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March 31, 2023

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

Attention: Sara Hardgrave, Acting Commission Secretary

Dear Sara Hardgrave:

Re: FortisBC Energy Inc. (FEI)
Natural Gas Demand-Side Management (DSM) – 2022 Annual Report

Attached please find the Natural Gas DSM Program 2022 Annual Report for FEI.

If further information is required, please contact Sarah Commander, Regulatory Projects Manager at (250) 469-6081.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Sarah Walsh

Attachment

FortisBC Energy Inc.

Natural Gas
Demand-Side Management Programs
2022 Annual Report

March 31, 2023

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1. REPORT OVERVIEW

FortisBC Energy Inc. (FEI or the Company) is committed to delivering a broad portfolio of cost-effective natural gas Demand-side Management[1] (DSM) measures that address the expectations of customers while meeting the requirements for public utilities to pursue cost-effective DSM. In 2022, the Company achieved a combined portfolio Modified Total Resource Cost (MTRC)[2] of 1.5 on expenditures of $108 million, meeting FEI's goal of cost-effective program delivery.

The 2022 DSM Annual Report (the Report) outlines the Company's actual results and expenditures for 2022 as compared to FEI's 2019-2022 DSM Plan approved by the BCUC in its Decision and Order G-10-19 (the Decision) and subsequent amendments approved by BCUC Orders G-135-21, G-301-21, and G-345-21. The Report compares 2022 actual activity and results to these approved DSM Plan values for 2022. Where the details of individual programs vary substantially from the 2019-2022 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 FEI'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 FEI is meeting the accountability mechanisms directed by the BCUC in Order G-10-19, which carries over a number of requirements from prior orders regarding

[1] Throughout this 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 (DSM 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).

DSM expenditures. One such mechanism contained in Order G-36-09 was the requirement to file DSM Annual Reports, which states:

> 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…

This 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 2022 DSM activities:

Section 1: Report Overview

- Provides a high-level background for the Report.

Section 2: Portfolio Overview

- Provides detail regarding the overall actual 2022 expenditures and cost-effectiveness results for DSM activities.
- Provides how the actual expenditures met adequacy provisions of the DSM regulations.

Section 3: Funding Transfers and Carryover

- Provides a discussion on funding transfers between Program Areas in 2022.

Section 4: Advisory Group Activities

- Provides information regarding Energy Efficiency and Conservation Advisory Group (EECAG) activities in 2022.

Sections 5 - 9 provide information on:

- Residential, Low Income, Commercial, Innovative Technologies, and Industrial Energy Efficiency Program Areas, respectively;
- Each Program Area section contains a table summarizing the planned and actual expenditures, including incentive and non-incentive expenditures, annual gas savings, as well as TRC and other cost-effectiveness test results. Additional tables outline the individual 2022 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 summary and detail regarding actual 2022 expenditures for the Conservation Education and Outreach (CEO) Program Area.

Section 11: Enabling Activities

- Provides both summary and detail regarding actual 2022 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 2022 program evaluation activities, as well as summary results from evaluations and studies completed in 2022.

Section 13: Data Gathering, Reporting and Internal Control Processes

- Provides a summary of FEI's data tracking, process control, and reporting for 2022 DSM activities, and a high-level description of FEI's internal approval process for programs.

Section 14: 2022 DSM Annual Report Summary

- Provides a summary conclusion for the Report and FEI's 2022 DSM activity.

2. PORTFOLIO OVERVIEW

In this Section, FEI provides its DSM energy savings, expenditures and cost-effectiveness test results at an overall Portfolio and Program Area level for 2022. A summary of the overall Portfolio results is provided in Table 2-1, demonstrating that the Company achieved a combined Portfolio MTRC of 1.5. FEI achieved DSM expenditures of $108.1 million and recorded annual natural gas savings of 1.2 million GJ in 2022. These energy savings resulted in carbon emission reductions of almost 70,000 tonnes of CO2e in 2022 and total reductions of 646,480[3] tonnes of CO2e over the life of all measures installed or undertaken in 2022. Expenditures and savings have increased over 2021 results by approximately $1.2 million and approximately 27,000 GJ, respectively.

Table 2-1: Overall DSM Portfolio Results for 2022

Indicator - 2022 Results		Total
Utility Expenditures, Incentives ($000s)		81,641
Utility Expenditures, Non-Incentives ($000s)		26,429
Utility Expenditures, Total ($000s)		108,071
Net Incremental Annual Gas Savings (GJ/yr.)		1,169,837
Annual GHG Emission Reductions* (tonnes CO2e/yr)		69,956
NPV of Annual Gas Savings (GJ/yr.)		10,810,708
Measure Lifetime GHG Emission Reductions* (tonnes CO2e)		646,480
Benefit/Cost Ratios	TRC	**0.9**
	MTRC	**1.5**
	UCT	**0.9**
	PCT	**2.4**
	RIM	**0.5**

Tables 2-2 and 2-3 below provide the expenditures and cost-effectiveness test results by Program Area for the overall DSM Portfolio.

[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).

Table 2-2: Overall DSM Portfolio Level Results by Program Area 2022 – Expenditures[4]

Program Area	Utility Expenditures ($000s)						
	Incentives		Non-Incentives		Plan Carryover from 2021	Total Expenditures	
	2022 Plan	2022 Actual	2022 Plan	2022 Actual		2022 Plan	2022 Actual
Residential	32,097	41,403	2,718	1,861	0	34,815	43,264
Commercial	16,850	13,282	2,950	3,393	0	19,800	16,675
Industrial	7,652	7,391	810	464	1,015	9,477	7,855
Low Income	8,362	7,835	2,622	1,719	1,279	12,263	9,554
Conservation Education and Outreach	0	0	9,433	8,135	1,917	11,350	8,135
Innovative Technologies	0	5,720	11,871	4,153	1,343	13,214	9,873
Enabling Activities	3,612	6,011	5,310	4,498	0	8,922	10,508
Portfolio Level Activities	0	0	1,979	2,205	0	1,979	2,205
ALL PROGRAMS	**68,573**	**81,641**	**37,693**	**26,429**	**5,554**	**111,820**	**108,070**

Table 2-3: Overall DSM Portfolio Level Results by Program Area 2022 – Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2022 Plan	2022 Actual	TRC	MTRC	UCT	PCT	RIM
Residential	238,323	262,336	0.5	1.7	0.7	1.9	0.4
Commercial	381,421	328,904	1.4	1.5	1.3	3.0	0.2
Industrial	466,317	442,205	2.2	2.2	4.2	3.9	0.8
Low Income	64,128	62,814	2.9	2.9	0.6	2.4	0.3
Conservation Education and Outreach	0	71,875	0.5	2.0	0.5	1.8	0.3
Innovative Technologies	Savings Not Estimated		Savings Not Estimated				
Enabling Activities	0	1,704	Calculated at Portfolio Level				
Portfolio Level Activities	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**1,150,189**	**1,169,837**	**0.9**	**1.5**	**0.9**	**2.4**	**0.5**

Portfolio Level Activities, shown in the tables above, are those activities for which the costs cannot be assigned to individual DSM programs. These activities are distinct from the Enabling Activities specifically listed in Section 11 of the 2019-2022 DSM Plan. These distinct Portfolio Level Activities include expenditures such as stakeholder engagement 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, expenditures were either zero or rounded to the nearest $000 expenditure level when expenditures were under $500.

[4] Carryover from the prior year is added to the current year plan. Information in Table 2-2 is net of such adjustments. Since FEI experienced a small over-spend in 2020, a negative carryover resulted as approved by Commission Order G-345-21. That negative carryover was allocated to the Enabling Activities and Portfolio Level Activities Areas in order that Program Areas with energy saving incentives not be impacted.

- 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 the Report are exclusive of third-party funding such as CleanBC funding from the British Columbia Ministry of Energy, Mines and Low Carbon Innovation (EMLI). 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.

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 provided 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 above shows that in 2022, FEI met the conditions of the DSM Regulation, achieving a Portfolio MTRC value of 1.5. Table 2.4 below shows that 31 percent of the Portfolio was enabled by the MTRC cost-effectiveness test.

Table 2-4: Programs Subject to MTRC and the Relative Proportion of 2022 Portfolio Expenditures

Program	Program TRC	Program MTRC	Expenditure ($000s) subject to cap	% of Portfolio Spending
Residential				
Home Renovation Rebate Program	0.6	1.8	$21,180	19.6%
New Home Program	0.4	1.4	$12,223	11.3%
Commercial				
Prescriptive Program	1.8	1.8	$105	0.1%
Rental Apartment Efficiency Program	0.7	1.2	$217	0.2%
Total			**$33,724**	**31.2%**

While FEI strives for TRC test results that approach or exceed 1.0 within each program and across all programs, there are benefits to implementing programs that do not meet this threshold. Some of these benefits include making programs available to those customers that would otherwise be underserved (such as Low Income and Residential customers), water savings, increased human health and comfort, and economic benefits such as job creation. These benefits 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).[5]

2.2 MEETING APPROVED EXPENDITURE LEVELS

FEI's 2022 DSM expenditure budget of $111.8 million includes the original expenditure approval of $96.8 million, accepted on January 17, 2019 pursuant to Decision and Order G-10-19, as well as an increase of $9.4 million pursuant to Decision and Order G-301-21, and a carryover amount from 2021 of $5.5 million pursuant to Decision and Order G-345-21. The Report also includes a reallocation of 2022 funding amounts for Residential and Low Income Program Areas as approved by BCUC Order G-135-21. 2022 DSM Plan amounts for Program Areas and the Portfolio shown in tables throughout the Report reflect these approved amendments to the DSM Plan. FEI's actual 2022 expenditures of $108.1 million for the total DSM portfolio shows that FEI's efforts to achieve the overall approved expenditure plan were successful. Incentive expenditures exceeded non-incentive expenditures by greater than a 3 to 1 margin in 2022.

Section 3 discusses funding transfers between Program Areas in 2022 within the overall DSM funding envelope and within the transfer rules as set out in the 2019-22 DSM Plan and approved pursuant to Order G-10-19. Section 3 also reports 2022 carryover 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:
>
> 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,

[5] As the DSM Regulation stipulates, the updated value that FEI has used for the ZEEA in 2020 in the MTRC calculation is $106/MWh, or $29.45/GJ.

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

FEI 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. Discussion of collaborative activity is captured in the individual Program Area sections and program descriptions found in Sections 5 through 11.

FEI, FortisBC Inc. (FBC) and British Columbia Hydro and Power Authority (BC Hydro) (collectively, 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 EMLI continued to collaborate in 2022. FEI's collaboration with EMLI on CleanBC programs includes administering incentives and enabling applications for EMLI's CleanBC rebates through FEI's application processes to provide a streamlined customer experience. The tables contained throughout the Report include only expenditure and savings information for FEI's expenditure portfolio. They do not include EMLI's CleanBC expenditures nor the savings attributed to EMLI's CleanBC incentives. In 2022, EMLI's CleanBC incentives were administered alongside FEI incentives in the Residential Home Renovation Rebate Program, the Low Income Prescriptive and Support Programs, and the Commercial Existing Building Performance Program as noted in Sections 5, 6 and 7 respectively.

2.5 SUMMARY

FEI's DSM Portfolio met the goal of cost effectiveness with a Portfolio MTRC value of 1.5 in 2022. The Company is of the view that both energy savings accounted for in the Portfolio and the resulting TRC remain conservative. Benefits from non-incentive expenditures such as those activities in the CEO and Enabling Program Areas play a particularly significant 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, as well as key market players 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. Decision and Order G-10-19 approved the continuation of FEI's existing transfer rules that allow FEI to transfer amounts equal to or less than 25 percent of the approved Program Area funding limit without further approval from the BCUC. Throughout this report, expenditure tables that show 2022 Plan values report such values prior to consideration of the 2022 transfers discussed in this Section.

Carryover 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 within the approved DSM Plan timeframe. These amounts are 'rolled over' to the next years' 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. Decision and Order G-10-19 approved FEI's request to carryover unspent amounts from one Program Area into the same Program Area in the next year without BCUC approval for the duration of the 2019-2022 DSM Plan. Since 2022 concludes the DSM Plan period, no funds were carried over into 2023.

Table 3-1 below shows that all Program Area transfers were within the 25 percent of the approved Program Area funding limit detailed in Decision and Order G-10-19 and did not exceed the approved 2022 Plan Expenditures (including 2021 carryover).

Table 3-1: Funding Transfers for 2022

Program Area	2022 Plan Expenditures (incl. 2021 Carryover*) ($000)	2022 Actual Expenditures ($000)	2022 Actuals less Plan Expenditures (incl. 2021 Carryover) ($000)	2022 Funding Transfer Amount In (Out) ($000)	Transfer as a percent of Approved (%)
Residential	34,815	43,264	8,449	8,449	24%
Commercial	19,800	16,675	-3,125	-3,125	-16%
Industrial	9,477	7,855	-1,622	-1,622	-17%
Low Income	12,263	9,554	-2,709	-2,678	-22%
Conservation Education and Outreach	11,350	8,135	-3,215	-2,837	-25%
Innovative Technologies	13,214	9,873	-3,341	0	0%
Enabling Activities	8,922	10,508	1,587	1,587	18%
Portfolio Level Activities	1,979	2,205	226	226	11%
ALL PROGRAMS	**111,820**	**108,070**	**-3,751**	**0**	

4. ADVISORY GROUP ACTIVITIES

The Energy Efficiency and Conservation Advisory Group (EECAG) provides insight and feedback on FEI's Portfolio of DSM activities and related issues. While EECAG provides input on both the electric and natural gas portfolios for FBC and FEI (together, FortisBC), this section describes those 2022 activities that mainly pertain to the FEI portfolio.

EECAG members may be invited 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. Examples include 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 2022, FEI sought EECAG input over two partial day engagement sessions in May. These sessions were hosted virtually and reduced to a few hours in length from the typical full-day workshops hosted in previous years. The topic of the session was a presentation and discussion on the proposed draft 2023-2027 FBC and 2023 FEI DSM expenditure plans. EECAG members provided feedback on new concepts and generally supported the areas being considered for the upcoming expenditure plans.

5. RESIDENTIAL PROGRAM AREA

5.1 *OVERVIEW*

The Residential Program Area reduced annual natural gas consumption by 262,336 GJ, achieving an overall MTRC of 1.7. $43.3 million was invested in Residential energy efficiency programs in 2022, and 96 percent of this investment was incentive spending. Tables 5-1 and 5-2 summarize the expenditures for the Residential Program Area, including incentive and non-incentive expenditures and annual gas savings, as well as TRC/MTRC and other cost-effectiveness test results.

Residential programs serve over 954 thousand customers[6] in the FEI service territories. For DSM purposes, these customers predominantly include those living in single-family homes, row houses, townhomes, or mobile homes[7]. 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 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	
	2022 Plan	2022 Actual	2022 Plan	2022 Actual	2022 Plan	2022 Actual
Home Renovation Program	24,345	26,937	1,425	956	25,770	27,893
New Home Program	7,502	14,293	750	623	8,252	14,916
Rental Apartment Efficiency Program	250	172	193	80	443	251
Non-Program Specific Expenses	0	0	350	203	350	204
ALL PROGRAMS	**32,098**	**41,403**	**2,718**	**1,861**	**34,816**	**43,264**

[6] FEI Annual Review for 2020 and 2021 Rates, BCUC Order G-319-20 Compliance Filing.
[7] 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				
	2022 Plan	2022 Actual	TRC	MTRC	UCT	PCT	RIM
Home Renovation Program	186,682	194,011	0.6	1.8	0.8	1.4	0.2
New Home Program	27,706	54,270	0.4	1.4	0.5	1.5	0.2
Rental Apartment Efficiency Program	23,935	14,056	3.9	--	3.5	12.9	0.6
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**238,323**	**262,336**	**0.5**	**1.7**	**0.7**	**1.9**	**0.4**

Notes:

- Non-incentive expenditures consist of rebate administration, communications, evaluation, and labour expenditures.
- The 2019-2022 DSM Plan figures were adjusted in 2021. The 2022 Plan figures shown in Table 5-2 are the figures approved pursuant to Order G-301-21.

5.2 2022 RESIDENTIAL ENERGY EFFICIENCY PROGRAMS

This section outlines the specific Residential energy efficiency initiatives undertaken in 2022, including program and measure descriptions and a breakdown of non-incentive expenditures for each of the Home Renovations Rebate Program, the New Home Program, and the Rental Apartment Efficiency Program.

Home Renovation Rebate Program

Program Description	The program promotes energy-efficiency home retrofits in collaboration with BC Utilities, EMLI, as well as federal 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., EMLI, Municipal and Federal Governments

Expenditures ($000s)						
Home Renovation Rebate Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**24,345**	**200**	**100**	**125**	**1,000**	**25,770**
2022 Actual	26,937	273	9	35	639	**27,893**

Participation		
Measure	**2022 Plan**	**2022 Actual**
Space Heating		
Furnace	8,682	16,290
Boiler	330	310
Combination System	990	1,097
Secondary Heating		
EnerChoice Fireplace	6,121	3,858
Water Heating		
0.67 EF Storage Tank Water Heater	2,000	927
Condensing Tankless Water Heater	7,000	5,451
Condensing Storage Tank Water Heater	100	29
Building Envelope		
Attic Insulation	1,500	1,880
Wall Insulation	250	219
Crawlspace and Basement Insulation	250	288
Other Insulation	100	86
Bonus Offers	2,720	4,529
Water Conservation and Retail measures		
Aerators & Showerheads	3,500	864
Draftproofing	20,000	9,001
ENERGY STAR Washer	2,000	495
ENERGY STAR Dryer	100	18
Other		
Drain Water Heat Recovery	100	0
Communicating Thermostat	5,473	4,505
Appliance Maintenance services	35,000	0
Total	**96,216**	**49,847**

Notes:

- The Home Renovation Rebate 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 an overarching program. In 2022, this program was a collaboration between the BC Utilities and the EMLI CleanBC Better Homes Program.
- Despite the Double Rebate offer ending in 2021, the strong momentum for early replacement of existing furnaces did not decline and 187% of the participation target was achieved in 2022. However, as a result of the furnace rebate significantly exceeding participation targets, FEI decided to not offer incentives for Appliance Maintenance services in 2022.

- Emphasis continued to be placed on Furnace Quality Installation. Rebate eligibility requirements include the installation of a two-pipe direct vent system and the completion of a commissioning sheet. An ENERGY STAR Verified Installation pilot (ESVI), launched in late 2019, which provides homeowners with a label that informs them that their installation conformed to best practices[8]. Due to COVID-19 implications and the desire to limit additional contractor time in the customers' homes, this pilot activity slowed. This provided the opportunity to launch the application software based on the commissioning information used for ESVI and work with contractors to gain feedback and improve the software further. A pilot for a commissioning sheet application was conducted with contractors in 2022 with a planned launch for Trade Ally Network contractors in 2023. FEI is continuing to evaluate energy savings associated with Quality Installation. Virtual and onsite furnace inspections were conducted through the program to continue to support quality installation and contractor education.

- Working with program partners, the Home Performance Stakeholder Council, and FEI's Trade Ally Network, FEI continues to promote the Home Performance industry through trades outreach, training, development of accredited contractor directories, and site visits for program compliance and quality installation. 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 Section 11.2.

New Home Program

Program Description	The New Home Program provides 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 high performance new homes.
Target Sub-Market	Residential
New vs. Retrofit	New
Partners	BC Hydro, FortisBC Inc., Municipal, Provincial and Federal Governments

Expenditures ($000s)						
New Home Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**7,502**	**130**	**45**	**25**	**550**	**8,252**
2022 Actual	14,293	61	17	0	544	**14,916**

[8] Please refer to Section11, Enabling Activities for more information.

Participation		
Measure	**2022 Plan**	**2022 Actual**
BC Energy Step Code – Whole Home		
STEP 2 (Single Family Dwelling)	150	419
STEP 2 (Townhome/Rowhome)	20	295
STEP 3 (Single Family Dwelling)	500	1,251
STEP 3 (Townhome/Rowhome)	225	572
STEP 4 (Single Family Dwelling)	150	269
STEP 4 (Townhome/Rowhome)	185	102
Space and Water Heating Systems		
0.67 EF Storage Tank Water Heater	25	44
Tankless Water Heater	810	1,110
Condensing Storage Tank Water Heater	150	5
Combination System	450	688
Secondary Heating		
EnerChoice Fireplace	950	1,143
Direct Vent Wall Furnace	0	0
Other		
Drain Water Heat Recovery	150	3
Communicating Thermostat	500	711
HVAC Zone Controls	75	0
ENERGY STAR Dryer	0	37
TOTAL	**4,340**	**6,649**

Notes:

- FEI, in collaboration with FBC, provides whole home incentives 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 the Energy Step Code in municipalities across BC.
- In fall 2020, the New Home Program provided enhanced incentives of $2,000 per Step Code level. The improved incentives drove additional participation and will remain in market into 2023, allowing builders to plan for the incorporation of energy efficient measures and execute plans over the life of the project.
- BC Energy Step Code – Whole Home incentives supported 2,908 new homes for a total of $11.6 million.
- Natural gas high efficiency equipment incentives supported 3,741 high-efficiency equipment installations totalling $2.6 million in incentives.
- FEI's Design Offer is available to builders pursuing Step 3, 4 or 5 and is intended to educate and encourage higher performance construction and reduce builder time and risk. The Design Offer helps to offset the costs of engaging mechanical and building envelope

designers and for pursuing an integrated design process (IDP). This offer assists in building the capacity and education of these service providers. This offer is funded through the Codes and Standards budget (Table 11.1).

- FEI collaborates with FBC, BC Hydro, EMLI 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 11.1 in the Codes and Standards budget.

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. 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	FBC

Expenditures ($000s)						
Rental Apartment Efficiency Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**250**	**107**	**46**	**24**	**17**	**445**
2022 Actual	171	47	0	30	3	**251**

Participation		
Measure	**2022 Plan**	**2022 Actual**
Aerators & Showerheads	19,303	12,579

Notes:

- Participation in 2022 was lower than anticipated due to several factors including heightened customer sensitivity to in-person interactions for the purpose of conducting the assessments and direct installs even after lifting many COVID-19 restrictions as well as a decreasing number of qualifying buildings.
- To address lower than anticipated participation in the RAP, FEI and FBC plan to complete a program redesign in 2023.

5.3 *SUMMARY*

Residential Program Area activity in 2022 resulted in over 262,336 GJ/yr of natural gas savings. These programs enabled customers to increase their home's performance while reducing their energy consumption. The program area continues to expand relationships with the trades and builders 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 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 2022, DSM investments in the Low Income Program Area were $9.5 million and annual gas savings were 62,814 GJ/yr. Tables 6-1 and 6-2 summarize the planned and actual expenditures for the Low Income Program Area in 2022, 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.

The Program Area experienced higher than expected investments in the Direct Install Program and the Prescriptive Program which led to the filing and subsequent BCUC approval[9] to increase the Program Area budget for 2021 and 2022. The planned figures in the tables below reflect the updated approved expenditures and savings.

Key highlights include:

- The Low Income Program Area performed well, exceeding 2021 expenditures of $9 million while meeting 2022 Plan forecast savings targets.
- Participation in the Direct Install Program increased after declining during the COVID-19 pandemic. Further, FEI completed more comprehensive energy efficiency retrofits for participants, including manufactured homes.
- The Prescriptive Program, including offers for Indigenous communities, achieved lower than anticipated participation. While the program gained momentum in 2020 and 2021 with the Double Rebates offer, participation in 2022 declined and was similar to prior years.

Table 6-1: 2022 Low Income Program Results Summary – Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2022 Plan	2022 Actual	2022 Plan	2022 Actual	2022 Plan	2022 Actual
Direct Install Program	3,450	5,404	1,855	891	5,305	6,295
Self Install Program	585	334	76	59	661	393
Prescriptive Program	4,067	1,987	363	293	4,430	2,279
Support Program	261	110	25	240	286	349
Non-Program Specific Expenses	0	0	302	237	302	237
2021 Carryover Expenditures	0	0	1,279	0	1,279	0
ALL PROGRAMS	**8,363**	**7,835**	**3,901**	**1,719**	**12,264**	**9,554**

[9] BCUC Order G-301-21

Table 6-2: 2022 Low Income Program Area Results Summary – Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2022 Plan	2022 Actual	TRC	MTRC	UCT	PCT	RIM
Direct Install Program	10,971	16,136	1.1	1.1	0.2	1.6	0.2
Self Install Program	28,080	22,888	20.0	20.0	4.0	9.9	0.6
Prescriptive Program	25,077	23,790	4.6	4.6	1.2	3.0	0.4
Support Program	Savings Not Estimated		Savings Not Estimated				
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**64,128**	**62,814**	**2.9**	**2.9**	**0.6**	**2.4**	**0.3**

Notes:

- EMLI also contributed funds through their CleanBC programs towards some Low Income programs as noted in the partnership details in Section 6.2. EMLI funding is excluded from the above financials and energy savings.

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

6.2 *2022 LOW INCOME PROGRAMS*

This section outlines the specific Low Income programs undertaken in 2022, including program and measure descriptions and a breakdown of non-incentive expenditures for each of the Direct Install Program, Self Install Program, Prescriptive Program and Support Program.

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, this program aims 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, EMLI

Expenditures ($000s)						
Direct Install Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**3,450**	**583**	**729**	**174**	**369**	**5,305**
2022 Actual	5,404	175	236	198	282	**6,295**

Participation		
Measure	**2022 Plan**	**2022 Actual**
Energy Conservation Assistance	2,300	3,319

Notes:

- The Direct Install Program achieved 119 percent of the expenditure target. Expenditures were driven by high participation, the installation of more comprehensive measures, such as insulation and furnaces, as well as the work completed in manufactured homes. This also resulted in achieving 147 percent of planned energy savings in 2022. Participation increased from 1,544 in 2021.

Self Install Program

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

Expenditures ($000s)						
Self Install Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**585**	**8**	**51**	**5**	**13**	**661**
2022 Actual	334	5	25	0	30	**393**

Participation		
Measure	**2022 Plan**	**2022 Actual**
Energy Savings Kit	13,000	14,924

Notes:

- The Self Install Program achieved 115 percent of the participation target. This is primarily due to re-engagement campaigns whereby previous participants receive additional energy saving measures such as window film, patio door film and caulking.

Prescriptive Program

Program Description	The program enables a straight-forward path towards a rebate for specific residential or commercial energy efficiency measure.
Target Sub-Market	Residential low income customers, Indigenous housing providers, non-profit housing providers, charities
New vs. Retrofit	New construction and retrofit
Partners	EMLI

Expenditures ($000s)						
Prescriptive Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**4,067**	**12**	**18**	**0**	**333**	**4,429**
2022 Actual	1,987	20	4	0	269	**2,279**

Participation		
Measure	**2022 Plan**	**2022 Actual**
Residential Retrofit		
Boiler	66	40
Furnace	628	403
Health and Safety	53	22
Insulation (Attic, Wall, and Other)	74	46
Thermostat	300	89
Ventilation	3	11
Water Heater	318	162
Windows and Doors	89	13
Residential New Construction		
STEP 2	15	0
STEP 3	15	5
STEP 4	13	3
Commercial		
Boiler	14	13
Bundled Measures	48	40
Furnace	41	50
Water Heater	22	46
TOTAL	**1,700**	**943**

Notes:

- The Prescriptive Program achieved 51 percent of planned expenditures. Participation declined compared to 2020 and 2021 after the time-limited Double Rebates offer on select measures ended in 2021. Resource and capacity constraints that began during COVID-19 continue to be a barrier in the social housing sector.

Support Program

Program Description	The program seeks 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, EMLI

Expenditures ($000s)						
Support Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**261**	**0**	**0**	**0**	**25**	**286**
2022 Actual	110	186	0	0	54	**349**

Participation		
Measure	**2022 Plan**	**2022 Actuals**
Residential Energy Efficiency Works	25	12
Non-Profit Custom Studies and Implementation Support	77	29
TOTAL	**102**	**41**

Notes:

- The Residential Energy Efficiency Works, an energy retrofit training offer for people facing barriers to employment, was deployed in partnership with Wildsight and Kootenay Skills Development Society in 2022. Participants contributed to making a group home, managed by the Kootenay Society for Community Living, more comfortable and energy efficient.

- In 2022, housing providers faced challenges with post COVID-19 pandemic staffing, cost pressures due to inflation, and supply chain disruptions. These factors contributed to delayed projects and resulted in less funding provided for energy studies and implementation support.

6.3 *SUMMARY*

In spite of some programs having lower than anticipated participation, the Low Income Program Area achieved the highest ever investment to date with $9.5 million in expenditures and 62,814 GJ/yr gas savings. This was primarily due to the robust performance of the Direct Install Program and supported by the continued investment in the Prescriptive Program, which encompasses offers for income qualified residential customers, charities, and non-profit housing providers, including Indigenous communities.

7. COMMERCIAL PROGRAM AREA

7.1 *OVERVIEW*

In 2022, Commercial energy efficiency programs continued to encourage commercial customers to reduce their overall consumption of natural gas and associated energy costs. The Commercial Program Area reduced annual natural gas consumption by approximately 328,904 GJ annually and achieved an overall TRC of 1.4. $16.7 million was invested in Commercial energy efficiency programs, of which 80 percent was incentive spending.

Key highlights include:

- The Gas Absorption Heat Pump offer in the Prescriptive Program was launched in June 2022.

- In 2022, FEI continued to administer EMLI's CleanBC incentives supporting non-cost effective commercial natural gas energy efficiency projects that were not eligible for existing FEI programs. In March 2022, EMLI advised FEI that it will disconnect from FEI's Commercial Programs and would no longer incent natural gas-related measures that are not cost effective. EMLI and FEI agreed to set the deadline of September 2023 for payment of any implementation incentives for projects that had been issued commitment letters and were already being implemented by the customers.

Table 7-1: 2022 Commercial Energy Efficiency Program Results Summary – Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2022 Plan	2022 Actual	2022 Plan	2022 Actual	2022 Plan	2022 Actual
Prescriptive Program	6,500	4,844	700	1,476	7,200	6,320
Performance - Existing Buildings	5,700	4,776	600	603	6,300	5,378
Performance - New Buildings	4,000	3,190	500	547	4,500	3,737
Rental Apartment Efficiency Program	650	472	350	195	1,000	667
Non-Program Specific Expenses	0	0	800	573	800	573
ALL PROGRAMS	**16,850**	**13,282**	**2,950**	**3,393**	**19,800**	**16,675**

Table 7-2: 2022 Commercial Energy Efficiency Program Results Summary – Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2022 Plan	2022 Actual	TRC	MTRC	UCT	PCT	RIM
Prescriptive Program	172,200	103,534	1.8	1.8	1.7	5.0	0.6
Performance - Existing Buildings	95,000	184,903	1.0	1.0	1.2	2.1	0.5
Performance - New Buildings	82,121	27,827	1.7	1.7	0.9	2.8	0.0
Rental Apartment Efficiency Program	32,100	12,639	0.7	1.2	0.6	2.9	0.4
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**381,421**	**328,904**	**1.4**	**1.5**	**1.3**	**3.0**	**0.2**

7.2 2022 COMMERCIAL ENERGY EFFICIENCY PROGRAMS

This section outlines the specific Commercial Energy Efficiency programs undertaken in 2022, including program and measure descriptions and a breakdown of non-incentive expenditures for each of the Prescriptive Program, Performance Programs (Existing and New Buildings) and Rental Apartment Efficiency Program.

Prescriptive Program

Program Description	This program provides rebates for the installation of high efficiency natural gas equipment, heat-loss reduction items and controls. Simple rebates are provided for equipment and products that meet specific performance standards. 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 ($000s)						
Prescriptive Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**6,500**	**314**	**130**	**38**	**218**	**7,200**
2022 Actual	4,844	188	240	0	1,047	**6,320**

Measure	2022 Plan	2022 Actual
Condensing Boiler	280	200
Mid Efficiency Boiler	6	13
Water Heater	200	169
Deep Fryer	73	30
Large Vat Deep Fryer	8	8
Griddle	31	1
Combination Oven	10	32
Convection Oven	54	9

Measure	2022 Plan	2022 Actual
Rack Oven	4	3
Conveyor Oven	8	0
Steam Cooker	6	1
Hydronic additives	0	22
Condensing Make Up Air Unit	109	13
Furnace Replacement (Baseline: Std.)	100	40
Furnace Replacement (Baseline: Mid)	100	49
HVAC Controls	24	6
Condensing Unit Heaters	101	0
Vortex Deaerators	19	0
Gas Infrared heater	0	30
Air curtains	10	6
Pipe and Tank Insulation	10	26
Steam Boilers	10	2
Steam Traps	10	2
Steam Trap Survey	10	0
Contractor SPIFF	100	98
TOTAL	**1,195**	**760**

Notes:

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

- Condensing Boiler, Water Heater and Condensing Unit Heater offers saw participation lower than Plan forecast.

- Hydronic Additives, Gas Infrared Heater, Pipe and Tank Insulation, Condensing Make Up Air Units, Steam Boilers, Vortex Deaerators, HVAC Controls and Steam Trap offers saw participation lower than Plan forecast. FEI has identified opportunities for promotion and marketing of these measures in 2023 to increase awareness of the offers.

- Commercial kitchen/restaurant measures continued to have mixed performance compared to Plan forecast. While measures such as Combination Ovens had Participation higher than Plan forecast, Convection Ovens and Griddle measures had Participation lower than Plan forecast.

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. The program also includes FEI's recommissioning offer jointly administered with BC Hydro and FortisBC to identify and implement low- and no-cost measures to optimize existing heating, ventilation, and cooling systems.
Target Sub-Market	Medium to large commercial, institutional and multifamily residential
New vs. Retrofit	Retrofit
Partners	FBC, BC Hydro

Expenditures ($000s)						
Performance - Existing Buildings	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**5,700**	**359**	**12**	**31**	**198**	**6,300**
2022 Actual	4,776	170	5	97	331	**5,378**

Participation		
Measure	**2022 Plan**	**2022 Actual**
Studies - Retrofit	76	75
Capital Upgrades - Retrofit	39	24
Recommissioning - Studies	82	56
Recommissioning - O&M	39	43
Commercial Energy Assessments	76	151
TOTAL	**311**	**349**

Notes:

- FEI administered EMLI's CleanBC incentives supporting non-cost effective commercial natural gas energy efficiency projects that were not eligible for existing FEI programs. EMLI discontinued support for those measures in 2022. The cost for administering additional EMLI CleanBC offers are accounted for separately and are not included in the program reporting herein.

- Towards year-end, some "Capital Upgrades – Retrofit" participants informed FEI that the completion of their projects was delayed due to supply chain issues triggered by the COVID-19 pandemic and inflationary pressures. Thus, several projects forecast to complete in 2022 are now planned for 2023.

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	FBC

Expenditures ($000s)						
Performance - New Buildings*	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**4,000**	**298**	**10**	**27**	**165**	**4,499**
2022 Actual	3,190	189	1	213	144	**3,737**

Participation		
Measure	**2022 Plan**	**2022 Actual**
BC Energy Step Code - Whole Building	6	12
Non-BC Energy Step Code - Whole Building	3	24
Early Engagement	12	0
Non-BC Energy Step Code - Engineered	29	0
BC Energy Step Code Capacity Building - Charrettes	1	0
TOTAL	**51**	**36**

Notes:

- The Performance Program – New Buildings was below plan in 2022 for incentives and savings. However, beginning in mid-2022, the program experienced an increased intake of projects for which agreements have been issued for the customers to proceed with energy modelling. FEI expects increased participation beginning in 2023.

- FEI continued outreach activities to architects, engineers, developers, and energy modellers in 2022 and the increased intake of projects in the second half of the year is a result of these outreach activities.

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 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 ($000s)						
Rental Apartment Efficiency Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**650**	**210**	**77**	**32**	**31**	**1,000**
2022 Actual	472	143	4	28	20	**667**

Participation		
Measure	**2022 Plan**	**2022 Actual**
Energy Assessments	70	76
Implementation Support Partial	3	2
Implementation Support Full	15	33
Condensing Boilers	15	6
Water Heaters	3	0
Recirculation Controls	58	1
TOTAL	**162**	**118**

Notes:

- 2022 was another challenging year for the Rental Apartment Efficiency Program due to COVID-19 and a decreasing number of qualifying buildings. As a result, this program achieved incentives and savings lower than Plan forecasts. However, FEI achieved higher than planned participation for Energy Assessment and Full Implementation Support components of this program.

- To address lower than anticipated participation in the RAP, FEI and FBC intend to conduct a program redesign in 2023.

7.3 *SUMMARY*

Commercial Program Area activity in 2022 resulted in approximately 328,904 GJ/yr 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 that are suitable for 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 and technology inclusion decisions.

All 2022 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.

Table 8-1 summarizes expenditures for the Innovative Technologies Program Area in 2022, including incentive and non-incentive expenditures.

Table 8-1: 2022 Innovative Technologies Program Area Results Summary – Expenditures[10]

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2022 Plan	2022 Actual	2022 Plan	2022 Actual	2022 Plan	2022 Actual
Technology Screening	0	0	851	321	851	321
Pilot Project Expenditures	0	877	2,447	1,227	2,447	2,104
Deep Retrofit	0	4,843	8,448	1,508	8,448	6,351
Non-Program Specific Expenses	0	0	125	1,097	125	1,097
2021 Carryover Expenditures	0	0	1,343	0	1,343	0
ALL PROGRAMS	**0**	**5,720**	**13,214**	**4,153**	**13,214**	**9,873**

8.2 *2022 INNOVATIVE TECHNOLOGIES ACTIVITIES*

This section outlines the specific Innovative Technologies Screening, Pilot Projects and Deep Energy Retrofit activities undertaken in 2022, including program and measure descriptions and a breakdown of non-incentive expenditures for each area.

[10] In 2022, the Innovative Technologies Program Area received approval from the BCUC to increase the total budget to $11.871 million to explore deep energy retrofits and gas heat pump technologies.

1 Technology Screening

Program Description	Technology screening activities include conducting prefeasibility studies, small field 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 is also used to determine the feasibility of launching a pilot or to make future Program Area inclusion decisions.
Target Market	Variable
New vs. Retrofit	Variable
Gas AMI (Advanced Metering Infrastructure)	The objective of this prefeasibility study was to assess the energy and non-energy benefits of implementing advanced metering infrastructure for residential application. The study recommended different pathways to utilizing gas AMI data for energy efficiency behaviour changes. In addition, the study also looked at the benefits of gas AMI for potential demand response programs. The study results will be handed off in Q1 2023 to the portfolio and communications managers. A pilot is being considered for 2023 to look further in to demand response.
Engine Driven Heat Pumps & Supplemental Cooling	The objective of this prefeasibility study was to identify the energy savings and non-energy benefits of engine driven heat pumps and supplemental cooling for commercial buildings. Study results were handed off in Q4 2022. A pilot is planned in 2023 to validate energy savings, customer acceptance and the installation process of this technology.
Hybrid Systems	The hybrid systems prefeasibility study was initiated to build off the 2021 prefeasibility study on hybrid system controls. It was determined in the original study that further research into the different hybrid system configurations was needed. In the study FEI looked at the energy savings and non-energy benefits of the different hybrid systems and which was more beneficial for implementation. Study results will be handed off in Q1 2023. A pilot is planned for2023 to validate the energy savings, customer acceptance and installation process.
Thermal Imaging	The objective of this prefeasibility study was to identify the energy savings and non-energy benefits of a residential thermal imaging program and the different methodologies available for implementation. The results of the study identified program opportunities to educate customers on their homes heat lose while directing them to improvement measures they could implement. Study results were handed off in Q4 2022 with next steps to investigate thermal imaging companies to learn more about their services.
Gas Appliance Power Source Backup	The gas appliance power source backup prefeasibility study looked at the potential resiliency technologies that would support a gas appliance during the loss of grid power. The intention was to consider the potential energy savings of being able to run your gas appliances during a black/brown out in order to eliminate or reduce a snap back in gas appliance consumption. Study results were handed off in Q4 2022 acknowledging this technology would not meet DSM requirements as currently installed as a separate measure but showed promise for resiliency and future consideration if built directly into energy efficient gas appliances.
Warm Mix Asphalt	FEI conducted a revised market study of warm mix asphalt additives to validate opportunities to pilot, verify, and support broader education and awareness activities. Results were handed in off in Q4 2022. A demonstration project is planned for 2023 to verify energy savings and customer acceptance.
Gas Heat Pump Lab Testing: Thermal Compression Heat Pump Technology	FEI provided funding for a European gas heat pump manufacturer in partnership with the Natural Gas Innovation Fund to conduct efficiency and performance lab testing for a residential gas heat pump to support the business case for expansion into the North American market.

Gas Heat Pump Lab Testing: Residential Gas Absorption Heat Pump	FEI is providing funding to the Gas Technology Institute to test and verify system performance for both a residential and commercial gas absorption heat pump manufacturer to support the business case for expansion into the North American market. Results expected Q3 2023.
North American Gas Heat Pump Collaborative	FEI is a founding member of the North American Gas Heat Pump Collaborative. In 2022, FEI provided funding to support manufacturer engagement opportunities to advance gas heat pumps in the residential sector. Funding activities will span across 2022-2023 and will be utilized to inform strategic communication and education strategies for contractors and customers to support the adoption of gas heat pump technologies.

	Expenditures ($000s)					
Technology Screening	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**300**	**501**	**0**	**0**	**50**	**851**
2022 Actual	0	273	0	0	48	**321**

Pilot Project Expenditures

Program Description	Pilot project activities 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 pilot projects are 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 CleanO2 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 CleanO2 Carbon Capture Technology can meet the energy conservation and greenhouse gas (GHG) reduction objectives of commercial and small business clients. In 2022, FEI collected measurement and verification data for one site. In 2023, FEI plans to install three additional systems. Pilot results are expected Q1 2025.
	2022 Participants Total 0
Commercial Gas Absorption Heat Pump Pilot	FEI further investigated an existing participant site to identify system performance enhancements for both domestic hot water and space heating applications. Pilot results are summarized in Table 12.2: Summary of Key Findings and Methodology for 2022 Completed C&EM Program Evaluation Studies.
	2022 Participants Total 1
Gas Technology Institute: Residential Gas Absorption Heat Pump Water Heater Pilot	FEI is funding Gas Technology Institute's North American Residential Gas Heat Pump Water Heat Pilot ("GHPWH") evaluating a GHPWH prototype for residential applications. The GHPWH will be an 80-gallon tank with efficiencies greater than 100%. Collectively, the pilot project intends to install 61 GHPWH across North America with 10 units being installed in FEI's service territory. The overall end goal is to provide evaluation results to support DSM program development and commercialization of gas heat pump water heaters. Due to manufacturing delays this pilot was put on hold for 2022 and will be reassessed in Q1 2023.
	2022 Participants Total 0

Residential Gas Absorption Heat Pump Pilot ("RGAHP")	FEI is evaluating the energy savings, installation, and customer acceptance of a pre-production residential gas absorption heat pump unit for residential space and water heating applications. In 2022, FEI provided incentives to procure ten pre-production gas heat pumps and completed nine installations with the final site targeting completion in Q1 2023. Measurement and verification will occur from Q1 2023 to Q1 2024. Pilot results are expected Q1 2024. Post evaluation of the pre-production unit, the Manufacturer will be responsible to replace the unit with a certified market ready product. 2022 Participants Total 10
Step 5 Homes Pilot	The objective of the pilot is to evaluate incremental costs and customer acceptance of achieving Step 5 of the BC Energy Step Code utilizing natural gas energy efficiency measures to support the Residential New Construction program development. In 2022, there were twelve Single-family Dwelling and two Multi-family Dwelling applicants. 2022 Participants Total 14
Thermal Compression Heat Pump Pilot ("TCHP")	FEI is evaluating the energy savings, installation and customer acceptance of a thermal compression heat pump (TCHP) prototype for residential space and water heating applications. The objective of the pilot is to install up to ten units in residential homes and to evaluate the system performance over a one-year period. In 2022, three TCHP prototypes were successfully installed, however, challenges identified in the commissioning and operation stage inhibited the gathering of measurement and verification data and continuation of the installs for the remaining seven sites. The manufacturer is establishing a plan to address those learnings that will be reviewed and assessed prior to recommencement of the pilot. 2022 Participants Total 3
Commercial Gas Heat Pump Pilot: Heritage Gas	FEI is funding a commercial gas absorption heat pump pilot with Heritage Gas to identify the energy savings, installation and customer acceptance of a pre-commercial gas absorption heat pump technology. Results are expected in Q2 2023. 2022 Participants Total 0
Gas Technology Demonstration Pilot ("GTD")	The Gas Technology Demonstration ("GTD") pilot provides funding to FEI Energy Specialists and Climate Action Partners to explore innovative technologies through three main offerings: Technology Feasibility Study, Technology Demonstration, and Technology Measurement and Verification. In 2022, GTD provided funding for LUX laundry, solar wall and solar thermal systems, integrated fault detection and diagnostic systems, and innovative retrofit window replacements. 2022 Participants Total 5

1

Expenditures ($000s)						
Pilot Project Expenditures	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**1,097**	**800**	**0**	**500**	**50**	**2,447**
2022 Actual	877	724	0	454	49	**2,104**

2

Deep Energy Retrofits

Deep Retrofit Demonstration – Commercial	FEI in partnership with the City of Vancouver, BC Housing and BC Non-profit Housing Association are identifying the feasibility of reducing up to 80 per cent of greenhouse gas emissions in an existing multi-unit residential building by undergoing a comprehensive deep energy retrofit utilizing natural gas energy efficiency. In 2022, FEI completed several project milestones including the selection of both a pilot participant and a prime consultant to initiate detailed design. A building condition assessment was completed to identify the building's current state and highlight the greatest opportunities for energy and non-energy upgrades. In addition, FEI conducted measurement and verification analysis to establish baseline energy consumption, occupant comfort and indoor air quality metrics. Furthermore, FEI supported the development of a tenant communications strategy including funding support of a tenant liaison position to lead building logistics and tenant communications efforts during the project. In 2022, the project completed detailed and schematic design. In 2023, activities will involve procurement of a general contractor to support construction activities throughout 2023-2025. Completion of the retrofit construction and evaluation results is expected by Q4 2025.
Drone Assisted Thermographic Study	The objective of this study is to identify the efficiency opportunities of utilizing innovative thermal imaging drone technologies compared to standard thermal imagining equipment. Study results provided insights into the advantages and limitations for thermal drones and were handed off in Q4 2022 to inform future deep energy retrofit assessments.
Deep Retrofit Implementation Approaches Study	The objective of this study is to understand the various design and construction methods of which a retrofit building project could be delivered and how these methods could impact a project to optimize the customer experience through a pilot program. Study results expected Q1 2022.
Deep Energy Retrofit Energy and Cost Modelling Study	The two objectives of this study were to identify and evaluate all industry accepted energy modelling platforms as well as understand the potential cost of a deep energy retrofit for both Single Family Dwelling (SFD) and Multi-Unit Residential Buildings (MURB). The result of this study was used in developing the business case for the deep energy retrofit pilot.
Deep Energy Retrofit Pilot- Part 3 Commercial and Part 9 Residential buildings	FEI is evaluating the potential energy savings, GHG emission reduction, customer and industry acceptance and implementation challenges of deep energy retrofits for FEI's residential and commercial natural gas customers. This pilot focuses on two streams. The first stream is Part 3 Multi-Unit Residential Buildings (MURB) and the second stream is Part 9 Single Family Dwellings (SFD), all located in BC Climate Zones 4, 5 and 6. The business case for this pilot program was developed and approved and the contract with two individual implementation contractors was awarded in 2022. In addition, recruitment activities were completed to drive participation as highlighted below. The balance of activities in the pilot program are planned for 2022 through the end of 2025.
	2022 Participants Total Residential 20 Total Commercial 4
Reframed Initiative Partnerships	FEI has entered into a partnership with Pembina Institute to promote a natural gas based deep energy retrofit pathway with Pembina Institute's Reframed Initiative. The Reframed Initiative is a partnership between Pembina Institute, City of Vancouver, BC Housing and BC Non-profit Housing Association with the main objective to bring together the construction industry, building owners, policy makers, and the financial sector to scale up deep retrofits.

Expenditures ($000s)						
Deep Retrofit	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**6,863**	**1,200**	**125**	**30**	**230**	**8,448**
2022 Actual	4,843	1,158	114	21	215	**6,351**

Notes:

- In 2021, the Innovative Technologies program area received BCUC approval for additional expenditures to expand technology research and evaluation for deep energy retrofits. However, some planned expenditures were delayed into 2023 due to procurement challenges, participant approval requirements, and construction document redesign.

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 screen technologies for further development as full programs in other areas of the DSM Portfolio.

The Innovative Technologies Program Area conducted several technology screenings, pilot projects, and deep energy retrofit activities as noted in Section 8.2 above, to investigate innovative solutions to reduce emissions in existing buildings by over 50 percent and to support the commercialization of natural gas heat pumps whereby the technologies can achieve system efficiencies greater than 100 percent.

The completed research from the Innovative Technologies Program Area helped transition commercial gas absorption heat pumps into FEI's first commercial gas heat pump rebate program. Furthermore, the team was recognized for their leadership in the evaluation and advancement of gas heat pumps across the Pacific Northwest and was the recipient of the Northwest Energy Efficiency Alliance's 2022 Leadership in Energy Efficiency Award for Innovation.

9. INDUSTRIAL PROGRAM AREA

9.1 *OVERVIEW*

In 2022, the Industrial Program Area continued to encourage industrial customers to use natural gas more efficiently, achieving an overall TRC of 2.2. As a result, net natural gas savings of approximately 442,205 GJ/yr were achieved. Table 9-1 summarizes expenditures for the Industrial Energy Efficiency Program Area in 2022, including incentive and non-incentive spending, annual and NPV gas savings, as well as all cost-effectiveness test results.

The Industrial Program Area experienced a stronger performance in 2022, compared to 2021, in terms of program expenditure and savings, however year-end results were below 2022 Plan forecast. This was due to some projects not completing as planned in 2022 which only became evident near year-end. The most common reasons for delay were supply chain issues, inflationary cost pressures, and events that were outside of the participants' control. As a result, total expenditure and savings in the Industrial Program Area were below plan in 2022.

Table 9-1: 2022 Industrial Energy Efficiency Program Results Summary – Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2022 Plan	2022 Actual	2022 Plan	2022 Actual	2022 Plan	2022 Actual
Performance Program	4,297	4,624	369	268	4,666	4,892
Prescriptive Program	3,000	2,258	110	113	3,110	2,371
Strategic Energy Management Program	355	509	152	31	507	540
Non-Program Specific Expenses	0	0	179	52	179	52
2021 Carryover Expenditures	0	0	1,015	0	1,015	0
ALL PROGRAMS	**7,652**	**7,391**	**1,825**	**464**	**9,477**	**7,855**

Table 9-2: 2022 Industrial Energy Efficiency Program Results Summary – Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2022 Plan	2022 Actual	TRC	MTRC	UCT	PCT	RIM
Performance Program	266,029	193,586	1.7	1.7	4.2	3.1	0.7
Prescriptive Program	144,288	81,564	2.2	2.2	2.6	3.9	0.7
Strategic Energy Management Program	56,000	167,054	13.8	13.8	11.2	20.6	1.0
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**466,316**	**442,205**	**2.2**	**2.2**	**4.2**	**3.9**	**0.8**

9.2 2022 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).
Target Sub-Market	Industrial Customers
New vs. Retrofit	New construction and retrofit
Partners	FBC

Expenditures ($000s)						
Performance Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**4,297**	**64**	**21**	**53**	**231**	**4,666**
2022 Actual	4,624	2	0	76	189	**4,892**

Participation		
Measure	**2022 Plan**	**2022 Actual**
Technology Implementation	9	13
Feasibility Study	11	6
Plant Wide Audit	8	1
TOTAL	**28**	**20**

Notes:

- The Performance Program continues to experience stable and steady participation, owing to referrals from the Strategic Energy Management (SEM) program.
- Towards year-end, a number of customers informed FEI that the completion of their projects was delayed due to supply chain issues and the inflationary pressures triggered by the COVID-19 pandemic, and that they would not complete their projects in 2022 as planned.

Prescriptive Program

Program Description	Prescriptive initiatives to encourage the implementation of technologies for specific industrial processes using natural gas as an energy source.
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, steam trap replacement and hydronic additives (retrofit only)
Partners	FBC

Expenditures ($000s)						
Prescriptive Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**3,000**	**4**	**4**	**50**	**53**	**3,110**
2022 Actual	2,258	25	0	0	88	**2,371**

Participation		
Measure	**2022 Plan**	**2022 Actual**
Process Boiler (Hot Water)	12	5
Thermal Curtains	14	8
Condensing and Infrared Heaters	49	81
Steam Traps Survey	3	0
Steam Traps Replacement	13	2
Insulation (Pipe and Tank)	30	5
Steam Boiler Measures	13	8
Air Curtains	0	4
Direct Contact Water Heater	0	2
Domestic Hot Water Recirculation Controls	0	1
Hydronic Additives	0	3
Combination Oven	0	1
Contractor SPIFF	0	67
TOTAL	**134**	**187**

Notes:

- The total 2022 participation for the prescriptive rebate offer was above Plan forecast. Towards year-end, a number of customers informed FEI that the completion of their projects was delayed due to supply chain issues and inflationary pressures, thus prescriptive rebate offer expenditures for 2022 were below target.

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, FBC

Expenditures ($000s)						
Strategic Energy Management Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**355**	**13**	**13**	**53**	**74**	**507**
2022 Actual	509	2	0	0	29	**540**

Participation		
Measure	**2022 Plan**	**2022 Actual**
Individual, Large Customer	5	5
Cohort, Medium Customers	10	34
TOTAL	**15**	**39**

Notes:

- FEI offers Strategic Energy Management (SEM) as a supplementary offer to the SEM program offered by BC Hydro and FBC. FEI's SEM support is focused on natural gas efficiency for participants who are already enrolled in BC Hydro's SEM program and FBC's pilot program who consume significant volumes of natural gas.
- FEI offered natural gas efficiency support to five BC Hydro SEM cohorts (BC Hydro Cohort 1, 2, 3, 5 and the Industrial Energy Manager cohort), as well as one cohort joint with FBC in the FortisBC Shared Service Territory (SST).
- The SEM program experienced higher than anticipated energy savings due to strong customer participation in SEM activities all cohorts.

9.3 *SUMMARY*

Industrial Energy Efficiency Program Area activity in 2022 resulted in approximately 442,205 GJ/yr 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, increased Point-of-Sale trade ally partners, the SEM 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. Several initiatives and campaigns were undertaken or continued in 2022, which provided behaviour change nudges to positively influence customer attitudes on energy efficiency. Educating and informing all types of customers and students (who are future customers) remains a strong priority. FEI is continuing to ensure steps are taken to ensure the information provided is relevant and timely. Table 10-1 presents the CEO expenditures for 2022.

Table 10-1: 2022 CEO Initiative Results Summary – Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2022 Plan	2022 Actual	2022 Plan	2022 Actual	2022 Plan	2022 Actual
General Residential Education Program	0	0	3,213	4,985	3,213	4,985
Residential Customer Engagement Tool	0	0	3,952	1,191	3,952	1,191
Commercial Education Program	0	0	911	931	911	931
School Education Program	0	0	1,251	948	1,251	948
Non-Program Specific Expenses	0	0	107	79	107	79
2021 Carryover Expenditures	0	0	1,917	0	1,917	0
ALL PROGRAMS	**0**	**0**	**11,350**	**8,135**	**11,350**	**8,135**

Table 10-2: 2022 CEO Initiative Results Summary- Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2022 Plan	2022 Actual	TRC	MTRC	UCT	PCT	RIM
General Residential Education Program	0	0	Savings Not Estimated				
Residential Customer Engagement Tool	0	71,875	0.5	2.0	0.5	1.8	0.3
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**	**71,875**	**0.5**	**2.0**	**0.5**	**1.8**	**0.3**

10.2 *2022 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, and participation in home shows and community events. This Program also includes the production of energy efficiency education materials and prizing for events, which are used to start conversations and further engage audiences. FEI's partnership with Empower Me focused on reaching non-English speaking customers to drive participation to FortisBC's rebate programs. 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, local governments and general public
New vs. Retrofit	New construction and retrofit
Partners	BC Hydro, FBC, local governments

Expenditures ($000s)						
General Residential Education Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**0**	**555**	**2,218**	**116**	**325**	**3,213**
2022 Actual	0	428	3,798	0	759	**4,985**

Notes:

- Higher than anticipated expenditures are attributed to an increase in communications resources and pre-purchasing paid media for Q1 2023 to ensure a sustained presence in market for the "We've got rebates" campaign.
- FEI, in partnership with BC Hydro, continued to partner with Empower Me, focusing on income-qualified non-English speaking customers driving participation in the utility's income qualified programs. Participants also learned about their utility bills, safety, and behaviour change initiatives to help them save energy and money.
- FortisBC continued with its "We've got rebates" general marketing campaign which continued to increase awareness of its rebate programs.

Residential Customer Engagement Tool Program

Program Description	This program provides 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. FortisBC's Customer Engagement Tool, My Energy Use, is an enhancement to Account Online providing customers with a better understanding of their home's energy use. Through the My Energy Use portal, customers can receive personalized insights into their individual home energy use, rebates, and earn reward points for participating in energy-savings activities. Through the portal, FortisBC is able to use the data collected to enhance program recruitment and participation in its programs. In addition to the portal, FEI sent six home energy reports during the year to approximately 80,000 customers. The reports help customers understand their energy usage in comparison to energy used by comparable homes and encourages customers to reduce their energy use through actionable advice.
Target Sub-Market	Residential
New vs. Retrofit	Retrofit
Partners	FBC

Expenditures ($000s)						
Residential Customer Engagement Tool	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**0**	**2,861**	**715**	**51**	**325**	**3,952**
2022 Actual	0	997	0	100	94	**1,191**

Notes:

- Lower than anticipated expenditures are a result of the program launch being delayed into late 2020 and cascading impacts year-after-year. As a result, the program expenditures are lower than Plan forecasts.

Commercial Education Program

Program Description	This program provides ongoing communication and education about energy conservation initiatives, as well as encourages behavioural changes to 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 virtual, face-to-face, print and online communications, and industry association meetings. FEI continued to support behavior education campaigns delivered by energy specialists in their respective organizations. Collaborations between internal departments, FBC and other utilities continued to achieve cost efficiencies for initiatives such as the Energy Wise Network offered in partnership with BC Hydro. CEO continued to provide information to customers and the public on natural gas conservation and efficiency and energy literacy. In collaboration with FBC, FEI supported and funded 746 small to medium size business energy assessments. Customers received advice on saving energy and learned about rebates on high-efficiency upgrades. The virtual assessments focused on low cost, no cost measures to reduce business's energy consumption. In addition to outbound calling by the vendor, customers were referred to the program through the FortisBC contact centre and Energy Solutions Managers.

Target Sub-Market	Commercial customers, energy specialists, energy management staff, municipalities, chambers of commerce and other business organizations
New vs. Retrofit	New construction and retrofit
Partners	BC Hydro, Municipalities, FortisBC Inc.

Expenditures ($000s)						
Commercial Education Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**0**	**507**	**127**	**60**	**217**	**911**
2022 Actual	0	340	340	0	251	**931**

Notes:

- FEI's partnership with BC Hydro continued in 2022. This included collaboration on the Energy Wise Network Program for commercial customers that led to 31 natural gas behaviour change projects being submitted in 2022 (with a completion date of March 31, 2023).

School Education Program

Program Description	This program responds to meeting the "adequacy" component of the Demand-Side Measures Regulation whereby a utility's 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 Energy Champions presentation 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	Energy conservation behaviour
Partners	BC Lions, FortisBC Inc.

Expenditures ($000s)						
School Education Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**0**	**764**	**191**	**57**	**238**	**1,251**
2022 Actual	0	461	311	0	177	**948**

Notes:

- FEI's Energy Leaders offers curriculum-connected lesson plans and presentations for grades K-12 that focus on energy literacy, conservation and efficiency. Energy is Awesome delivered conservation messaging for students in the K-5 grades. After six years in market, the educational programs are being redeveloped. Lower than anticipated expenditures were due to the redevelopment process being postponed to 2023.

- For students enrolled in post-secondary institutions, FEI delivered virtual presentations about demand side management policies and programs in British Columbia, as well as employment opportunities within the energy management sector. It also provided funding support for the BCIT high performance building lab to provide hands-on training on zero energy buildings using an envelope-first approach and its SEMAC (Sustainable Energy Management) program. It co-sponsored a UBC Okanagan Smart Energy research chair to study optimal energy use and resilient and green infrastructure, which included sponsorship of the Wilden Living Lab 2 project.

10.3 *SUMMARY*

The CEO Program Area continues to support the DSM Portfolio goals of energy conservation in a variety of ways. Several initiatives and campaigns were undertaken in 2022, providing behaviour change nudges to positively influence customer attitudes about efficiency. Educating all types of customers and students remains a strong priority. FEI is continuing to ensure that information provided is relevant and timely.

FEI continued its collaboration with FBC in 2022 to maximize efficiencies across both utilities. Costs continue to be shared on school, residential and commercial outreach as applicable.

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.

11. ENABLING ACTIVITIES

11.1 *OVERVIEW*

Enabling Activities are initiatives that support and supplement FEI's C&EM program development and delivery. These programs, activities and projects provide resources common to the support and delivery of all program area activities.

Table 11-1: 2022 Enabling Activities Results – Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2022 Plan	2022 Actual	2022 Plan	2022 Actual	2022 Plan	2022 Actual
Trade Ally Network	0	0	2,396	1,406	2,396	1,406
Codes and Standards	462	3,461	1,845	933	2,307	4,394
Reporting Tool & Customer Application Portal	0	0	576	1,538	576	1,538
Customer Research	0	0	149	101	149	101
Commercial Energy Specialist Program	2,400	2,039	279	312	2,679	2,351
Community Energy Specialist Program	750	510	64	208	814	718
ALL PROGRAMS	**3,612**	**6,011**	**5,310**	**4,498**	**8,922**	**10,508**

Table 11-2: 2022 Enabling Activities Results - Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2022 Plan	2022 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				
Customer Research	Savings Not Estimated		Savings Not Estimated				
Commercial Energy Specialist Program	0	1,704	Savings included in portfolio level C/B ratio				
Community Energy Specialist Program	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**0**	**1,704**					

11.2 *2022 ENABLING ACTIVITIES BY PROGRAM*

Trade Ally Network

Activity Description	The Trade Ally Network (TAN) is FEI's contractor network whose main objective is to advance energy efficiency messaging and to promote the company's DSM programs. The TAN includes contractors, equipment manufacturers, distributors and Point of Sale partners who offer rebates at the point of sale to commercial customers. FEI recognizes the critical role these industry groups play when it comes to influencing the end-use Residential and Commercial customers who make energy efficiency decisions. TAN is an important initiative under Enabling Activities that supports and supplements DSM program development and delivery, by providing FEI with a direct communication channel with industry stakeholders. TAN also supports FEI by: • providing trade allies with co-op funding for advertising, delivering targeted messaging about energy efficiency, and to promote C&EM rebate programs. • funding eligible training that relates to the promotion and sales of high efficiency appliances, appliance safety, installation, best practices, or similar courses related to energy efficient measures that support FEI's current rebate programs. In 2022, Trade Ally Network contractors were responsible for 68% percent of the 2022 Residential Furnace and Boiler Replacement Program rebates. In 2022, FEI hosted several virtual and in-person training sessions for the trade allies that focused on the best practices for installing high-efficiency natural gas appliances and new technologies, that were designed to assist TAN contractors in maintaining competitiveness and continuing to address energy efficiency needs of FEI's residential and commercial customers in the changing marketplace.

Expenditures ($000s)						
Trade Ally Network	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**0**	**1,061**	**265**	**637**	**433**	**2,396**
2022 Actual	0	307	415	373	311	**1,406**

Notes:

- The Quality Assurance process was changed in 2020 to virtually conducting site visits and this has remained the same for 2022. Through the FEI site visit process, approximately 829 site visits were conducted, a 14% increase from 2021.
- An ENERGY STAR Verified Installation pilot (ESVI), launched in late 2019, due to COVID-19 implications and the desire to limit additional contractor time in the customers' homes, this pilot activity slowed. This provided the opportunity to launch the application software based on the commissioning information used for ESVI and work with contractors to gain feedback and improve the software further. A pilot for a commissioning sheet application was conducted with contractors in 2022 with a launch planned for TAN contractors in 2023.
- 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 EMLI. Only the FEI contribution is reported here.

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 and 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 adoption of new codes and standards, FEI collaborated with various municipalities to help them assess their building portfolio. These provide options they could undertake when considering the upcoming provincial Greenhouse Gas Reduction Standard, BC Energy Step Code amendments, and striving towards Net Zero GHG emissions. FEI is supporting the development of energy performance standards such as a CSA standard on Combination Space and Water Heating standard for radiant heating systems, and Hybrid Heating Systems. 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 encourage 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. Additional support was provided to encourage early design activities such as mechanical design, building envelope design and integrated design process (IDP). These activities minimize time and risk when building to the upper tiers of the BC Energy Step Code. 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 delivered initiatives 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. Throughout 2022, the impact of the COVID-19 pandemic continued to influence the delivery of educational and training sessions. As a result, some sessions were cancelled and others moved to an online / virtual format, while some were able to continue in-person.

Expenditures ($000s)						
Codes and Standards	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**462**	**1,189**	**297**	**196**	**163**	**2,307**
2022 Actual	3,461	513	312	2	106	**4,394**

Notes:

- The Codes and Standards expenditures were higher than planned, primarily due to an increase in activity in energy modelling and blower door testing. Financial measures to assist in compliance with building codes via energy modelling and blower door tests for new residential homes were higher in 2022. This activity advances the market to build high performance homes with improved building envelope and promotes compliance with the Air Change per Hour (ACH) metric that was introduced in BC Energy Step Code.

Reporting Tool & Customer Application Portal

Activity Description	The Demand-side Management Tracking System (DSMS) Project is transitioning FBC and FEI from their legacy 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, FEI's legacy system vendor has ceased any further development of that system.

Expenditures ($000s)						
Reporting Tool & Customer Application Portal	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**0**	**340**	**85**	**0**	**152**	**576**
2022 Actual	0	1,220	0	0	318	**1,538**

Notes:

- The reporting tool and customer application portal launched in 2020 and, as of 2022, all current DSM programs are now being tracked in the portal.
- The need to support a streamlined customer experience, as well as the ongoing evolution of C&EM programs, have both extended the project timeline and increased the expenditures associated with completing the project and migrating to the Microsoft PowerApps licensing model.

Customer Research

Activity Description	Research activities undertaken under this budget in 2022 included a refresh of our residential segmentation, as well as ongoing research to track the impact of general C&EM communications, and communications testing.

Expenditures ($000s)						
Customer Research	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**0**	**102**	**25**	**21**	**1**	**149**
2022 Actual	0	21	0	69	11	**101**

Notes:

- Lower than Plan forecast expenditures in Customer Research is primarily driven by a delay in implementation of a data analytics tool. FEI expects that the tool will be implemented in 2023 or 2024.

Commercial Energy Specialist Program

Activity Description	This program funded Energy Specialist, Energy Analyst and Thermal Energy Manager positions in large commercial organizations. Funding ranged from $50,000 up to $80,000 per year based on position and an annual contract. A funded position's 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 45 participants in 2022. This program is funded as an enabling activity but claims natural gas savings for those projects completed by energy specialists, energy analysts and thermal energy managers that are not claimed by another FEI DSM program. Total 2022 verified (non-C&EM program) annual savings were 1966 GJ. FEI considers this to be an energy management program, and hence a specified demand-side measure, as defined in the DSM Regulation.

Expenditures ($000s)						
Commercial Energy Specialist Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**2,400**	**85**	**21**	**27**	**146**	**2,679**
2022 Actual	2,039	86	0	38	189	**2,351**

Notes:

- The Energy Specialist Program continues to experience success as an enabling program. In 2022, organizations with Energy Specialists were responsible for 37 percent of natural gas savings and 33 percent of the incentives paid out in the Commercial Program Area. This is an addition to the Conservation Education and Outreach, Innovative Technologies, Low Income and Residential programs and incentives that the funded positions promoted and used in 2022. Note many participants were unable to complete retrofit projects due to supply chain issues triggered by the COVID-19 pandemic.
- Some organizations had funded positions for part of the year only as they were new and added to the program later in the year or their funding agreements concluded and were not renewed.
- The energy savings listed only apply to third party verified natural gas projects completed by funded positions in 2022 which did not 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, regional districts and Indigenous communities and organizations, up to $100,000 per year based on bi-annual contracts. 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. Several Indigenous community positions are cost-shared with BC Hydro. 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 14 participants in 2022. FEI considers this to be an energy management program, and hence a specified demand-side measure, as defined in the DSM Regulation.

Expenditures ($000s)						
Community Energy Specialist Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2022 Plan	**750**	**8**	**2**	**27**	**27**	**814**
2022 Actual	510	1	0	3	204	**718**

Notes:

- Actual participation was below Plan forecast as some communities only had a Community Energy Specialist for part of the year, which was related to staffing challenges and hiring delays.

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. FEI continued to work with industry partners, including FBC, BC Hydro, and EMLI to support the industry and the Home Performance Stakeholder Council - an industry led group tasked with addressing the fragmented interests, opportunities and challenges that exist in BC's home performance industry.

FEI's involvement in codes and standards work in 2022 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 collaboration with the provincial Building Safety and Standards Branch, FEI and FBC provided support to educate builders and energy advisors and encourage the building of high performance homes in BC.

The continued development work in 2022 to implement the new DSM management system has further improved customer experience and service delivery for DSM programs. Finally, customer research initiatives and the Energy Specialist programs continue to help improve the delivery of programs and energy efficiency awareness and behaviour in BC.

12. EVALUATION

In alignment with FEI'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.[11] Based on this ongoing assessment, all programs are evaluated when appropriate. The 2022 evaluation activities presented here reflect the number of programs in market, and the type of evaluation activities required to provide program feedback.

12.1 *2022 PROGRAM EVALUATION AND EVALUATION RESEARCH ACTIVITIES*

In 2022, FEI's various evaluation activities included quantifying energy savings, assessing participant awareness and satisfaction, identifying barriers to participation, assessing customer usability, engaging 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 2022. 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 to provide a concise, easy-to-view summary of evaluation activities. Included in the table are: a list of all the 2022 evaluation activities; the Program Area each activity occurred in; the general type of evaluation activity undertaken; the Company's actual 2022 evaluation expenditures; and a status update on each activity. The total expenditure for program evaluation and research activities in 2022 was approximately $1.85 million or 1.71% of the total expenditure which is consistent with previous DSM Plan years.

[11] 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 2022[12]

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	$14	Customer engagement and awareness of C&EM activities. Ongoing weekly ad tracking of C&EM advertisements. **Completed from May to July, September and October 2022 by Majid Khoury.**
MyVoice Panel Software	Enabling Activities	Communications	none	$55	Home Renovation Rebate & Free Ridership Online Research **Ongoing by FortisBC Energy Inc**
COMMERCIAL ENERGY SPECIALIST PROGRAM					
Energy Specialist Program Evaluation 2021	Enabling Activities	Process & Impact	FortisBC Energy Inc. & FortisBC Inc.	$7	The evaluation study includes program and industry stakeholder surveys and an energy savings audit on projects completed in 2021. **Completed May 2022 by Prism Engineering** **Preliminary results reported in the 2021 Annual Report**
Energy Audit 2022 Update	Enabling Activities	Impact	FortisBC Energy Inc. & FortisBC Inc.	$31	The study is an update to an energy savings audit to verify energy savings from projects completed in 2022. **To be completed Q2 2023**
COMMUNITY ENERGY SPECIALIST PROGRAM					
Community Energy Specialist Program Evaluation 2021	Enabling Activities	Process	FortisBC Energy Inc. & FortisBC Inc.	$3	Program evaluation consisting of a process evaluation and interviews with internal and external stakeholders in order to gather feedback for future program design. **Completed June 2022 by Prism Engineering**
TRADE ALLIED NETWORK QUALITY ASSURANCE					
Insulation & Program Compliance Site Visits	Enabling Activities	Evaluation Study	none	$62	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	$226	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.
Furnace Quality Installation Field Study	Enabling Activities	Evaluation Study	none	$17	In-person site assessments for furnace upgrades with a focus on capturing the pre-change out data to assess the baseline for the furnaces replaced. **Completed August 2022 by Ecolighten**
Furnace Performance Testing	Enabling Activities	Evaluation Study	none	$68	Field study to evaluate the effect of quality installation on the overall performance of residential furnaces with a focus on determining the furnace AFUE and steady-state efficiency at a high input rate. **Completed November 2022 by NGTC**

[12] 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 2022 (continued)

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partners	Actual Evaluation Expenditure (000's)	Evaluation Status
CODES & STANDARDS					
Energy Code Compliance Studies	Enabling Activities	Process	none	$2	Online 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. **Completed December 2021 by RDH Building Science** **Results reported in the 2021 Annual Report**
HOME RENOVATION PROGRAM					
Insulation Measures Characterization Analysis	Residential	Market Study	FortisBC Energy Inc., FortisBC Inc. & BC Hydro	$1	Characterization analysis of insulation measures incented as part of the Home Renovation Rebate Program. **Completed December 2021 by Dunsky** **Results reported in the 2021 Annual Report**
Furnace Quality Installation Field Analysis	Residential	Evaluation Study	none	$16	Data analysis component of the Furnace Quality Installation Field Study. **To be completed Q2 2023**
Space Heating Incremental Cost Research	Residential	Market Study	none	$18	Industry research on incremental costs associated with furnaces and boilers that are installed as part of the FortisBC Residential and Low Income incentive programs. **Completed May 2022 by ICF**
RENTAL APARTMENT EFFICIENCY PROGRAM					
Participant and Building Owner Surveys	Residential / Commercial	Process	FortisBC Energy Inc. & FortisBC Inc.	$55	Surveys conducted with building owners and tenants to assess customer satisfaction, program awareness, and gather feedback for future program design. **2021 results: Completed July 2022 by Cohesium Research** **2022 results: To be completed Q2 2023**
Performance Testing	Residential / Commercial	Process	FortisBC Energy Inc. & FortisBC Inc.	$2	Ongoing performance testing for RAP participants.
DIRECT INSTALL PROGRAM					
Direct Install Quality Assurance	Low Income	Evaluation Study	FortisBC Energy Inc., FortisBC Inc. & BC Hydro	$169	Ongoing quality assurance to ensure direct install measures are installed according to program policies and procedures.
Ongoing Customer Feedback Surveys	Low Income	Process	FortisBC Energy Inc., FortisBC Inc. & BC Hydro	$29	Ongoing surveys with Direct Install program participants to gather feedback on their customer experience, satisfaction with the program and the program representatives. **Completed February 2023 by Sentis Market Research**

Table 12-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2022 (continued)[13]

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partners	Actual Evaluation Expenditure (000's)	Evaluation Status
COMMERCIAL PERFORMANCE PROGRAM					
Third Party Energy Study Reviews	Commercial	Measurement & Verification	none	$97	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 include engineering calculations for specific energy conservation measures, document reviews, and feasibility study reviews.
COMMERCIAL NEW CONSTRUCTION PROGRAM					
Third Party Energy Model Reviews	Commercial	Measurement & Verification	none	$173	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.
Commercial New Construction Program Evaluation	Commercial	Process & Impact	FortisBC Energy Inc. & FortisBC Inc.	$82	Evaluation of the program from design to delivery, including assessment of incentive levels and free-ridership, and understanding the impact of program changes, and identifying opportunities and areas for improvement. **Completed December 2022 by Econoler**
INNOVATIVE TECHNOLOGIES					
Carbon Capture Pilot	Innovative Technologies	Measurement & Verification	none	$10	Measurement of energy savings, installation and technology performance associated with the carbon capture system. **To be completed Q3 2024**
Commercial Gas Absorption Heat Pump Pilot	Innovative Technologies	Measurement & Verification	none	$56	Measurement of energy savings, installation and customer acceptance of the gas-fired absorption heat pump technology for commercial DHW applications. **Phase 1 & 2:** Completed October 2020 by Building Energy Solutions Ltd. **Results reported in the 2020 Annual Report** **Phase 3 & 4:** Completed September 2021 by Building Energy Solutions Ltd. **Results reported in the 2021 Annual Report** **Phase 5:** Focusing on pre-heat for ventilation heating. **To be completed Q2 2023**
Thermal Compression Heat Pump Pilot	Innovative Technologies	Measurement & Verification	none	$22	Measurement of energy savings, installation and customer acceptance of the thermal compression heat pump technology for residential space heat and DHW applications. **To be completed Q1 2023**
Residential Gas Absorption Heat Pump Pilot	Innovative Technologies	Measurement & Verification	none	$74	Measurement of energy savings, installation and customer acceptance of the gas-fired absorption heat pump technology for residential space and water heating applications. **To be completed Q1 2024**

[13] 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 2022 (continued)

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partners	Actual Evaluation Expenditure (000's)	Evaluation Status
INNOVATIVE TECHNOLOGIES					
Deep Energy Retrofit Pilot	Innovative Technologies	Measurement & Verification	none	$21	Measurement of energy savings, installation and customer acceptance of building envelope and energy system upgrades for residential and commercial buildings. **Residential pilot to be completed Q4 2024** **Commercial pilot to be completed Q4 2025**
Residential Hybrid Heating Program	Innovative Technologies	Measurement & Verification	none	$291	Measurement of energy savings, identification of switch over temperature, preferred control system and customer acceptance of the system in residential settings. **To be completed Q2 2024**
INDUSTRIAL PERFORMANCE PROGRAM					
Third Party Energy Study Reviews	Industrial	Measurement & Verification	none	$33	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 include engineering calculations for specific energy conservation measures, plant wide audits, document reviews, and feasibility study reviews.
Third Party Measurement & Verification	Industrial	Measurement & Verification	none	$43	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					
Customer Engagement Tool Service Quality Research	CEO	Process	FortisBC Energy Inc. & FortisBC Inc.	$37	Customer experience and satisfaction with the Home Energy Report. **Q1 though Q3 reports were completed in 2022** **Q4 report to be completed Q1 2023**
Customer Engagement Tool Evaluation - Year 1	CEO	Impact	FortisBC Energy Inc. & FortisBC Inc.	$5	Evaluation of the overall program, validation of the treatment and control group selection, and net savings attributed to the distribution of the Home Energy Reports. **Completed March 2022 by Econoler** **Preliminary results provided in 2021 Annual Report**
Customer Engagement Tool Evaluation - Year 2	CEO	Process & Impact	FortisBC Energy Inc. & FortisBC Inc.	$57	Evaluation of the overall program, validation of the treatment and control group selection, and net savings attributed to the distribution of the Home Energy Reports. **To be completed Q2 2023**
PORTFOLIO					
Comprehensive Energy Savings Project	Portfolio	Market Study	none	$60	A comprehensive review to better understand the tracking of total energy savings and emission reductions that are being employed by other utilities and organizations. **Completed August 2022 by Posterity Group**
FortisBC EM&V Framework Review	Portfolio	Process	FortisBC Energy Inc. & FortisBC Inc.	$11	A comprehensive research study including literature review and interviews with key stakeholders to identify key findings and prioritize recommendations to update the EM&V Framework. **To be completed Q3 2023**

Table 12-2: Summary of Key Findings and Methodology for 2022 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	Online interviews were conducted weekly with approximately 125 per week with BC adults living within the FortisBC service territory. The research was conducted when the C&EM advertisements were in market (May to July, September and October 2022).	**Results:** Awareness of the advertisements remained strong throughout the year with over 50% of participants recalling at least one advertisement. Two-thirds of survey participants agreed that the advertisements made them want to visit the organization's website to learn more. Among those who recalled the advertisements there was a high degree of knowledge about FortisBC's C&EM activities, with 8 in 10 aware of our rebate programs. **Outcome of Key Findings:** Awareness of the advertisements remain strong and the creative is still effective. Consider ways to make the offers more memorable.
MyVoice Panel Software	Enabling Activities	Communications	FortisBC MyVoice online community panel.	**Results:** Sixty-eight percent of program participants who completed the rebate application form online found it easy or very easy to complete. **Outcome of Key Findings:** Continue to explore ways to make the application form less onerous and easy to complete.
COMMERCIAL ENERGY SPECIALIST PROGRAM				
Energy Audit 2022 Update	Enabling Activities	Impact	The methodology remains consistent with the Energy Savings Audit completed in previous years. The Audit reviewed and verified energy savings from gas and electric projects implemented and completed by Commercial Energy Specialists in 2022 without the assistance of a FortisBC incentive program. Energy savings were verified on a project-by-project basis either through a utility analysis or an analytical savings analysis approach.	**Results:** Based on the preliminary findings, 10 gas projects completed in 2022 were reviewed and verified to have resulted in 1,704 GJ energy savings. The remaining projects still in the process of review have an estimated 80% claimed to verified savings ratio. **Outcome of Key Findings:** Results were taken under consideration for future program design.
COMMUNITY ENERGY SPECIALIST PROGRAM				
Community Energy Specialist Program Evaluation 2021	Enabling Activities	Process	The evaluation assessed the success of the Community Energy Specialist Program considering its connection to the Climate Actions Partner Program and opportunities moving forward. The evaluation included 48 documentation reviews, and interviews with 13 program participants, and stakeholders to gather feedback on the effectiveness of the program and identify opportunities for program improvement.	**Results:** Results from the documentation reviews and stakeholder interviews provided feedback on what's working well (supporting the local community, training and networking opportunities, and adding resources to support local governments), and identified some program challenges (complexity of the Specialist role & local government landscapes, and competing priorities). Recommendation options were proposed to addressed the key findings. **Outcome of Key Findings:** Results were reviewed and recommendations taken under consideration for future program design.

Table 12-2: Summary of Key Findings and Methodology for 2022 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
TRADE ALLIED NETWORK QUALITY ASSURANCE				
Furnace Quality Installation Field Study	Enabling Activities	Evaluation Study	90 furnace participants from the FortisBC ENERGY STAR Verified Installation (ESVI) Pilot and Income Qualified Energy Conservation Assistance Program (ECAP) were selected for performance assessments including pre-changeout testing, installation & commission, and data analysis from July 2021 to May 2022.	**Results:** The testing results from 62 full participants and 28 partial participants were evaluated for reporting on furnace sizing, external static pressure implication and technical comparison of in-situ performance between the old standard/mid efficiency furnaces and the new high-efficiency furnace. The results support the theory that furnace in-situ performance can be improved upon. Improvements suggested include; incorporating a full suite of quality installs practices including proper furnace sizing, equipment selection, installation, and commissioning of the equipment. **Outcome of Key Findings**: FortisBC will consider implementing additional training and make educational resources available to contractor installers. FortisBC will also consider launching a commissioning sheet mobile application to reduce admin work and promote commissioning at the time of installation.
Furnace Performance Testing	Enabling Activities	Evaluation Study	15 old furnaces removed from the homes of FortisBC Rebate Program participants were shipped to an independent lab in Quebec for testing between July 5 and August 17, 2022. The test methodology created by NGTC is used for measuring the annual fuel utilization efficiency (AFUE) of residential gas-fired or oil-fired furnaces and boilers to determine AFUE and steady-state efficiency at a high input rate	**Results**: 15 furnaces were tested (with one-stage combustion and indoor air combustion). Many units don't provide the expected capacity on their nameplates, even if their orifice size is generally the same size as indicated. However, in most cases, this capacity difference should not have been an issue on site due to equipment oversizing. The annual fuel utilization efficiency (AFUE), which includes start-up and cool-down heat losses, is inferior to the steady-state efficiency (SSE): No correlation between AFUE and SSE has been established. **Outcome of Key Finding**s: Results and recommendations were reviewed and further analysis will be conducted. NGTC recommends another batch of testing with additional parameters at the time of the on-site testing as well as the in-lab testing.
HOME RENOVATION REBATE PROGRAM				
Space Heating Incremental Cost Research	Residential	Market Study	From December 2021 through April 2022, 42 HVAC contractors based in BC were contacted via phone and email. A template to collect incremental cost data from HVAC contractors was used to gather information on equipment type, input rating ranges, and efficiency levels. Costs were also broken down by equipment and labor.	**Results:** The research produced an updated set of residential boiler and furnace (i) total cost data (equipment and labor) and (ii) incremental cost data from upgrades with efficiency ratings ranging from 94% to 96%+ for boilers, and 95% to 98%+ for furnaces. The information was based on responses from eight HVAC contractors surveyed. **Outcome of Key Findings:** Results were reviewed and taken under consideration for future program design.
NEW HOME PROGRAM				
New Home Program Evaluation	Residential	Process & Impact	The purpose of this evaluation was to conduct a process and impact evaluation of the New Homes Rebate program. The main study methods include a program logic model, cross tabulation of survey data, interview summaries, engineering modeling and free rider algorithms.	**Results:** The Program's incentives are appropriate to achieve significant levels of participation. While the Program is well known to builders, there is room for enhanced marketing and communication to residential construction industry. Suggestions include creating a Program specific modelling guideline and to capture loads from all natural gas appliances. **Outcome of key findings:** The Program team is currently evaluating the preliminary results of the evaluation and processing how FortisBC can use the key findings to improve the program. FortisBC is exploring ways to gather more data from future program participants that could assist with the evaluations.

Table 12-2: Summary of Key Findings and Methodology for 2022 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)

RENTAL APARTMENT EFFICIENCY PROGRAM				
Participant and Building Owner Surveys	Residential/Commercial	Process	This study is an ongoing evaluation conducted annually for the program. It includes in-person installations of efficiency measures, a telephone or online survey with building owners/managers, and an online survey with tenants.	**Results:** The survey results indicate that 71% of the tenants surveyed indicating "very" or "somewhat satisfied" with the overall program (80% in 2020). Participants remain pleased with the program with mean scores of 4.2 and higher for virtually all of the areas examined. Tenants also continue to view the various aspects of the program positively. In particular the installation is once again viewed as extremely favourable. **Outcome of Key Findings:** Continue to conduct ongoing tenant and building owner surveys to provide feedback to program design.
DIRECT INSTALL PROGRAM				
Ongoing Customer Feedback Surveys	Low Income	Process	Two separate surveys were conducted to evaluate the Direct Install Program. The first survey is a paper survey with an option to be completed online. A total of 712 program participants completed the survey between January 2022 to January 2023. The survey assessed customer satisfaction with the program application process, the measures installed, and the experience with the installation contractors. A subgroup of participants from the first survey who were eligible for additional draft-proofing, insulation, bathroom fans, programmable thermostats, and/or a natural gas furnace were contacted to participate in a second survey (online and telephone) to assess customer satisfaction with the program and gather feedback to improve the program design. A total of 213 participants completed the survey between January and December 2022.	**Results:** The first survey showed that overall satisfaction of participants remained high (77% in Q1 to 83% in Q4) and consistent with previous years. The most common products installed were energy-saving light bulbs and exterior door weather stripping, similar to last year although the percentage of participants reporting these has declined. Similar to the first survey, the second survey showed that 77% of participants were very satisfied with the program, and nine out of ten would likely recommend it to others. Positive feedback stems from appreciation of the products and good qualities of the staff who conducted the evaluation and contractors who completed the work. On average, participants had 3.2 products installed; most had bathroom fan installed (84%) followed by insulation (68%), and 90% were very satisfied with the quality of the natural gas furnace installed. Majority (85%) of the participants agreed that the comfort of their homes has increased as a result of the program. **Outcome of Key Findings:** Continue to conduct the participant surveys to assess the program's development and contractor experience.
COMMERCIAL NEW CONSTRUCTION PROGRAM				
Commercial New Construction Program Evaluation	Commercial	Process & Impact	The evaluation conducted interviews with stakeholders and CNC participants and supported these with the review and analysis of information from tracking sheets, program guidelines, project files, and jurisdictional requirements on commercial new construction.	**Results:** The participants' overall program satisfaction was found to be very high, and participation has improved since 2020 as a result of program changes made at the time. Based on program tracking, project savings per square feet has decreased since 2019 indicating that savings per project are now harder and more expensive to achieve. The overall evaluation also found that corporate policy and jurisdictional requirements are key motivators in deciding to build better-than-code buildings. **Outcome of Key Findings**: Results and recommendations were reviewed and taken under consideration for future program design.

Table 12-2: Summary of Key Findings and Methodology for 2022 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)

CONSERVATION EDUCATION AND OUTREACH				
Customer Engagement Tool Service Quality Research	CEO	Process	Email-to-online methodology to gather feedback on customer experience and satisfaction with the Home Energy Report.	**Results:** In Q1, both gas and electric report recipients rated the ease of understanding the home energy use and energy savings tips at 88%, and the usefulness of the reports at 56% and 54% respectively. In Q2, the results for gas and electric report recipients were slightly lower at 87% and 86% for ease of understanding the home energy use and energy savings tips. Similarly, the usefulness of the reports was lower in Q2 at 52% for gas report recipients and 40% for electric recipients. The main points of criticism for the home energy use classification section continue to be that the comparison to other homes is inaccurate or not helpful. The top positive comment is that the report is in line with their expectations. **Outcome of Key Findings:** Results and recommendations were reviewed and taken under consideration for future program design.
Customer Engagement Tool Evaluation - Year 2	CEO	Process & Impact	The study consisted of an impact evaluation and a process evaluation. The impact evaluation determined the natural gas and electricity energy savings using staff interviews and monthly and cumulative savings calculation using natural gas and electricity billing data. The process evaluation assessed the program's effectiveness through in-depth interviews with key stakeholders, and an online survey with program participants.	**Results:** In 2022, the natural gas savings increased to 1.05 GJ per participant, which represents approximately 1.36% reduction in annual gas consumption exceeding the 1% program target. The evaluation brought to light some areas for improvement such as the need for more personalized tips in the Home Energy Reports and the impact of reward points in driving customer behaviour. **Outcome of Key Findings:** Results and recommendations were reviewed and taken under consideration for future program design.
Portfolio				
Comprehensive Energy Savings Project	Portfolio	Market Study	The study estimated the historical comprehensive energy savings and GHG emissions reduction from 2010 to 2021 using data from FortisBC's annual report documentation, and the future comprehensive energy savings and GHG emissions reduction for 2022 to 2030 using forecast data from the 2021 FortisBC Conservation Potential Review.	**Results:** Total lifetime comprehensive energy savings for 2010 to 2021 was 110.4 million GJ, and the future comprehensive energy savings was estimated to be 1.32 billion GJ. The effect of early replacement savings is reduced drastically in future estimates from 12.2% increase for 2010 to 2021, to 1.5% for 2022 to 2030. The results suggest that in-situ equipment performances will increase over time towards the code baseline performance requirements. **Outcome of Key Findings:** Results and recommendations were taken under consideration for future guidance.

12.2 *EVALUATION COLLABORATION*

In 2022, 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 Direct Install Quality Assurance study. Additionally, in 2022, the BC Utilities and EMLI started initial conversations to launch a new joint evaluation study to assess hybrid dual fuel heat pump, all electric heat pump, and window/doors measures.

In keeping with the MOU on collaboration discussed in Section 2.4, the BC Utilities continue to hold update project 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*

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 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 the 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 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 and the Application for Updated DSM Expenditures for 2021 and 2022[14], were submitted to the BCUC for approval in 2021.

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:

[14] Filed on March 19, 2021 and approved by BCUC Order G-135-21.

- 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 retained.

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 2021 assessing the effectiveness of controls that were in place the prior year. That audit noted that key controls are in place and operating effectively to mitigate risk around program development, program administration (including rebate payments), evaluation, and program reporting. The next internal audit is scheduled for 2023.

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. 2022 DSM ANNUAL REPORT SUMMARY

In 2022, FEI achieved 97 percent of its total approved DSM expenditures and estimated annual energy savings for the year, based on its 2019-2022 DSM Plan, including approved amendments. Annual energy savings were approximately 1.2 million GJ, slightly increasing over savings achieved in 2021. Incentive expenditures at year-end were more than four times that of non-incentive expenditures, making up 80 percent of the overall portfolio expenditures. The resulting total lifetime energy savings for 2022 DSM activity is estimated at 10.8 million GJ and corresponding lifetime GHG emissions reductions of 646,480 tonnes CO2e.

The Report details how FEI cost-effectively delivered these programs as set out in the 2019-2022 DSM Plan. 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.