promoting the implementation and adoption of the BC Energy Step Code in 2019, and initiated a BC building compliance survey.
- FEI further expanded its education and training activities in 2019 via the BUILT*better* initiative to provide the building industry with knowledge on a variety of building techniques and products that contribute to high-performance construction. In addition, FEI continued to collaborate with FBC, MEMPR, BC Hydro and BC Housing to provide education to builders and energy advisors, and support policy regarding high performance homes in BC.
- FEI provided research funding and support to the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) for various energy efficiency-related projects.
- FEI also continued to keep its library of codes and standards references current and purchased the latest testing standards and up-to-date building codes and other relevant documents. It further continued to develop internal documents and bulletins for relevant Program Areas and personnel within the Company.

Reporting Tool & Customer Application Portal

Activity Description	The Demand-side Management Tracking System (DSMS) Project will transition FBC and FEI from their existing DSM tracking systems onto a new, joint system. These tracking systems are used to manage DSM rebates from the application stage through to payment, including application review, reporting, and customer communications. The primary reasons for transitioning both utilities to a new system are: an improved ability to operate joint programs by sharing a platform, the introduction of online application forms for gas customers, improved reporting via integrated dashboards, and a powerful communications management system. In addition, the vendor has ceased any further development of the system currently in use by FEI.

Expenditures						
Reporting Tool & Customer Application P	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	0	350	0	0	**240**	**590**
2019 Actual	0	2,483	0	0	361	**2,845**

Notes:

- Several factors caused the 2019 expenditure on the reporting tool and customer application portal to be higher than planned for FEI in 2019. Aspects of the tool development were pushed into 2019 from 2018 due to increased complexities as the

timing of integrations with other FortisBC technical solutions were brought forward to coincide with the timing of the tool development. These integrations allowed further customer facing enhancements to the system and to the DSM programs that will rely on the tool, resulting in an increase in the scope of the implementation. FEI also took advantage of an opportunity to reduce overall licensing costs by advancing payment for licensing fees from future years into 2019. Finally, as a result of the above noted delays, FEI needed to continue its maintenance contract with the vendor of the existing tracking system for another year.

Conservation Potential Review Program

Activity Description	FEI considers the CPR to be an important tool for use in developing, supporting, and assessing current and future C&EM 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 explored through conservation and energy management programs over the study period. The CPR does this by comparing the economic and market potential of viable measures to a base case scenario.

Expenditures						
Conservation Potential Review	Incentives	Administration	Communication	Evaluation	Labour	TOTAL
2019 Plan	0	0	0	0	**0**	**0**
2019 Actual	0	0	0	0	29	**29**

Notes:

- The BCUC accepted the 2017 LTGRP as in the public interest on February 25, 2019 and directed FEI to submit the next resource plan by March 31, 2022. Given that an essential input to the LTGRP is the CPR, work had to be completed in 2019 to scope out the project and select the vendor in order to meet those deadlines. The expenditures realized in 2019 account for the labour incurred to complete those tasks.

Customer Research

Activity Description	Research activities undertaken under this budget in 2019 included the commercial end use study, ongoing research to track the impact of C&EM communications, communications testing, and web site user experience testing.

Expenditures						
Customer Research	Incentives	Administration	Communication	Evaluation	Labour	TOTAL
2019 Plan	0	150	0	20	**0**	**170**
2019 Actual	0	0	0	165	0	**165**

Notes:

- Closer examination of the 2019 customer research activity identified that it is more appropriately categorized as evaluation related work rather than administration, hence the variance in the actual versus plan split between these categories.

Commercial Energy Specialist Program

Activity Description	This program funded Energy Specialist positions in large commercial organizations, up to $60,000 per year based on an annual contract. Funded Energy Specialists' key priority is to identify and implement opportunities for their organization to participate in FEI's C&EM programs, while also identifying and implementing non-program specific opportunities to use natural gas more efficiently. There were 27 participants in 2019. This program is funded as an enabling activity but claims natural gas savings for those projects completed by energy specialists that are not claimed by another FEI DSM program. Total 2019 verified (non-C&EM program) annual savings were 2,133 GJ. FEI considers this to be an energy management program, and hence a specified demand-side measure, as defined in the DSM Regulation.

Expenditures						
Commercial Energy Specialist Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	2,400	100	0	60	**135**	**2,695**
2019 Actual	1,465	21	0	38	160	**1,684**

Notes:

- The Energy Specialist Program continues to experience success as an enabling program. In 2019, organizations with Energy Specialists were responsible for 33 percent of natural gas savings and 23 percent of the incentives paid out by Commercial C&EM programs. This is an addition to the Conservation Education and Outreach, Innovative Technologies, Low Income and Residential programs and incentives that Energy Specialists promoted and used in 2019.
- 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 third party verified natural gas projects completed by Energy Specialists in 2019, which 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.

Community Energy Specialist Program

Activity Description	This program funded Senior Energy Specialist positions in municipalities and regional districts, up to $100,000 per year based on an annual contract. In the FEI service territory, C&EM contributes 60% of this funding amount with the other 40% coming from FEI's External Relations department. In the FEI/FBC shared service territory, C&EM contributes 75% of this funding (split 50/50 between C&EM FEI and FBC) with the other 25% coming from FEI's External Relations department. Senior Energy Specialists lead policy development and implementation as communities develop or refresh their sustainability and energy plans including BC Energy Step Code support where applicable and raise awareness of and participate in FEI's C&EM programs. There were eight participants in 2019. FEI considers this to be an energy management program, and hence a specified demand-side measure, as defined in the DSM Regulation.

Expenditures						
Community Energy Specialist Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2019 Plan	750	10	0	25	**25**	**810**
2019 Actual	160	0	0	0	141	**302**

Notes:

- C&EM's funding contribution to Senior Energy Specialist positions increased slightly from what was initially envisioned in the 2019-2022 DSM Plan. A review of the Senior Energy Specialists work plans and quarterly reports found that they spend on average at least 60 percent of their time on C&EM related projects/tasks in the FEI non-shared service territory and 75 percent of their time on C&EM related projects/tasks in the FEI/FBC shared service territory. Therefore the C&EM funding contribution was adjusted.
- Actual participation was under the forecast due primarily to a slower than anticipated uptake of communities into the program, funding agreements not being renewed or Senior Energy Specialists leaving for other job opportunities. Some communities had Senior Energy Specialists for part of the year only as their funding agreements started mid-year, concluded and were not renewed or became temporarily vacant.

11.3 *SUMMARY*

Enabling Activities are critical initiatives that support and supplement DSM program development and delivery. The Trade Ally Network provides FEI the opportunity to quickly and effectively communicate new programs or revisions to existing programs. 78 percent of the 2019 Residential Furnace and Boiler Replacement Program participants used contractors who were members of the Trade Ally Network. Furthermore, the value of the Trade Ally Network Program was demonstrated by the successful adoption of an additional requirement for the Residential Furnace and Boiler Replacement Program, i.e. a commissioning sheet. FEI was able to successfully implement a commissioning sheet by way of input and feedback from Trade Ally Network members.

FEI's newly established BUILT*better* initiative provided the building industry with reliable education and training on a variety of building techniques and products that will contribute to high-performance builds throughout British Columbia. The initiative is broad and entails a variety of activities such as in-person educational seminars, case study publications that showcase building construction to various high-performance levels, as well as support for local governments.

FEI's involvement in codes and standards work in 2019 continued to encompass various activities including monitoring, reviewing and responding to existing and proposed regulatory changes and direct participation in working groups, committees and sub-committees that explore the development of future targets, codes and standards.

In 2019, the Codes and Standards Program Area significantly contributed to FEI's successful fulfilment of its obligation with respect to the adequacy requirements as per Section 3 of the DSM Regulation.

The continued development work in 2019 to implement a new DSM management system, will help to improve the customer experience and service delivery for DSM programs. Once fully implemented, this new system will replace the existing tool and provide improved features and reports to help FEI manage its expanding portfolio of DSM activities and enable new and improved online functions for FEI's customers.

12. EVALUATION

In alignment with the Company's Evaluation, Measurement and Verification (EM&V) Framework and industry standard practice, program evaluation activities are assessed at different stages of each program's lifecycle.[13] Based on this ongoing assessment, all programs are evaluated when appropriate. The 2019 evaluation activities presented here reflect the number of programs in market, and the type of evaluation activities required to provide program feedback.

12.1 *2019 PROGRAM EVALUATION AND EVALUATION RESEARCH ACTIVITIES*

In 2019, 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, conducting industry research, and conducting quality assurance site visits. 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 2019. 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 2019 evaluation activities; the Program Area each activity occurred in; the general type of evaluation activity undertaken; the Company's actual 2019 evaluation expenditures; and a status update on each activity. The total expenditure for program evaluation and research activities in 2019 was approximately $1.5 million.

[13] Types of evaluation activities include: Communications evaluations, which focus on advertising and media outreach, and focus groups; Evaluation studies, where quality assurance is conducted to gain more insight on the incented measure, and literature reviews conducted to better understand 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 and validation of energy savings through energy study and energy model reviews.

Table 12-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2019[14]

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partners	Actual Evaluation Expenditure (000's)	Evaluation Status
CUSTOMER RESEARCH					
FortisBC Communication Tracking: Energy Efficiency Conservation	Enabling Activities	Communications	none	$17	Customer engagement and awareness of C&EM activities. **Completed March, July and December 2018 by Sentis Research**
MyVoice Panel Software	Enabling Activities	Communications	none	$23	Various online testing projects: • Energy Leaders Program **Completed September 2019 by FortisBC Energy Inc.** • Customer Engagement Tool (CET) incentives **Completed May 2019 by FortisBC Energy Inc.** • Commercial Customer Recognition Survey **Completed June 2019 by FortisBC Energy Inc.**
Unified Digital Experience Project	Enabling Activities	Communications	none	$57	Integration of several new customer facing digital technologies into the FortisBC online service landscape. These projects will ensure consistency with FortisBC's visual identity standards, operate seamlessly to delivery users with consistent, pleasant to use and low-effort interactions. **Completed August 2019 by UPANUP Studios**
Customer Rebate Journey Mapping	Enabling Activities	Communications	none	$29	Study to understand the motivations for and barriers to participation in residential rebate programs. **Completed December 2019 by UPANUP Studios**
Commercial End Use Study	Enabling Activities	Communications	none	$18	Survey conducted with commercial customers including multi-family residential buildings to collect information about the building, the business(es) occupying the building, the fuel choice for heating, cooling and cooking, the types and ages of the appliances installed, energy-use behaviors, and customer attitudes towards energy issues. **To be completed Q2 2020**
Ethnic Media Buying Process Study	Enabling Activities	Communications	none	$21	Market research to establish baseline from BC residents of Chinese and South Asian communities to determine their awareness, beliefs and perception towards natural gas. **Completed November 2019 by Maple Diversity Communication Inc.**

[14] Table 12.1 does not include Prefeasibility Studies. Please refer to the Innovative Technologies section (Section 8) for details.

Table 12-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2019 (continued)

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partners	Actual Evaluation Expenditure (000's)	Evaluation Status
COMMERCIAL ENERGY SPECIALIST PROGRAM					
Energy Audit 2019 Update	Enabling Activities	Impact	None	$38	The study is an update to an energy savings audit to verify energy savings from projects completed in 2018 and 2019. **To be completed Q2 2020.**
TRADE ALLIED NETWORK QUALITY ASSURANCE					
Insulation & Program Compliance Site Visits	Enabling Activities	Evaluation Study	none	$48	Ongoing site visit of homes with insulation and draft proofing measures with a focus on quality assurance and program compliance in order to provide contractor feedback and promote future contractor education and training.
Furnace Quality Assurance & Program Compliance Site Visits	Enabling Activities	Evaluation Study	none	$214	Ongoing site visit of homes with furnace or boiler upgrades with a focus of quality assurance and program compliance in order to provide contractor feedback and promote future contractor education and training.
CODES & STANDARDS					
Energy Code Compliance Survey	Enabling Activities	Process	none	$25	Survey of industry professionals and building officials regarding compliance with the BC Energy Step Code energy performance requirements for new buildings including residential and commercial. **To be completed Q3 2020**
HOME RENOVATION PROGRAM					
Appliance Maintenance Rebate Program - Evaluation 2019	Residential	Process	none	$18	Quantitative research study among 2019 program participants to assess the program and gather feedback for future program design. **To be completed Q2 2020**
Fireplace Savings Review	Residential	Evaluation Study	none	$12	Simulation modeling and literature reviews completed to assess fireplace savings assumptions. **Completed February 2019 by Posterity Group** **Completed March 2019 by BES Canada**
Home Renovation Rebate Program Participant Survey	Residential	Process	none	$15	Program participant survey to assess program awareness, application process and overall program satisfaction. **Completed July 2019 by Sentis Market Research**
Space Heating Evaluation 2019	Residential	Process & Impact	none	$24	Program participant and contractor surveys to assess customer satisfaction, program awareness and gather feedback for future program design. Consumption analysis is included as part of the program evaluation. **To be completed Q2 2020**
Smart Learning-Style (Connected) Thermostats - Literature Review	Residential	Evaluation Study	none	$5	Literature review on customer awareness and uptake of smart learning-style thermostats. **Completed February 2020 by Sampson Research**

Table 12-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2019 (continued)

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partners	Actual Evaluation Expenditure (000's)	Evaluation Status
HOME RENOVATION PROGRAM					
Direct Vent Wall Furnace Rebate Program Research	Residential	Process	none	$14	Survey conducted among program participants to identify the program's strengths, areas of improvement, program awareness and contractor satisfaction. **Completed December 2019 by Sentis Market Research**
Energy Coach Customer Experience	Residential	Evaluation Study	none	$12	Market research to determine the effectiveness and delivery of the services available to customers regarding the options and opportunities to improve the energy efficiency of their home or building. **Completed November 2019 by Sentis Market Research**
Retail Program Evaluation	Residential	Process & Impact	FortisBC Energy Inc. & FortisBC Inc.	$11	Customer survey, literature review and consumption analysis for the residential retail programs. **To be completed Q2 2020**
NEW HOME PROGRAM					
Builder and Energy Advisor Survey	Residential	Process	none	$4	Interviews with builders and Energy Advisors to understand their knowledge of the New Home Rebate Program. **To be completed Q2 2020**
RENTAL APARTMENT EFFICIENCY PROGRAM					
Performance Testing	Residential / Commercial	Evaluation Study	none	$2	Ongoing performance testing for RAP participants.
Participant and Building Owner Surveys	Residential / Commercial	Process	FortisBC Energy Inc. & FortisBC Inc.	$23	Surveys conducted with building owner and tenant to assess customer satisfaction, program awareness, and gather feedback for future program design. **2018 results: Completed February 2019 by Cohesium Research** **2019 results: To be completed Q1 2020**
DIRECT INSTALL PROGRAM					
Furnace Quality Assurance	Low Income	Evaluation Study	FortisBC Energy Inc., FortisBC Inc. & BC Hydro	$172	Ongoing quality assurance to ensure direct install measures are installed according to program policies and procedures.
Ongoing Customer Feedback Survey	Low Income	Process	FortisBC Energy Inc., FortisBC Inc. & BC Hydro	$17	Survey with Direct Install program participants to gather frequent and ongoing feedback on their customer experience, satisfaction with the program and the program evaluators. **2018 results: Completed March 2019 by Sentis Market Research** **2019 results: To be compited Q2 2020**
SELF INSTALL & DIRECT INSTALL PROGRAMS					
Low Income Measure Characterization Study	Low Income	Evaluation Study	none	$5	A review and update on the energy savings assumption of the measures currently promoted through the Direct Install Program and Self Install Program. **Completed December 2019 by Dunsky**

Table 12-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2019 (continued)[15]

COMMERCIAL PERFORMANCE PROGRAM					
Program Evaluation 2018	Commercial	Process	none	$4	Survey with program participants and consultants to assess the level of program satisfaction, speed of receiving program decision, and overall feedback which provide feedback for program recommendation. **Completed March 2019 by Mazzi Consulting**
Third Party Energy Study Reviews	Commercial	Measurement & Verification	none	$115	Ongoing reviews conducted by third party consultants to review and verify the savings as noted in the project energy study reports. Energy study reviews may includes engineering calculations for specific energy conservation measures, plant wide reviews, document reviews, and feasibility study reviews.
Third Party Measurement & Verification	Commercial	Measurement & Verification	none	$11	Ongoing third party M&V conducted as part of the program evaluation. The M&V activities include the completion of an M&V plan, commissioning validation site visits, and M&V reports. M&V activities align with the International Performance Measurement and Verification Protocol (IPMVP).
COMMERCIAL PRODUCT REBATE PROGRAM					
Compliance Site Visits	Commercial	Evaluation Study	none	$28	Ongoing site visits to ensure the energy efficiency measures are installed according to the program requirements. **2018 results: Completed May 2019 by FRESCo** **2019 results: To be completed Q2 2020**
COMMERCIAL NEW CONSTRUCTION PROGRAM					
Third Party Energy Model Reviews	Commercial	Measurement & Verification	none	$14	Ongoing BC Energy Step Code and Non-BC Energy Step Code energy model validations conducted by a third party consultant as part of the program administration and evaluation.
INNOVATIVE TECHNOLOGIES					
Smart Learning Thermostat Pilot	Innovative Technologies	Measurement & Verification	FortisBC Energy Inc. & FortisBC Inc.	$29	Measurement of energy savings, installation and customer acceptance associated with smart learning thermostats. **Completed April 2019 by APEX Analytics LLC**
Carbon Capture Pilot	Innovative Technologies	Measurement & Verification	none	$15	Measurement of energy savings, installation and technology performance associated with the carbon capture system. **To be completed Q3 2021.**

[15] 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. 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. January 2012.

Table 12-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2019 (continued)

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partners	Actual Evaluation Expenditure (000's)	Evaluation Status
INNOVATIVE TECHNOLOGIES					
On Demand Recirculation Controls Pilot	Innovative Technologies	Measurement & Verification	none	$71	Measurement of energy savings, installation and customer acceptance of the on-demand recirculation controls technology. **Completed July 2019 by RDH Building Science**
Gas Absorption Heat Pump Pilot	Innovative Technologies	Measurement & Verification	none	$122	Measurement of energy savings, installation and customer acceptance of the gas-fired absorption heat pump technology. **To be completed Q2 2020**
INDUSTRIAL PERFORMANCE PROGRAM					
Program Evaluation 2018	Industrial	Process	none	$52	Survey with program participants and consultants, verification of program enabled savings and program M&V structure to provide feedback to program design. **Completed April 2019 by Posterity**
Third Party Energy Study Reviews	Industrial	Measurement & Verification	none	$42	Ongoing reviews conducted by third party consultants to review and verify the savings as noted in the project energy study reports. Energy study reviews may includes engineering calculations for specific energy conservation measures, plant wide reviews, document reviews, and feasibility study reviews.
Third Party Measurement & Verification	Industrial	Measurement & Verification	none	$90	Ongoing third party M&V conducted as part of the program evaluation. The M&V activities include the completion of an M&V plan, commissioning validation site visits, and M&V reports. M&V activities align with the International Performance Measurement and Verification Protocol (IPMVP).
CONSERVATION EDUCATION AND OUTREACH					
Claiming Energy Savings Study	CEO	Evaluation Study	none	$27	A research study to benchmark which utilities claim savings for their behavioral initiatives and identify whether there is enough evidence to support reporting behavioral-related energy savings for FortisBC. **Completed January 2020 by ICF Canada**

Table 12-2 contains a summary of all program evaluation studies and pilot program reports completed in 2019 and includes a brief description of the methodologies and key findings.

Table 12-2: Summary of Key Findings and Methodology for 2019 Completed DSM Program Evaluation Studies and Pilot Program Reports

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
CUSTOMER RESEARCH				
FortisBC Communication Tracking: Energy Efficiency Conservation	Enabling Activities	Communications	Three waves of online interviews conducted with approximately 840 per wave of British Columbia adults living within the FortisBC service territory.	**Results:** The percentage of participants had aided awareness of at least one of the three main energy efficiency activities undertaken by FortisBC showed a consistent trend with 81% in 2018 to 80% in 2019 The engagement index was redefined to provide greater differentiation between levels of engagement. Overall, nearly three-quarters of participants were at least moderately engaged, while four-in-ten (39%) were extremely or highly engaged. **Outcome of Key Findings:** Continue to emphasize the overarching energy efficiency activities rather than individual programs to build awareness.
MyVoice Panel Software	Enabling Activities	Communications	FortisBC MyVoice online community panel.	**Results: Energy Leaders Program** – Ninety-seven percent of program participants who had downloaded lesson plans found the plans to be useful. **Outcome of Key Findings:** Implement new ideas to help increase teacher awareness of the program. **Results: Customer Engagement Tool (CET) Incentives** - Greater than eight-in-ten survey participants would be interested in participating in online energy conservation challenges. **Outcome of Key Findings:** Continue to explore ways to motivate customer participation in the Customer Engagement Tool. **Results: Commercial Customer Recognition Survey–** Seventy-five percent of participants see value in being recognized for their energy efficiency efforts. **Outcome of Key Findings:** Explore ways to recognize commercial customers for their energy efficiency efforts.
Unified Digital Experience Project	Enabling Activities	Communications	Various task and goal based projects were initiated and deliverables met within the project scope.	**Results:** An interim site was created to display progress, options, examples and files. This design system site evolved to provide direction for FortisBC and third-party vendors. **Outcome of Key Findings:** Recommendations on updates to the digital design system were taken into consideration.

Table 12-2: Summary of Key Findings and Methodology for 2019 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
CUSTOMER RESEARCH				
Customer Rebate Journey Mapping	Enabling Activities	Communications	Online surveys and focus groups with 900 BC Residents were conducted between October and November 2019.	**Results:** Over one-half (54%) of participants were motivated by the availability of a rebate to purchase high-efficiency space or water heating equipment. One-quarter of survey participants that purchased equipment, but didn't apply for a rebate, stated a dissatisfaction in the length of time or effort required to complete the program process. **Outcome of Key Findings:** Results were taken under consideration for future program design.
Ethnic Media Buying Process Study	Enabling Activities	Communications	Combination of online and telephone surveys were conducted with 400 BC Residents between September and October 2019 (210 from the Chinese community and 190 from the South Asian community).	**Results:** A total of 400 surveys were completed suggesting the opportunity for FortisBC to provide more education and additional awareness of natural gas usage and safety to the Chinese and South Asian communities. **Outcome of Key Findings:** The results will be used to shape the messaging for future marketing communications that will promote natural gas literacy, TAN as well as FortisBC's rebate programs.
COMMERCIAL ENERGY SPECIALIST PROGRAM				
Energy Audit 2019 Update	Enabling Activities	Impact	The methodology remains consistent with the Energy Savings Audit completed in previous years. A total of 31 completed projects from 2018 & 2019 were reviewed by Prism Engineering Ltd. Each Energy Specialist was required to complete a project-specific questionnaire and provide detailed project calculations and information for review. Project savings were verified on a project by project basis. Energy Specialist gas savings projects verified were those that did not take advantage of an existing FortisBC incentive program.	**Results:** A total of 10 completed projects for 2019 were reviewed to represent savings in 2019. The preliminary results indicate a total verified savings of 9,657 GJ/year for the 10 projects completed in 2019. **Outcome of Key Findings:** Results were taken under consideration for future program design.
HOME RENOVATION REBATE PROGRAM				
Fireplace Savings Review	Residential	Evaluation Study	A review of existing savings assumptions, other fireplace technical literature review, and simulation modelling was conducted to identify key factors affecting the energy savings associated with fireplace upgrades.	**Results:** Fireplace savings were validated and consistent with program assumptions. **Outcome of Key Findings:** Results were reviewed and applied to future program design.

Table 12-2: Summary of Key Findings and Methodology for 2019 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
HOME RENOVATION REBATE PROGRAM				
Home Renovation Rebate Program Participant Survey	Residential	Process	A combination of email-to-online and phone invitation-to-online surveys were conducted with 256 Home Renovation Rebate Program participants between March 28 and April 12, 2019. The purpose of the survey was to assess program awareness, reasons for participation, overall customer satisfaction, and general program delivery.	**Results:** Overall program satisfaction is high with 94% indicating "somewhat satisfied" and "very satisfied" with the overall program. 60% indicated probable or definite plans to undertake more home energy efficiency upgrades in the future. **Outcome of Key Findings:** Results were taken under consideration for future program design.
Direct Vent Wall Furnace Rebate Program Research	Residential	Process	Online survey with 2018 Connect to Gas participants was conducted between October 28 and November 15, 2019 to gauge the awareness of direct vent wall furnaces (DVWF) and gather feedback to help inform the development of a future rebate program.	**Results:** Participants are highly satisfied with the program overall - 96% are satisfied, including 75% who are very satisfied. In line with the high satisfaction levels, 95% of those surveyed would make the same choice if they had to make the purchase decision again. The two strongest motivators to install a DVWF are to improve home comfort and to lower energy bills. **Outcome of Key Findings:** Results are being taken under consideration for the development of a future C&EM program.
Energy Coach Customer Experience Study	Residential	Evaluation Study	Telephone interactions and webforms conducted to engage energy coaches specific to residential and commercial energy efficiency measures and FortisBC rebate programs.	**Results:** Customer interactions were professional and polite. High level discussions and information relating to cost savings and incentives were provided to customers. **Outcome of Key Findings:** Results were taken under consideration where there's opportunity for FortisBC to provide additional education and information to the energy coaches.
RENTAL APARTMENT EFFICIENCY PROGRAM				
Participant and Building Owner Surveys	Residential/Commercial	Process	This study is an ongoing evaluation conducted annually for the program. Two separate surveys were conducted; a building owner/manager survey and tenant survey. A telephone survey was completed for 42 property owners/managers, and an online survey was completed for 263 tenants.	**Results:** The survey results continue to show positive feedback with 88% of the building owners and 81% of the tenants surveyed indicating "very" or "somewhat satisfied" with the overall program. The high satisfaction levels from building owners/managers are primarily attributable to a positive experience with the Program. The favorable areas include; the application process, the level of program communications, installation of the fixtures were good, and the professionalism and friendliness of the installer. **Outcome of Key Findings:** Continue to conduct ongoing tenant and building owner surveys to provide feedback to program design.

Table 12-2: Summary of Key Findings and Methodology for 2019 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
DIRECT INSTALL PROGRAM				
Ongoing Customer Feedback Survey	Low Income	Process	Program participants were offered two options to complete the survey - online or paper. A total of 862 participants completed the survey between January 8, 2018 to January 7, 2019. The purpose of the survey was to assess program satisfaction with the installed measures, and program contractor experience to provide feedback for future program design.	**Results:** Overall program satisfaction is high with 95% indicating "satisfied" and "very satisfied" with the overall program. The main reason customers participate in the program is to save money (four-in-ten customers). On average participants had three products installed with the most common being the energy-saving light bulbs, faucet aerators and high efficiency showerheads. Nine-in-ten participants are satisfied with the professionalism of the contractors, and the quality of the contractor's work. **Outcome of Key Findings:** Continue to conduct the participant surveys to assess the program's development and contractor experience.
SELF INSTALL & DIRECT INSTALL PROGRAMS				
Low Income Measure Characterization Study	Low Income	Evaluation Study	This study uses documentation review, literature review and engineering calculations to verify energy savings attributed the measures incented in the low income programs.	**Results:** Energy savings values were validated for a list of low income measures. **Outcome of Key Findings:** Results were used to update program energy savings in the low income program area and to the EmpowerMe program.
COMMERCIAL PERFORMANCE PROGRAM				
Program Evaluation 2018	Commercial	Process	This study uses a combination of literature review, program documents and application review, and online and telephone surveys with program participants and consultants. A total of 182 program applications from 2013 to 2018, with 91 individual participants were reviewed as part of this study.	**Results:** 34 surveys were completed resulting in a 37% response rate. The survey results showed high levels of customer satisfaction with a mean score 4 on a 5-point satisfaction scale. The consultant satisfaction survey results showed an overall satisfaction with a mean score of 4.6. Literature review indicated markets for natural gas energy efficiency retrofits for this customer segment are stable. **Outcome of Key Findings:** Results were taken under consideration for future program design.
COMMERCIAL PRODUCT REBATE PROGRAM				
Compliance Site Visits	Commercial	Evaluation Study	Ongoing site visit of commercial buildings with space heating hot water boilers, DHW heaters, and food service equipment hot water upgrades with a focus of quality assurance and program compliance.	**Results:** A total of 55 sites visits were completed including 21 boiler upgrades, 19 water heaters, and 15 food service equipment. Overall, the majority of the sites visited met the general program requirements. **Outcome of Key Findings:** Continue to conduct ongoing program compliance site visits with the additional focus to assess furnaces.

Table 12-2: Summary of Key Findings and Methodology for 2019 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)[16]

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
INNOVATIVE TECHNOLOGIES				
Smart Learning Thermostat Pilot	Innovative Technologies	Measurement & Verification	**M&V Plan:** Complies with International Performance Measurement and Verification Protocol (IPMVP). The selected IPMVP option and measurement boundary was Option C[3], normalized methodology whereby a regression is created for both the baseline and the post-installation period and weather-normalized with a dataset derived from the Canadian Weather Energy and Engineering Datasets (CWEEDS). **M&V:** Participant surveys were conducted to assess the initial installation and usage experience of 211 participants, and a follow-up survey with 167 participants to understand the changes to satisfaction and usage characteristics. Consumption analysis was conducted using a control group to assess energy savings.	**Pilot Objective:** This pilot focused on verifying the energy savings, customer acceptance and installation of Smart Learning Thermostats across residential customers in the joint service territory of Kelowna, BC. **Outcome of key findings**: The results showed that overall, participants showed a high satisfaction with smart learning thermostats (92 per cent were somewhat or very satisfied), with 95 per cent of participants stating they would recommend the technology to others. Energy savings attributed to the smart learning thermostats were shown to be larger in colder months and smaller during warmer months when less heating is needed. As a result of the pilot program and study results, FortisBC implemented the smart learning thermostat measure in the residential, low income and commercial program areas. Energy saving were used as directional due to the small sample size.
On Demand Recirculation Controls Pilot	Innovative Technologies	Measurement & Verification	**M&V Plan:** Complies with the International Performance Measurement & Verification Protocol. The selected IPMVP option and measurement boundary was Option A[4] Retrofit Isolation Key Parameter Measurement. **M&V:** The pilot program enrolled 19 commercial building participants. The M&V was conducted over a 12-week period. The control strategy was employed for one week on (upgrade measure), then one week off (baseline) to compare week over week. A billing analysis was compiled on each building to identify overall savings.	**Pilot Objective:** This pilot focused on verifying the energy savings and customer acceptance of installing on-demand recirculation controls for central domestic hot water systems in 19 multi-family rental apartment buildings in the Lower Mainland. **Outcome of key findings:** The final report showed that buildings installing on-demand recirculation controls realized domestic hot water savings of up to 22 per cent. Overall, building managers reported feeling satisfied or somewhat satisfied with the installation and performance of the technology. FortisBC is currently evaluating the feasibility of offering this measure as a rebate program for FortisBC commercial customers.
INDUSTRIAL PERFORMANCE PROGRAM				
Program Evaluation 2018	Industrial	Process	Phone interviews were conducted with 10 program participants, 4 engineering consultants, and 3 FortisBC key account managers to assess program satisfaction, funding, application process and feedback for future program design.	**Results:** Overall, participants were satisfied with their participation and experience with the program (average score of 7.7 out of 10). An average score of 8.9 out of 10 believed the program incentives and energy savings identified through the program were worth the effort to participate. **Outcome of Key Findings:** Results were taken under consideration for future program design.

[16] IPMVP Option A - Measurement of key parameters governing energy use to assess consumption. www.evo-world.org
IPMVP Option C - Measurement of the whole facility to assess the energy performance of a total facility. www.evo-world.org

12.2 *EVALUATION COLLABORATION*

In 2019, 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. Tables 12-1 and 12-2 provide information on program evaluation activities conducted in partnership with other organizations. FEI, FBC and BC Hydro continue to collaborate in the evaluation projects for the Low Income Direct Install Program – Ongoing Customer Feedback Survey, and Furnace Quality Assurance study.

In keeping with the MOU on collaboration discussed in Section 2.4, FEI, FBC and BC Hydro held annual 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 expenditures are in compliance with the Company's internal control processes and with BCUC 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 *ROBUST BUSINESS CASE PROCESS APPLIED TO ALL PROGRAMS*

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.

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 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.

In addition to the internal business case process, FEI is required to submit a detailed plan for new programs to the BCUC for approval prior to the expenditure of any funds. No new programs, beyond those approved as part of the 2019-2022 DSM Plan, were submitted to the BCUC for approval in 2019.

13.3 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 applications and supporting documents are filed and stored for seven years.

13.4 INTERNAL AUDIT SERVICES

On an approximately biannual basis, FEI engages its own Internal Audit Services (IAS) group to review the internal controls associated with the DSM activities. Such an audit was performed in 2019 assessing the effectiveness of controls that were in place the prior year. That audit (see Appendix A) concluded 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.

13.5 SUMMARY

FEI is committed to strong internal controls in all aspects of its DSM activity. 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.

14. 2019 DSM PROGRAMS ANNUAL REPORT SUMMARY

FEI achieved 97 percent of its total approved DSM expenditures and achieved 95 percent of estimated energy savings based on its 2019-2022 DSM Plan in 2019. Incentive expenditures for the year were almost double non-incentive expenditures, making up 65 percent of the overall portfolio expenditures. These results represent a significant achievement toward FEI's objective of nearly doubling its DSM activity over 2018. FEI's DSM Portfolio in 2019 saw a new highest level of energy savings achieved to date at 832,000 GJ annually. The resulting total lifetime energy savings for all the measures implemented as a result of FEI's DSM programs during the year is estimated at 7.760 million GJ. These energy savings correspond with a lifetime GHG emission reduction of 462,000 tonnes CO2e.

The Report details how FEI cost-effectively delivered these programs within the expenditure limits accepted by the BCUC, and in accordance with the DSM Regulation. FEI continues to offer a robust portfolio of DSM programming accessible to all customer groups and locations, meeting the adequacy requirements of the DSM Regulation and operating according to the Company's DSM Guiding Principles. FEI also continues to implement strong internal data gathering, monitoring and reporting control practices.

Appendix A
INTERNAL AUDIT REPORT

FortisBC Energy Inc.
Internal Audit Report

Date: September 12, 2019

To: **Dennis Swanson**, VP, Energy Supply & Resource Development

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

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

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

---

INTRODUCTION

The Conservation and Energy Management Program ("the Program") 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 $35.874 million for 2018 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 2018 programs, namely those around program development, program administration including rebate payments, and program reporting and evaluation. This was accomplished by:

- Inspecting that a cost/benefit analysis is developed for each new 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.