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March 27, 2024

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

Attention: Patrick Wruck, Commission Secretary

Dear Patrick Wruck:

Re: FortisBC Energy Inc. (FEI)
Natural Gas Demand-Side Management (DSM) – 2023 Annual Report

Attached please find the Natural Gas DSM Program 2023 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
2023 Annual Report

March 27, 2024

Table of Contents

List of Tables

1. REPORT OVERVIEW

FortisBC Energy Inc. (FEI or the Company) is committed to delivering a broad portfolio of 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 2023, the Company achieved a combined portfolio Modified Total Resource Cost (MTRC)[2] of 1.4 on expenditures of $124.2 million, meeting FEI's goal of cost-effective program delivery.

The 2023 DSM Annual Report (the Report) outlines FEI's actual results and expenditures for 2023 as compared to its 2023 DSM Expenditures Plan accepted by the BCUC in its Decision and Order G-45-23 (the Decision). The Report compares 2023 actual activity and results to the approved DSM Plan values for 2023. Where the details of individual programs vary substantially from the 2023 DSM Expenditures Plan, explanations are provided in the applicable Program Area sections of the Report.

1.1 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 2023. A summary of the overall Portfolio results is provided in Table 1-1, demonstrating that FEI achieved a combined Portfolio MTRC of 1.4. FEI achieved DSM expenditures of $124.2 million and recorded annual natural gas savings of 1.4 million GJ in 2023. These energy savings resulted in carbon emission reductions of 96,604 tonnes of CO2e in 2023 and total reductions of 687,104[3] tonnes of CO2e over the life of all measures installed or undertaken in 2023. Expenditures and savings have increased over 2022 results by approximately $16 million and approximately 250,000 GJ, respectively.

[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).

[3] Emission reduction value is determined by a combination of the life cycle (well to burner tip) emission factor and AR5 Global Warming Potential (GWP) factor. The new emission factor, 0.068 tonnes CO2e/GJ, has been adopted for consistency with other regulatory proceedings, including GreenBond and Sustainability reporting. 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 1-1: Overall DSM Portfolio Results for 2023

Indicator - 2023 Results		Total
Utility Expenditures, Incentives ($000s)		96,588
Utility Expenditures, Non-Incentives ($000s)		27,622
Utility Expenditures, Total ($000s)		124,210
Net Incremental Annual Gas Savings (GJ/yr.)		1,420,903
Annual GHG Emission Reductions* (tonnes CO2e/yr)		96,621
NPV of Annual Gas Savings (GJ/yr.)		10,104,476
Measure Lifetime GHG Emission Reductions* (tonnes CO2e)		687,104
Benefit/Cost Ratios	TRC	**1.0**
	MTRC	**1.4**
	UCT	**0.9**
	PCT	**2.5**
	RIM	**0.5**

Tables 1-2 and 1-3 below provide the expenditures and cost-effectiveness test results by Program Area for the overall DSM Portfolio.

Table 1-2: Overall DSM Portfolio Level Results by Program Area 2023 – Expenditures

Program Area	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2023 Plan	2023 Actual	2023 Plan	2023 Actual	2023 Plan	2023 Actual
Residential	39,196	39,132	4,798	2,167	43,994	41,299
Commercial	21,442	16,197	5,128	3,447	26,570	19,644
Industrial	5,787	7,291	1,061	460	6,848	7,751
Low Income	10,348	7,497	2,903	2,362	13,251	9,859
Conservation Education and Outreach	0	9	9,713	8,258	9,713	8,267
Innovative Technologies	18,838	19,816	7,122	3,550	25,960	23,365
Enabling Activities	5,662	6,646	6,349	4,977	12,010	11,623
Portfolio Level Activities	0	0	2,730	2,403	2,730	2,403
ALL PROGRAMS	**101,273**	**96,588**	**39,804**	**27,622**	**141,077**	**124,210**

Table 1-3: Overall DSM Portfolio Level Results by Program Area 2023 – Savings

Program Area	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2023 Plan	2023 Actual	TRC	MTRC	UCT	PCT	RIM
Residential	250,319	229,281	0.6	1.5	0.8	1.9	0.4
Commercial	563,816	362,743	2.0	2.0	2.0	4.3	0.5
Industrial	628,422	679,565	2.1	2.1	3.7	3.6	0.8
Low Income	77,408	51,380	2.1	2.1	0.5	2.3	0.3
Conservation Education and Outreach	81,420	95,078	0.6	2.1	0.6	2.0	0.4
Innovative Technologies	Savings Not Estimated		Savings Not Estimated				
Enabling Activities	0	2,855	Calculated at Portfolio Level				
Portfolio Level Activities	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**1,601,385**	**1,420,903**	**1.0**	**1.4**	**0.9**	**2.5**	**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 9 of the 2023 DSM Plan. These distinct Portfolio Level Activities include expenditures such as stakeholder engagement activities, portfolio level labour, 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 $000s expenditure level when expenditures were under $500.
- A "Non-Program Specific Expense" line item has been included for each Program Area in Sections 4 through 10. These expenditures support multiple programs within that Program Area and therefore, are not specific to only one program. Generally, these expenditures represent items such as training, travel, marketing collateral, and consulting services that support the overall Program Area.

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.

1.2 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 1-3 above shows that in 2023, FEI met the conditions of the DSM Regulation, achieving a

Portfolio MTRC value of 1.4. Table 1-4 below shows that 24.7 percent of the Portfolio was enabled by the MTRC cost-effectiveness test.

Table 1-4: Programs Subject to MTRC and the Relative Proportion of 2023 Portfolio Expenditures

Program	Program TRC	Program MTRC	Expenditure ($000s) subject to cap	% of Portfolio Spending
Residential				
Home Renovation Rebate Program	0.7	1.5	$15,297	12.30%
New Home Program	0.5	1.4	$13,392	10.80%
Commercial				
Prescriptive Program	1.5	1.7	$946	0.8%
CEO				
Customer Engagement Tool (CET) Program	0.6	2.0	$1,062	0.9%
Total			**$30,697**	**24.7%**

While FEI strives for TRC test results that approach or exceed 1.0 within each program and across all programs, there are benefits to implementing programs that do not meet this threshold. Some of these benefits include making programs available to those customers that would otherwise be underserved (such as Low Income and Residential customers), water savings, increased human health and comfort, and economic benefits such as job creation. These benefits were recognized in the DSM Regulation as effective for the 2023 DSM Plan, which enabled use of an MTRC in determining program and Portfolio cost effectiveness. The MTRC used 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).[4]

1.3 MEETING APPROVED EXPENDITURE LEVELS

The 2023 DSM expenditure budget for FEI, amounting to $141 million, was approved on March 6, 2023, through Order G-45-23.

FEI's 2023 actual expenditures of $124.1 million for the entire DSM portfolio demonstrate its commitment to achieving expenditure levels.

Section 2 discusses funding transfers between Program Areas in 2023 within the overall DSM funding envelope and within the transfer rules as set out in the 2023 DSM Expenditure Plan Application and approved pursuant to Order G-45-23. Section 2 also reports 2023 carryover amounts for each Program Area.

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

1.4 MEETING ADEQUACY REQUIREMENTS OF THE DSM REGULATION

The 2023 DSM Plan complies with the adequacy requirements set out in the DSM Regulation that were in effect at the time of the filing of FEI's 2023 DSM Expenditure Plan Application, which includes amendments up to March 24, 2017. The DSM Regulation adequacy requirements were 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,
>
> 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 5 provides details regarding FEI's DSM programs for Low Income customers. FEI also continues to deliver the Rental Apartment Efficiency Program (RAP) through its Commercial program as discussed in each of the respective Program Area sections (Section 6). Sections 5 and 6 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 9.

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 10. 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 4 and 6 respectively.

1.5 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. FEI 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 4 through 10.

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 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 2023. 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 expenditure and savings information for FEI's expenditure portfolio only. They do not include EMLI's CleanBC expenditures nor the savings

attributed to EMLI's CleanBC incentives. In 2023, EMLI's CleanBC incentives were administered alongside FEI incentives in the Residential Home Renovation Rebate Program, the Low Income Direct Install Program, and the Commercial Existing Building Performance Program as noted in Sections 4, 5 and 6 respectively.

1.6 SUMMARY

FEI's DSM Portfolio met the goal of cost effectiveness with a Portfolio MTRC value of 1.4 in 2023. FEI 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.

2. FUNDING TRANSFERS

The BCUC Decision and Order G-45-23 (the Decision) on FEI's 2023 DSM Expenditure Plan Application accepted the amended funding transfer rules between Program Areas where only transfers exceeding 25 percent *out* of a program area require approval from the BCUC to proceed.

Table 2-1 below shows that all Program Area transfers were within the approved Program Area funding limit detailed in the Decision and did not exceed the approved 2023 Plan Expenditures.

Table 2-1: Funding Transfers for 2023

Program Area	2023 Plan Expenditures ($000)	2023 Actual Expenditures ($000)	2023 Actual less Plan Expenditures ($000)	2023 Funding Transfer Amount Out (In) ($000)	Transfer as a percent of Approved (%)
Residential	43,994	41,299	-2,696	0	0%
Commercial	26,570	19,644	-6,926	903	3%
Industrial	6,848	7,751	903	-903	-13%
Low Income	13,251	9,859	-3,392	0	0%
Conservation Education and Outreach	9,713	8,267	-1,446	0	0%
Innovative Technologies	25,960	23,365	-2,594	0	0%
Enabling Activities	12,010	11,623	-387	0	0%
Portfolio Level Activities	2,730	2,403	-328	0	0%
ALL PROGRAMS	**141,078**	**124,210**	**-16,867**	**0**	

3. 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 2023 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 2023, FEI sought EECAG input through an engagement session in May and open written feedback until June. The topic of the session was a presentation and discussion on the proposed draft 2024-2027 FEI DSM Expenditure Plan. EECAG members provided feedback on new concepts and generally supported the areas being considered for the upcoming expenditure plan.

4. RESIDENTIAL PROGRAM AREA

4.1 OVERVIEW

The Residential Program Area reduced annual natural gas consumption by 229,281 GJ, achieving an overall MTRC of 1.5. $41.3 million was invested in Residential energy efficiency programs in 2023, and 95 percent of this investment was incentive spending. Tables 4-1 and 4-2 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 976 thousand customers[5] in the FEI service territories. For DSM purposes, these customers predominantly include those living in single-family homes, row houses, townhomes, or mobile homes[6]. 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 2023 DSM Plan, the customer offerings for the Residential Program Area consist of consolidating measures within two overarching programs: Home Renovation and New Home. 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 4-1: Residential Program Area Results Summary – Expenditures

Program	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2023 Plan	2023 Actual	2023 Plan	2023 Actual	2023 Plan	2023 Actual
Home Renovation Program	27,879	23,167	2,435	1,226	30,314	24,393
New Home Program	11,318	15,965	1,517	773	12,835	16,738
Non-Program Specific Expenses	0	0	846	168	846	168
ALL PROGRAMS	**39,196**	**39,132**	**4,798**	**2,167**	**43,994**	**41,299**

[5] FortisBC Energy Inc. 2022 Annual Information Form

[6] 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 4-2: Residential Program Area Results Summary – Savings

Program	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2023 Plan	2023 Actual	TRC	MTRC	UCT	PCT	RIM
Home Renovation Program	210,293	169,342	0.7	1.5	0.9	1.4	0.2
New Home Program	40,025	59,939	0.5	1.4	0.6	1.5	0.2
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**250,319**	**229,281**	**0.6**	**1.5**	**0.8**	**1.9**	**0.4**

Notes:

- Non-incentive expenditures consist of rebate administration, communications, evaluation, and labour expenditures.

4.2 2023 RESIDENTIAL ENERGY EFFICIENCY PROGRAMS

This section outlines the specific Residential energy efficiency initiatives undertaken in 2023, including program and measure descriptions and a breakdown of non-incentive expenditures for each of the Home Renovation Rebate Program and the New Home 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, FBC, EMLI, Municipal and Federal Governments

Expenditures ($000s)						
Home Renovation Rebate Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	27,879	704	398	107	1,226	**30,314**
2023 Actual	23,167	342	102	41	741	**24,393**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Space Heating		
Furnace	8,551	11,885
Boiler	300	377
Combination System	600	1,321
Secondary Heating		
EnerChoice Fireplace	4,500	2,405

Participation		
Measure	**2023 Plan**	**2023 Actual**
Water Heating		
0.67 EF Storage Tank Water Heater	0	591
Condensing Tankless Water Heater	7,350	4,387
Condensing Storage Tank Water Heater	100	18
Building Envelope		
Attic Insulation	2,006	1,481
Wall Insulation	299	115
Crawlspace and Basement Insulation	320	238
Other Insulation	159	86
High Performance Windows and Doors	15,000	7,452
Bonus Offers	3,040	3,751
Water Conservation and Retail measures		
Aerators & Showerheads	4,630	5,524
Draftproofing	17,400	86,030
ENERGY STAR Washer	300	1,387
ENERGY STAR Dryer	10	30
Other		
Drain Water Heat Recovery	100	0
Communicating Thermostat	6,620	6,359
Air sealing - Contractor incentive	2,006	0
Energy Advisor Support	0	1
Appliance Maintenance services	50,000	23,501
Total	**123,292**	**156,939**

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 2023, this program was a collaboration between the BC Utilities and the EMLI CleanBC Better Homes Program.
- Point-of-sale retail rebates were captured under the HRR Program Area. This includes a comprehensive suite of measures including draftproofing, water savers and communicating thermostats. In 2023, retail rebates were offered in collaboration with BC Hydro.
- Overall participation was 127% of the 2023 plan. This was driven by the point-of-sale retail rebates, which are low-cost self-install measures. With the exception of early Furnace replacements, overall uptake in larger home upgrades declined in 2023, likely due to increasing costs within the home renovation and HVAC industries, in addition to increasing

financial strains on residential customers. Higher uptake in lower cost measures, and lower uptake in higher cost measures resulted in participation exceeding plan while total incentive expenditures were 83 percent of plan.

- 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. A pilot for the digital commissioning sheet application was conducted with contractors in 2022 and was launched for Trade Ally Network contractors in 2023. FEI is continuing to evaluate energy savings associated with Quality Installation. Virtual furnace site visits 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 10.2.

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, FBC, Municipal, Provincial and Federal Governments

Expenditures ($000s)						
New Home Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	11,318	355	300	20	842	**12,835**
2023 Actual	15,965	50	277	16	430	**16,738**

Participation		
Measure	**2023 Plan**	**2023 Actual**
BC Energy Step Code - Whole Home[1]		
STEP 2 (Single Family Dwelling)	300	244
STEP 2 (Townhome/Rowhome)	50	150
STEP 3 (Single Family Dwelling)	950	1685
STEP 3 (Townhome/Rowhome)	450	924
STEP 4 (Single Family Dwelling)	165	278
STEP 4 (Townhome/Rowhome)	150	105

Participation		
Measure	**2023 Plan**	**2023 Actual**
STEP 5 (Single Family Dwelling)	40	11
STEP 5 (Townhome/Rowhome)	10	5
Space and Water Heating Systems		
0.67 EF Storage Tank Water Heater	0	38
Condensing Tankless Water heater	1100	951
Condensing Storage Tank Water Heater	125	0
Combination System	500	310
Secondary Heating		
EnerChoice Fireplace	750	955
Other		
Drain Water Heat Recovery	30	4
Communicating Thermostat	650	621
ENERGY STAR Washer	0	116
ENERGY STAR Dryer	50	19
TOTAL	**5,320**	**6,416**

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 DSM Regulation. The amendment supports utilities' ability to provide incentives for builders who adopt the Energy Step Code in municipalities across BC.
- Enhanced incentives of $2,000 per Step Code level were maintained in 2023, allowing builders to plan for the incorporation of energy efficient measures and execute plans over the life of the project. The improved incentives continued to drive the adoption of building high-performance homes. Overall Step Code participation in 2023 achieved 161% of plan.
- BC Energy Step Code – Whole Home incentives supported 3,402 new homes for a total of $14.07 million.
- Natural gas high efficiency equipment incentives supported 3,014 high-efficiency equipment installations totalling $1.89 million in incentives.
- 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 10 and shown in Table 10-1 in the Codes and Standards budget.

4.3 SUMMARY

In 2023, the Residential Program Area achieved just under 100% of total planned expenditures and 92% of planned savings. The difference between achieved savings and total expenditures resulted from lower adoption of larger home efficiency upgrades such as insulation and high efficiency water hearing in the Home Renovation Program Area, while the New Home Program exceeded plan participation with particularly strong uptake of BC Energy Step Code Whole Home incentives. Overall, the participation in residential programs resulted in over 229,281 GJ/year 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.

5. LOW INCOME PROGRAM AREA

5.1 OVERVIEW

The Low Income Program Area serves low income customers as well as Indigenous housing, co-operative housing, non-profit housing, and charities that aid low income customers. In 2023, DSM investments in the Low Income Program Area were $9.9 million and annual gas savings were 51,380 GJ/yr. Tables 5-1 and 5-2 summarize the planned and actual expenditures for the Low Income Program Area in 2023, including incentive and non-incentive expenditures and annual gas savings, as well as the cost-effectiveness test results. The TRC for Low Income programs uses the same inputs as the MTRC without impacting the MTRC Cap in accordance with the DSM Regulation.

Key highlights include:

- The Low Income Program Area performed well, achieving 74 percent of planned expenditures and 66 percent of planned energy savings.
- Participation in the Direct Install Program was the highest to date, driven in part by the participation of housing providers with multi-unit apartment buildings.
- The Prescriptive Program, including offers for Indigenous communities, achieved lower than anticipated results. Participation in 2023 was modest, this could be partly attributed to the economy, with low income individuals being particularly impacted by inflation.
- The Performance Program, encompassing support for the construction of high-performance homes and commercial buildings, achieved lower than anticipated results. Due to capacity constraints in Indigenous communities, several projects experienced delayed completion in 2023.

Table 5-1: 2023 Low Income Program Area Results Summary – Expenditures

Program	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2023 Plan	2023 Actual	2023 Plan	2023 Actual	2023 Plan	2023 Actual
Direct Install Program	5,920	4,936	1,490	1,238	7,410	6,175
Self Install Program	468	331	142	141	610	471
Prescriptive Program	3,720	2,209	556	324	4,276	2,532
Peformance Program	240	21	95	1	334	22
Support Program	0	0	336	237	336	237
Non-Program Specific Expenses	0	0	285	421	285	421
ALL PROGRAMS	**10,348**	**7,497**	**2,903**	**2,362**	**13,251**	**9,859**

Table 5-2: 2023 Low Income Program Area Results Summary – Savings

Program	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2023 Plan	2023 Actual	TRC	MTRC	UCT	PCT	RIM
Direct Install Program	15,620	18,621	1.0	1.0	0.3	1.5	0.2
Self Install Program	27,120	17,671	18.5	18.5	3.1	15.6	0.5
Prescriptive Program	33,778	15,071	3.6	3.6	0.8	3.3	0.3
Peformance Program	890	17	0.7	0.7	0.1	1.9	0.1
Support Program	Savings Not Estimated		Savings Not Estimated				
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**77,408**	**51,380**	**2.1**	**2.1**	**0.5**	**2.3**	**0.3**

Notes:

- EMLI also contributed funds through their CleanBC programs towards some Low Income programs as noted in the partnership details in Section 5.2. 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.

5.2 2023 LOW INCOME ENERGY EFFICIENCY PROGRAMS

This section outlines the specific Low Income programs undertaken in 2023, including program and measure descriptions and a breakdown of non-incentive expenditures for each of the Direct Install Program, Self Install Program, Prescriptive Program, Performance 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 themselves, this program aims to remove that barrier by having a program delivery agent/contractor perform the installation at no cost to them
Target Sub-Market	Low income homeowners and renters living in single family dwellings, townhomes, manufactured homes, or row homes, and housing providers (including apartment buildings)
New vs. Retrofit	Retrofit
Partners	BC Hydro, FBC

	Expenditures ($000s)					
Direct Install Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**5,920**	**325**	**419**	**448**	**298**	**7,410**
2023 Actual	4,936	238	441	230	329	**6,175**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Energy Conservation Assistance	2,000	5,042

Notes:

- The Direct Install Program achieved 252 percent of planned participation. This represents the highest participation recorded for the program and was partly driven by the participation of housing providers with multi-unit apartment buildings, some of which were delayed since the COVID-19 pandemic due to housing provider capacity constraints.
- The Direct Install Program achieved 83 percent of planned expenditures and 119 percent of planned energy savings. Although participation in the program far exceeded the planned target, the average investment per each individual multi-unit apartment building participant is lower than other housing types which resulted in lower than anticipated expenditures. Energy saving targets were exceeded as a result of very high participation and the continued trend of installing more comprehensive measures, such as insulation and furnaces for eligible participants.

Self Install Program

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

Expenditures ($000s)						
Self Install Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**468**	**23**	**72**	**20**	**27**	**609**
2023 Actual	331	8	85	0	48	**471**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Energy Savings Kit	12,000	11,656
Re-engagement Kit	4,000	-
TOTAL	**16,000**	**11,656**

Notes:

- The Self Install Program achieved 73 percent of planned participation. A planned re-engagement campaign, whereby previous participants receive additional energy saving measures such as window film, patio door film and caulking, was cancelled due to program partner constraints.

- The Self Install Program achieved 77 percent of planned expenditures and 65 percent of planned energy savings. Expenditures and savings were consistent with participation results.

Prescriptive Program

Program Description	The prescriptive program enables a straightforward path towards a rebate for specific residential or commercial energy efficiency measures
Target Sub-Market	Low income homeowners, charities, Indigenous housing providers and non-profit housing providers
New vs. Retrofit	Retrofit
Partners	BC Hydro, FBC

Expenditures ($000s)						
Prescriptive Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**3,720**	**98**	**34**	**32**	**392**	**4,275**
2023 Actual	2,209	9	45	22	248	**2,532**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Residential		
Furnace	540	359
Boiler	38	36
Communicating Thermostat	95	51
0.67 EF Storage Tank	0	2
Condensing Tankless Water Heater	184	138
Condensing Storage Tank Water Heater	2	0
Insulation (Attic, Wall, Crawlspace and Other)	73	23
Ventilation	40	12
EnerChoice Fireplace	22	0
Combination System	20	0
Appliance Maintenance	400	7
Windows and Doors	60	216
Health and Safety	40	9
Commercial		
Non-profit Bundled Measures	121	47
Boiler	17	18
Water Heater	13	29
Gas Heat Pump	7	3
Furnace	20	30
Other		
Two Upgrade Bonus	180	82
TOTAL	**1,872**	**1,062**

Notes:

- The Prescriptive Program achieved 57 percent of planned participation, 59 percent of planned expenditures, and 45 percent of planned energy savings. Participation was consistent, though slightly higher than 2022 which recorded 943 participants. Participation has not returned to what was achieved in 2020 and 2021 during the time-limited Double Rebates offer on select measures. Although Indigenous participation increased 24 percent from 2022, it was below expectations due to capacity constraints in communities.

Performance Program

Program Description	The performance program supports the adoption of the BC Energy Step Code and the construction of high-performance homes and commercial buildings
Target Sub-Market	Charities and housing providers
New vs. Retrofit	New construction
Partners	FBC

Expenditures ($000s)						
Performance Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**240**	**19**	**8**	**6**	**62**	**333**
2023 Actual	21	19	0	0	1	**41**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Commercial - Small Commercial New Construction	1	0
STEP 2 (Single Family Dwelling)	2	0
STEP 2 (Townhome/Rowhome)	2	0
STEP 3 (Single Family Dwelling)	8	3
STEP 3 (Townhome/Rowhome)	7	0
STEP 4 (Single Family Dwelling)	5	0
STEP 4 (Townhome/Rowhome)	5	0
STEP 5 (Single Family Dwelling)	3	0
Bundled residential new home measures	27	0
TOTAL	**60**	**3**

Notes:

- The Performance Program achieved lower than anticipated results. Due to capacity constraints in Indigenous communities, the applications for several projects were delayed and therefore were not paid in 2023. However, those communities anticipate their applications will be submitted in 2024. In addition, several communities changed direction and decided to install electric heating systems instead of gas.

Support Program

Program Description	The support program seeks to enhance energy efficiency retrofit skills for people who experience barriers to employment through training and educational opportunities
Target Sub-Market	Low income customers
New vs. Retrofit	New construction and retrofit
Partners	-

Expenditures ($000s)						
Support Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**0**	**255**	**30**	**3**	**48**	**336**
2023 Actual	0	145	0	0	92	**237**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Residential Energy Efficiency Works	25	7

Notes:

- The Support Program achieved 28 percent of planned participation and 71 percent of planned expenditures.
- The Residential Energy Efficiency Works, an energy retrofit training offer for people facing barriers to employment, was deployed in partnership with the Canadian Mental Health Association and the Foundry in 2023. Participants contributed to making a group home, managed by Freedom's Door, more comfortable and energy efficient by replacing windows and installing other energy efficient measures. A second Residential Energy Efficiency Works session was planned but postponed due to a program partner's lack of capacity and need to address more urgent priorities.

5.3 SUMMARY

Despite some programs having lower than anticipated results, the Low Income Program Area achieved the highest ever investment to date with $9.9 million in expenditures and 51,380 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.

6. COMMERCIAL PROGRAM AREA

6.1 OVERVIEW

In 2023, 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 362,743 GJ annually and achieved an overall TRC of 2.0. In 2023, FEI invested $19.6 million in Commercial energy efficiency programs, of which 82 percent was incentive spending.

Key highlights include:

- A Gas Heat Pump prescriptive offer was developed and launched.
- The Hybrid Dual Fuel Rooftop Unit offer in the Commercial Prescriptive Program was developed and launched in December 2023.
- The Commercial Energy Assessment Program experienced significantly higher than planned participation, contributing to the identification of energy conservation measures and opportunities at several customer locations.

Table 6-1: 2023 Commercial Program Area Results Summary – Expenditures

Program	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2023 Plan	2023 Actual	2023 Plan	2023 Actual	2023 Plan	2023 Actual
Prescriptive Program	7,464	4,837	2,292	1,425	9,756	6,262
Performance - Existing Buildings	8,292	8,225	1,050	697	9,342	8,922
Performance - New Buildings	4,036	1,409	585	551	4,621	1,960
Rental Apartment Efficiency Program	1,649	1,726	451	149	2,100	1,875
Non-Program Specific Expenses	0	0	750	625	750	625
ALL PROGRAMS	**21,442**	**16,197**	**5,128**	**3,447**	**26,570**	**19,644**

Table 6-2: 2023 Commercial Program Area Results Summary – Savings

Program	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2023 Plan	2023 Actual	TRC	MTRC	UCT	PCT	RIM
Prescriptive Program	275,637	119,789	2.9	2.9	2.6	7.1	0.5
Performance - Existing Buildings	210,543	172,976	1.5	1.7	1.8	3.6	0.6
Performance - New Buildings	35,809	27,827	1.3	1.3	1.3	2.8	0.6
Rental Apartment Efficiency Program	41,828	42,151	2.4	2.4	2.5	5.4	0.6
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**563,816**	**362,743**	**2.0**	**2.0**	**2.0**	**4.3**	**0.5**

6.2 2023 COMMERCIAL ENERGY EFFICIENCY PROGRAMS

This section outlines the specific Commercial Energy Efficiency programs undertaken in 2023, 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**
2023 Plan	**7,464**	**623**	**534**	**107**	**1,028**	**9,756**
2023 Actual	4,837	335	54	0	1,036	**6,262**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Condensing Boiler & Heating Plant Optimization	250	330
Domestic Water Heater & System Optimization	60	147
Condensing Volume boiler	27	0
Condensing tankless water heater	60	272
Food Services Efficiency Measures	91	193
Low flow spray valves	50	0
Condensing make-up air unit	50	20
Furnace replacement (Std & Mid)	70	78
HVAC Controls	20	0
Condensing Unit Heater	40	4
Vortex Deaerator	15	0
Air Curtains	5	0
Pipe and Tank Insulation	20	21
Steam Boiler Optimization Measures	10	7
Hybrid Systems (Hybrid Dual Fuel Rooftop Unit)	10	3
Gas Heat Pump	40	0
Connected Thermostats	10	14
Boiler Additives	250	21
TOTAL	**1,078**	**1,110**

Notes:

Overall, participation in our prescriptive programs was close to plan, but planned expenditures and savings were lower than plan due to slower than expected uptake for new offers including Gas Heat Pumps.

A number of measures had participation levels that deviated from the 2019-2022 DSM Plan including:

- Condensing Volume Boiler, Condensing Unit Heater, and Condensing make up air unit offers saw participation lower than Plan. This can be attributable to market conditions in 2023, including higher interest rates and inflation.
- Boiler Additives, Air Curtains, and Vortex Deaerators offers saw participation lower than Plan. FEI has identified opportunities for promotion and marketing of these measures in 2024 to increase awareness of the offers.
- Condensing Boiler, Domestic Water Heater and Condensing Tankless Water Heater measures had high participation, exceeding the Plan. Food Services Efficiency Measures also performed higher than Plan.

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**
2023 Plan	**8,292**	**200**	**100**	**100**	**650**	**9,342**
2023 Actual	8,225	13	0	346	338	**8,922**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Studies - Retrofit	25	54
Capital Upgrades - Retrofit	37	52
Recommissioning (Studies & O&M)	37	107

Participation		
Measure	**2023 Plan**	**2023 Actual**
Commercial Energy Assessments	15	144
TOTAL	**114**	**357**

Notes:

- The Performance Program-Existing Buildings experienced stable and steady participation in 2023. Supply chain issues are improving and the offers within the program continue to be popular.
- 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.
- The Commercial Energy Assessment and Continuous Optimization Programs saw significant increases in participation due to increased promotion and outreach.

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**
2023 Plan	**4,036**	**55**	**30**	**110**	**390**	**4,620**
2023 Actual	1,409	205	0	291	55	**1,960**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Step Code - Whole Building	9	31
Non-Step Code - Whole Building	9	11
Early Engagement	5	0
Small Commercial New Construction	5	0
Step Code Capacity Building - Charettes	2	0
TOTAL	**30**	**42**

Notes:

- The Performance Program – New Buildings was below plan in 2023 for incentives and savings. This was due to project delays from high interest rates and inflationary pressures.
- Most of the participation in the program came from post energy model incentives as opposed to building completions. This led to high participation and lower than expected savings and expenditures in 2023.
- FEI continued outreach activities to architects, engineers, developers, and energy modellers in 2023 and application intake increased as a result of these outreach activities.

Rental Apartment Efficiency Program (RAP)

Program Description	There are three components to this program. The first component is to provide participants direct install in-suite energy efficiency upgrades completed by an agent of FortisBC. The second component is to simultaneously provide participants 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.
Target Sub-Market	Rental Apartment Buildings
New vs. Retrofit	Retrofit

Expenditures ($000s)						
Rental Apartment Efficiency Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**1,649**	**220**	**150**	**47**	**34**	**2,099**
2023 Actual	1,726	73	4	28	45	**1,875**

Participation		
Measure	**2023 Plan**	**2023 Actual**
RAP - Energy Assessments (Common Area)	70	88
RAP - Implementation Support Partial (Common Area)	5	2
RAP - Implementation Support Full (Common Area)	15	38
RAP - Condensing Boilers (Common Area)	15	8
RAP - Water Heaters (Common Area)	5	15
RAP - Recirculation Controls (Common Area)	20	1
1.5GPM Showerheads (Gas) (Unit)	6020	2424
1.5GPM Handheld Showerhead (Gas) (Unit)	1576	804
1.5GPM Bathroom Aerators (Gas) (Unit)	5485	0
1.5GPM Kitchen Aerators (Gas) (Unit)	6222	0
TOTAL	**19,433**	**3,380**

Notes:

- 2023 was another challenging year for the Rental Apartment Efficiency Program due to market saturation and fewer qualifying buildings. As a result, this program achieved direct installs and associated savings lower than Plan forecasts. However, FEI achieved higher than planned participation for Energy Assessment and Full Implementation Support components of the program, which resulted in higher than planned incentive spending.

- To address lower than anticipated direct install participation in the RAP, FEI and FBC began a program redesign process in 2023.

6.3 SUMMARY

Commercial Program Area activity in 2023 resulted in approximately 362,743 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 and promotion of these programs is instrumental to the ongoing success of these programs in generating natural gas savings and fostering market transformation in the commercial sector.

7. INNOVATIVE TECHNOLOGIES PROGRAM AREA

7.1 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 2023 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.

Table 7-1 summarizes expenditures for the Innovative Technologies Program Area in 2023, including incentive and non-incentive expenditures.

Table 7-1: 2023 Innovative Technologies Program Area Results Summary – Expenditures

Program	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2023 Plan	2023 Actual	2023 Plan	2023 Actual	2023 Plan	2023 Actual
Technology Screening	300	193	500	522	800	716
Pilot Project Expenditures	7,010	11,854	2,392	883	9,402	12,737
Deep Retrofit	11,528	7,769	2,257	1,110	13,784	8,879
Non-Program Specific Expenses	0	0	1,974	1,034	1,974	1,034
ALL PROGRAMS	**18,838**	**19,816**	**7,122**	**3,550**	**25,960**	**23,365**

7.2 2023 INNOVATIVE TECHNOLOGIES ACTIVITIES

This section outlines the specific Innovative Technologies Screening, Pilot Projects and Deep Energy Retrofit activities undertaken in 2023, including program and measure descriptions and a breakdown of non-incentive expenditures for each area.

1 Technology Screening

Program Description	Technology screening activities include conducting prefeasibility studies, small field demonstrations or lab tests 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
Hybrid – All in one	The objective of this prefeasibility study was to assess the energy benefits of implementing integrated air source heat pumps (ASHPs) with natural gas-fired heating systems in a single package that is installed outdoors. The pre-feasibility study was completed to assess the market opportunity, technical characteristics, and energy savings potential of this technology. The study results were provided to the program areas in Q2 2023.
HRV & ERV	This prefeasibility study characterizes the energy and non-energy benefits of energy recovery ventilators (ERVs) and heat recovery ventilators (HRVs) in residential and multi-unit residential buildings (MURBs). The study also provides an estimate of their energy and greenhouse gas (GHG) savings potential in FEI's service area. The study results were provided to the program areas in Q2 2023.
Fireplace Controls	This prefeasibility study characterized the energy and non-energy benefits of fireplace controls and estimated energy and greenhouse gas (GHG) savings potential. The study focused on five controls: on/off remotes, time remotes, thermostat/programmable thermostat remotes, programmable thermostat remotes, modulating flame remotes, and smart home controllers. The study results were provided to the program areas in Q2 2023.
Innovative Windows Technologies	The objective of this prefeasibility study was to identify the energy savings and non-energy benefits of replacement of window systems with innovative window technologies in the existing single-family homes. This study focuses on three innovative technologies: insulating glass units (IGUs) and vacuum insulated glazing (VIG) windows, and electrochromic (EC) windows. Study results were provided to the program areas in Q4 2023.
Gas Heat Pump Lab Testing: Residential Gas Absorption Heat Pump	FEI provided funding for a European gas heat pump manufacturer in partnership with the Natural Gas Technologies Center to conduct efficiency and performance lab testing for a residential gas heat pump to support evaluation of the business case for expansion into the North American market. Results were provided to the program areas in Q3 2023.
Gas Heat Pump Lab Testing: Residential Gas Absorption Heat Pump	FEI provided funding to the Gas Technology Institute to test and verify system performance of a commercial gas absorption heat pump manufacturer based in China to support evaluation of the business case for expansion into the North American market. Results were provided to the program areas in Q3 2023.
North American Gas Heat Pump Collaborative	FEI is a founding member of the North American Gas Heat Pump Collaborative. In 2023, FEI provided funding to support manufacturer engagement opportunities to advance gas heat pumps in the residential sector. Funding activities span across 2023 and are utilized to inform strategic communication and education strategies for contractors and customers to support the adoption of gas heat pump technologies.
Natural Gas Innovation Fund (NGIF) Project 1: BKR Energy Inc.	FEI is a funding member of Industry Grants Program of Natural Gas Innovation Fund (NGIF). In 2023 FEI provided funding to support BKR Energy Inc. to develop smart fuel switching controllers for residential homes that use hybrid heating system. Funding activities will span across 2023-2024 and will be utilized to develop a smart control system that can facilitate switching between fuels based on various parameters such as Time of Use (TOU) energy rate, equipment efficiency and outdoor air temperature.

Natural Gas Innovation Fund (NGIF) Project 2: Homy Building Solutions	In 2023. FEI provided funding to support Homy Building Solutions to develop a hybrid gas absorption heat pump technology for the residential segment. Funding activities will span across 2023-2025 and will be utilized to develop a skid package that combines a gas absorption heat pump with a vapor compression cycle. The gas absorption heat pump will supply hot water for space heating and domestic hot water needs all year round. The vapor compression cycle will compensate for the poor cooling efficiency of the gas heat pump. It will also use the waste heat in the condenser to provide domestic hot water to the building and increase efficiency by reducing energy consumption.
Natural Gas Innovation Fund (NGIF) Project 3: Stone Mountain Technologies Inc.	In 2023, FEI provided funding to support Stone Mountain Technologies Inc. to develop a hybrid gas-electric heat pump for residential heating, cooling, and domestic hot water. Funding activities will span across 2023-2025 and will be utilized to develop an integrated gas absorption heat pump and electric heat pump into a single system that will provide very highly efficient space heating and cooling for all seasons. Additionally, the system will also provide domestic hot water.
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 2023, GTD provided funding for Fault detection and diagnostics, Skyspark automated analytics, people counting technology, venturi steam trap, Ecopilot – HVAC Optimization, and building envelope study. 2023 Participants Total 7

Expenditures ($000s)						
Technology Screening	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**300**	**500**	**0**	**0**	**0**	**800**
2023 Actual	193	493	0	0	30	**716**

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 carbon capture and conversion technology installations in the Lower Mainland and Vancouver Island. The pilot is testing if the CleanO2 Carbon Capture Technology can meet the energy conservation and greenhouse gas (GHG) reduction objectives of commercial and small business clients. In 2023, FEI supported installation of one unit. To date, FEI has installed 8 units under this pilot and has been collecting performance data. Manufacturer supply challenges have caused some delays in achieving the target of installing ten units under this pilot. Pilot results are expected in 2025. 2023 Participants Total 1

Commercial Gas Absorption Heat Pump Pilot	FEI further investigated an existing participant site to identify system performance enhancements for space heating applications by installing additional gas absorption heat pumps. The performance enhancement of the gas heat pump system in this building is currently under evaluation and results will be available in 2024. In 2023, FEI also received results of pilots which introduced ventilation services to the end usages of the gas absorption heat pump. The pilot results are summarized in Table 11-2: Summary of Key Findings and Methodology for 2023 Completed C&EM Program Evaluation Studies. 2023 Participants Total 1
Commercial Gas Absorption Heat Pump Pilot	FEI installed a newer model of gas absorption heat pump at a healthcare facility in Lower Mainland which can provide heating and supplemental cooling. The objective is to identify system performance enhancements for both space heating and supplemental cooling. Pilot results are expected in Q3 2024. 2023 Participants Total 1
Commercial Gas Engine-driven Heat Pump Pilot ("GEHP")	FEI is evaluating the energy savings, installation, and customer acceptance of a gas engine-driven heat pump for commercial customers which provides high-efficient space heating, cooling, ventilation, and domestic hot water. In 2023, FEI provided incentives to install these gas engine-driven heat pumps at four different sites within Lower Mainland and Vancouver Island. The installation will continue in early part of Q1 2024, and evaluation period will begin from Q2 2024. Pilot results are expected in Q2 2025. 2023 Participants Total 4
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 2023, FEI provided incentives to install ten pre-production gas heat pumps. Measurement and verification started in Q2 2023 and will continue through the 2024 heating season. Pilot results are expected in 2024. 2023 Participants Total 10
Residential Hybrid Heating Pilot Phase 1	FEI is evaluating the energy savings, installation, and customer acceptance of a hybrid heating system for residential customers which is a combination of an air source heat pump with a natural gas furnace with integrated controls. In this pilot, FEI installed sub-metered equipment at residential customers who are already using a hybrid heating system in their homes. These customers are using equipment that are not variable flow and both components of the hybrid system are not installed at the same time. This pilot will provide data to evaluate the system performance of hybrid heating systems and will be used as a baseline to compare the performance of the newer models. Results are expected in Q2 2024. 2023 Participants Total 21
Residential Hybrid Heating Early Adopter Offer	FEI is evaluating the energy savings, installation, and customer acceptance of hybrid heating system for residential customers which is a combination of an air source heat pump with a natural gas furnace with integrated control. In this pilot, FEI provided incentives to participants throughout the province to install new hybrid heating systems in their homes. The objective of the pilot is to evaluate the system performance, energy consumption, GHG emissions reduction and customer acceptance of this technology. Data collection is ongoing and will continue throughout 2024. 2023 Participants Total 492

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 2023, three TCHP prototypes were installed, however, challenges identified during 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 reviewing and assessing these learnings prior to recommencing of the pilot. 2023 Participants Total 3

Expenditures ($000s)						
Pilot Project Expenditures	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**7,010**	**1,207**	**250**	**935**	**0**	**9,402**
2023 Actual	11,854	202	0	651	30	**12,737**

Deep Energy Retrofits

Program Description	Deep Energy retrofit pilots and initiatives are focused on developing information and firsthand data on energy and GHG reduction savings in single family and multi-unit residential buildings while learning about challenges, barriers, industry capacity and existing gaps. The results of these activities is meant to inform other program areas within the larger C&EM portfolio for consideration to launch a deep energy retrofit rebate program in near future.
Deep Energy Retrofit Pilot- Part 3 Commercial 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 Commercial natural gas customers. This pilot focuses on Part 3 Multi Unit Residential Buildings (MURB), with 4 final participants, located in BC Climate Zones 4, and 5. Phase 1 (Education and Recruitment) and Phase 2 (Detailed Design) of this pilot began for all 4 buildings in 2022. The Detailed design phase continued and completed in 2023 and the scope of construction was developed with building permits received for all 4 buildings in the same year. Phase 3 (Construction) started in 2023 for two of the buildings and continued with achieving planned progress. The balance of activities in this pilot program are planned for 2024 and 2025. 2023 Participants Total 4
Deep Energy Retrofit Pilot- 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 natural gas customers. This pilot began in 2022 and focuses on Part 9 Single Family Dwellings (SFD), with 20 final participants, located in BC Climate Zones 4, 5 and 6. The pilot continued throughout 2023 with completing the detailed designed phase, developing the retrofit construction scope and starting the construction phase. 80% of the construction phase was also completed by end of Q4, 2023. The balance of activities in the pilot program are planned for 2024 and 2025. 2023 Participants Total 20
Deep Energy Retrofit Support in Other Communities	FEI's Innovative Technology team supported the Community Engagement team in partnering with other organizations, (such as the Community Energy Association - CEA) for early market development and gauging the industry capacity in creating initiatives on the topic of deep energy retrofit planning and implementation.

Deep Energy Retrofit IDP Certification	FEI provided the Canadian Association of Consulting Energy Advisors (CACEA) with funding to deliver an Integrated Design Process (IDP) Facilitation training program. The objective of the program is to expand the number of qualified IDP facilitators in British Columbia as well as increasing the uptake of the IDP by the residential building sector.
Deep Energy Retrofit Program Financing Study	The objective of this study was to identify the potential financial incentives, and funding institutions which can support future deep energy retrofit programs and participation. The study was designed to include results to consider for both Single Family Dwelling (SFD) and Multi-Unit Residential Building (MURB) future programs.
Reframed Initiative Partnerships	FEI entered 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 being to bring together the construction industry, building owners, policy makers, and the financial sector to scale up deep retrofits. This partnership was completed in Q4, 2023.

Expenditures ($000s)						
Deep Retrofit	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**11,528**	**1,332**	**750**	**175**	**0**	**13,784**
2023 Actual	7,769	566	161	114	269	**8,879**

Notes:

- Actual expenditures are less than Plan due to longer than expected preconstruction activities associated with agreements and designs for one of the Part 3 deep energy retrofit projects.

7.3 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 inclusion 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 7.2 above, to investigate innovative solutions to reduce gas energy use and resulting 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 Pilots launched in 2023 established that the gas absorption heat pump system can be designed as more than 100 percent efficient and can handle diversified loads of space heating, ventilation, and domestic hot water and support decarbonization. Some of the other Pilots

launched in 2023 will assist FEI to add more measures, such as gas engine-driven heat pumps, into future rebate programs.

8. INDUSTRIAL PROGRAM AREA

8.1 OVERVIEW

In 2023, the Industrial Program Area continued to encourage industrial customers to use natural gas more efficiently, achieving an overall TRC of 2.1. As a result, net natural gas savings of approximately 679,565 GJ/yr were achieved. Table 8-1 summarizes expenditures for the Industrial Energy Efficiency Program Area in 2023, 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 2023, compared to 2022, in terms of program expenditure and savings. Year-end results were above 2023 Plan forecast. Despite inflationary cost pressures, industrial program participation was successful across programs. As a result, total expenditure and savings in the Industrial Program Area were above Plan in 2023.

Table 8-1: 2023 Industrial Energy Efficiency Program Area Results Summary – Expenditures

Program	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2023 Plan	2023 Actual	2023 Plan	2023 Actual	2023 Plan	2023 Actual
Performance Program	3,308	4,185	373	229	3,680	4,414
Prescriptive Program	1,891	2,248	211	70	2,102	2,318
Strategic Energy Management Program	589	859	277	83	866	942
Non-Program Specific Expenses	0	0	200	77	200	77
ALL PROGRAMS	**5,787**	**7,291**	**1,061**	**460**	**6,848**	**7,751**

Table 8-2: 2023 Industrial Energy Efficiency Program Area Results Summary – Savings

Program	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2023 Plan	2023 Actual	TRC	MTRC	UCT	PCT	RIM
Performance Program	135,800	133,492	1.6	1.6	3.8	2.8	0.8
Prescriptive Program	351,823	70,147	3.3	3.3	3.0	5.2	0.8
Strategic Energy Management Program	140,800	475,926	6.3	6.3	4.8	10.3	0.9
Non-Program Specific Expenses	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**628,422**	**679,565**	**2.1**	**2.1**	**3.7**	**3.6**	**0.8**

8.2 2023 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**
2023 Plan	**3,308**	**100**	**30**	**50**	**193**	**3,680**
2023 Actual	4,185	1	0	71	158	**4,414**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Technology Implementation	14	9
Feasibility Study	18	7
Plant-wide Audit	10	0
TOTAL	**42**	**16**

Notes:

- The Performance Program had lower than expected participation, but we still had several large projects complete in 2023. This led to significant energy savings and higher than expected expenditures in the program.

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 which are retrofit only.
Partners	FBC

Expenditures ($000s)						
Prescriptive Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**1,891**	**40**	**50**	**25**	**96**	**2,102**
2023 Actual	2,248	30	0	0	40	**2,318**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Process Boiler (Hot Water and Steam)	15	24
Air Curtains - Large Door	2	0
Direct Contact Water Heater	1	0
Steam Traps Survey	8	4
Steam Traps Replacement	5	2
1" insulation 0.5-1" HW pipe	3	8
1" insulation ≥ 1" HW pipe	3	0
1" insulation 0.5-1" LPS pipe	4	0
1" insulation ≥ 1" LPS pipe	4	0
1" insulation 0.5-1" HPS pipe	4	0
1" insulation ≥ 1" HPS pipe	4	0
Tank Insulation 1" Low Temp	3	0
Tank Insulation 1" High Temp	3	0
Tank Insulation 2" High Temp	3	0
Other Prescriptive Measures	15	1
Thermal curtains	10	8
Single Stage Infrared Heater	1	0
Two Stage Infrared Heater	20	159
Condensing Infrared Heater	20	0
TOTAL	**128**	**206**

Notes:

- The total 2023 participation and expenditures for the prescriptive rebate offer was above Plan. The Two Stage Infrared Heater measure saw strong participation, performing above Plan due to high customer demand.

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 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**
2023 Plan	**589**	**105**	**75**	**25**	**72**	**866**
2023 Actual	859	1	0	0	82	**942**

Participation		
Measure	**2023 Plan**	**2023 Actual**
Individual, Large Customer	8	11
Cohort, Medium Customers	8	43
TOTAL	**16**	**54**

Notes:

- The Strategic Energy Management (SEM) program experienced higher than anticipated energy savings due to strong customer participation in SEM activities.
- The SEM program continues to be an important funnel for a variety of opportunities including, but not limited to, capital upgrades and low/no cost initiatives that achieve substantial savings.

8.3 SUMMARY

Industrial Energy Efficiency Program Area activity in 2023 resulted in approximately 679,565 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.

9. CONSERVATION EDUCATION AND OUTREACH INITIATIVES

9.1 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 2023, which positively influenced customer attitudes on energy efficiency. Educating and informing all types of customers, including students, remains a strong priority. FEI is continuing to ensure steps are taken to ensure the information provided is relevant and timely. Table 9-1 presents the CEO expenditures for 2023.

Table 9-1: 2023 CEO Program Area Results Summary – Expenditures

Program	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2023 Plan	2023 Actual	2023 Plan	2023 Actual	2023 Plan	2023 Actual
General Residential Education Program	0	5	3,887	4,282	3,887	4,286
Residential Customer Engagement Tool	0	0	3,039	1,544	3,039	1,544
Commercial Education Program	0	5	1,437	1,509	1,437	1,513
School Education Program	0	0	1,253	824	1,253	824
Non-Program Specific Expenses	0	0	98	99	98	99
ALL PROGRAMS	**0**	**9**	**9,713**	**8,258**	**9,713**	**8,267**

Table 9-2: 2023 CEO Program Area Results Summary- Savings

Program	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2023 Plan	2023 Actual	TRC	MTRC	UCT	PCT	RIM
General Residential Education Program	0	0	Savings Not Estimated				
Residential Customer Engagement Tool	81,420	95,078	0.6	2.1	0.6	2.0	0.4
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	**81,420**	**95,078**	**0.6**	**2.1**	**0.6**	**2.0**	**0.4**

9.2 2023 CEO PROGRAMS

Residential General Education Program

Program Description	This program provides information to residential customers and the 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 educational 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. FEI also partnered with other organizations, such as the Community Energy Association, to provide energy efficiency and conservation education to residential customers. Collaborations between internal departments and FBC continue to be sought to achieve cost efficiencies in the budget, particularly for awareness 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**
2023 Plan	**0**	**678**	**2,660**	**0**	**549**	**3,887**
2023 Actual	5	774	2,564	0	943	**4,286**

Notes:

- Higher than anticipated expenditures are attributed to an increase in communications resources and paid media for Q1 2024 to ensure a sustained presence in market.
- 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.
- FEI continued with its "We've got rebates" general awareness campaign driving participation in 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. FEI'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-saving activities. Through the portal, FEI can 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**
2023 Plan	**0**	**2,570**	**175**	**72**	**221**	**3,039**
2023 Actual	0	1,337	0	121	86	**1,544**

Notes:

- Lower than planned expenditures are due to expansion of the tool not proceeding as a result of an unexpected program overlap with an energy rating tool being developed externally for BC residential homeowners, and FBC reconsidering a proposed Virtual Energy Audit program, after further customer research.

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 846 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, FBC

Expenditures ($000s)						
Commercial Education Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**0**	**495**	**730**	**0**	**212**	**1,437**
2023 Actual	5	600	574	0	335	**1,513**

Notes:

- FEI's partnership with BC Hydro continued in 2023. This included collaboration on the Energy Wise Network Program for commercial customers that led to 24 natural gas behaviour change projects being submitted in 2023 (with a completion date of March 31, 2024).

School Education Program

Program Description	This program responds to meeting the "adequacy" component of the DSM 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 supported FEI's corporate school initiatives, including but not limited to Live It Earth, which is a curriculum-connected online learning platform. The assembly-style Energy Champions presentations also continued in partnership with the BC Lions. Partnerships and funding support for post-secondary and adult learning initiatives included in-class presentations, as well as supporting education campaigns delivered by energy specialists (or an energy manager).
Target Market	Students and teachers
New vs. Retrofit	Energy conservation behaviour
Partners	BC Lions, FBC

Expenditures ($000s)						
School Education Program	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**0**	**774**	**286**	**0**	**193**	**1,253**
2023 Actual	0	412	277	0	136	**824**

Notes:

- FEI and FBC sponsored curriculum-connected programs for grades K-12 that focus on energy literacy, conservation and efficiency. The Live It Earth series delivered energy efficiency and conservation education for students in grades K-7 through an interactive

online learning platform. After seven years in the market, the educational programs for high school students are being redeveloped. Lower than anticipated expenditures were due to the implementation of the high school program targeted for 2024.

- For students enrolled in post-secondary institutions, FEI, in collaboration with FBC, delivered virtual presentations about demand side management policies and programs in British Columbia, as well as employment opportunities within the energy management sector. FEI and FBC also provided funding support for the BCIT high performance building lab, which provides hands-on training on zero-energy buildings using an envelope-first approach. FEI and FBC co-sponsored resilient and green infrastructure, including the Wilden Living Lab 2 project sponsorship.
- FEI supported the BC First Nations Energy and Mining Council to provide energy management education for Indigenous community building maintenance and operations and support capacity building for Indigenous peoples.

9.3 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 2023, positively influencing 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 2023 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.

10. ENABLING ACTIVITIES

10.1 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 10-1: 2023 Enabling Program Area Results – Expenditures

Program	Utility Expenditures ($000s)					
	Incentives		Non-Incentives		Total Expenditures	
	2023 Plan	2023 Actual	2023 Plan	2023 Actual	2023 Plan	2023 Actual
Trade Ally Network	0	0	2,955	2,215	2,955	2,215
Codes and Standards	2,309	3,699	714	1,271	3,022	4,971
Reporting Tool & Customer Application Portal	0	0	1,570	818	1,570	818
Customer Research	0	0	225	100	225	100
Commercial Energy Specialist Program	2,534	2,068	596	281	3,130	2,349
Community Energy Specialist Program	819	879	289	292	1,108	1,171
ALL PROGRAMS	**5,662**	**6,646**	**6,349**	**4,977**	**12,010**	**11,623**

Table 10-2: 2023 Enabling Program Area Results - Savings

Program	Incremental Annual Gas Savings, Net (GJ)		Benefit/Cost Ratios				
	2023 Plan	2023 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	2,855	Savings included in portfolio level C/B ratio				
Community Energy Specialist Program	Savings Not Estimated		Savings Not Estimated				
ALL PROGRAMS	**0**	**2,855**					

10.2 2023 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 FEI's DSM programs. The TAN includes contractors, equipment manufacturers, distributors, Point of Sale partners who offer rebates at the point of sale to commercial customers, and other stakeholders 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. FEI also supports TAN by: • providing trade allies with co-op funding for advertising, delivering targeted messaging about energy efficiency, and by informing them about 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 2023, Trade Ally Network contractors were responsible for 71% percent of the 2023 Residential Furnace and Boiler Replacement Program rebates. In 2023, FEI hosted several in-person training sessions for the trade allies that focused on the best practices for installing high-efficiency natural gas appliances as well as advanced DSM measures, 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**
2023 Plan	**0**	**1,260**	**787**	**315**	**594**	**2,955**
2023 Actual	0	1,091	637	231	255	**2,215**

Notes:

- The Quality Assurance process was changed in 2020 to virtually conducting site visits and this has remained the same for 2023.
- The commissioning sheet online application was launched in 2023 for TAN contractors. This provided the opportunity to launch the application software based on the commissioning information used for ENERGY STAR Verified Installation online application and work with contractors to gain feedback and improve the software further.
- 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, EMLI and others. Only the FEI contribution is included 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 a 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. It supports implementation and adoption of such measures.It also 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.

Expenditures ($000s)						
Codes and Standards	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**2,309**	**502**	**0**	**60**	**152**	**3,022**
2023 Actual	3,699	345	817	9	101	**4,971**

Notes:

- The Codes and Standards expenditures were higher than Plan, 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 2023. 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 Reporting Tool & Customer Application Portal is a joint FBC and FEI tracking system that is used to manage DSM rebates from the application stage through to payment, including application review, reporting, and customer communications. The reporting tool improves the ability to operate joint programs and by sharing a platform it streamlines the customer experience, improves reporting via integrated dashboards, and is a powerful communications management system.

Expenditures ($000s)						
Reporting Tool & Customer Application Portal	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**0**	**1,157**	**0**	**0**	**413**	**1,570**
2023 Actual	0	553	0	0	265	**818**

Notes:

- The reporting tool and customer application portal launched in 2020 and, as of 2023, all current DSM programs are now being tracked in the portal.
- The integrations for the tool were previously outsourced while the programs were being built within the tool. In 2023, those integrations were brought in-house to be fully self-sufficient in supporting the portal resulting in reduced costs for ongoing support.

Customer Research

Activity Description	Research activities undertaken under this budget in 2023 included a segmentation analysis for FEI's Low-Income customers and research, investigatinghard-to reach segments, and ongoing research to track the impact of general C&EM communications, and communications testing.

Expenditures ($000s)						
Customer Research	**Incentives**	**Administration**	**Communication**	**Evaluation**	**Labour**	**TOTAL**
2023 Plan	**0**	**100**	**0**	**100**	**25**	**225**
2023 Actual	0	0	0	97	3	**100**

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. 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 2023. 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 2023 verified (non-C&EM program) annual savings were 2,855 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**
2023 Plan	**2,534**	**250**	**0**	**57**	**289**	**3,130**
2023 Actual	2,068	73	0	31	178	**2,349**

Notes:

- The Energy Specialist Program continues to experience success as an enabling program. In 2023, organizations with Energy Specialists were responsible for 35 percent of natural gas savings and 34 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 2023. 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 2023 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 17 participants in 2023. 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**
2023 Plan	**819**	**28**	**0**	**35**	**226**	**1,108**
2023 Actual	879	1	1	0	290	**1,171**

Notes:

- Participation in the program was slightly higher than forecast due to the increased interest of local government and Indigenous communities. Community Energy Specialists

successfully promoted and delivered energy conservation programs, including implementing new technologies and assisting customers with retrofit projects.

10.3 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.

FEI's involvement in codes and standards work in 2023 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 2023 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.

11. 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.[7] Based on this ongoing assessment, all programs are evaluated when appropriate. The 2023 evaluation activities presented here reflect the number of programs in market, and the type of evaluation activities required to provide program feedback.

11.1 2023 PROGRAM EVALUATION AND EVALUATION RESEARCH ACTIVITIES

In 2023, 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 11-1 provides a summary of all program evaluation and evaluation research related activities undertaken in 2023. 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 2023 evaluation activities; the Program Area each activity occurred in; the general type of evaluation activity undertaken; the Company's actual 2023 evaluation expenditures; and a status update on each activity. The total expenditure for program evaluation and research activities in 2023 was approximately $2.41 million or 1.94 percent of the total expenditure which is consistent with previous DSM Plan years.

[7] 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 11-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2023[8]

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	$26	Customer engagement and awareness of C&EM activities. Ongoing weekly ad tracking of C&EM advertisements. **Completed from January to February; May to July, August to October 2023 by Majid Khoury.**
Rebate Uptake Research	Enabling Activities	Communications	none	$14	Study to assess residential customers' awareness of energy-savings products, and rebate programs, purchasing patterns and barriers, and accessibility to the energy-savings products. **Completed September 2023 by Sentis Market Research**
Residential End Use Study	Enabling Activities	Communications	FortisBC Energy Inc. & FortisBC Inc.	$30	Survey conducted with residential customers of FortisBC in the Shared Service Territory (SST). The survey gathered detailed dwelling, occupant, and energy end-use information including renovations and activities directly or indirectly influencing residential consumption of natural gas and electric usage. Results for natural gas and electric customers are published separately. **Completed April 2023 by Sampson Research Inc.**
Low Income Customer Segmentation Study	Enabling Activities	Communications	none	$27	Analysis of Census data and survey data to identify potential participant targets for energy efficiency communications. **Completed November 2023 by Environics Analytics Group Ltd**
COMMERCIAL ENERGY SPECIALIST PROGRAM					
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. **Completed April 2023 by Prism Engineering** **Preliminary results reported in the 2022 Annual Report**
TRADE ALLIED NETWORK QUALITY ASSURANCE					
Insulation & Program Compliance Site Visits	Enabling Activities	Evaluation Study	none	$85	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	$147	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.

[8] Table 11-1 does not include Prefeasibility Studies. Please refer to the Innovative Technologies section (Section 7) for details.

Table 11-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2023 (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	Evaluation Study	none	$9	Evaluation of the impacts of BC Building Code changes on different building types. **Completed June 2023 by E3 ECO Group Inc.**
HOME RENOVATION PROGRAM					
Home Renovation Program Evaluation	Residential	Process & Impact	FortisBC Energy Inc. & FortisBC Inc.	$41	Evaluation of the program from design to delivery, including assessment of free-ridership, and identifying opportunities and areas for improvement. **To be completed Q2 2024**
NEW HOME PROGRAM					
New Home Program Evaluation	Residential	Process & Impact	FortisBC Energy Inc. & FortisBC Inc.	$16	An expanded impact analysis of the 2022 Program evaluation of the New Home rebate program utilizing additional program data set. **Completed November 2023 by Mazzi Consulting**
DIRECT INSTALL PROGRAM					
Direct Install Quality Assurance	Low Income	Evaluation Study	FortisBC Energy Inc., FortisBC Inc. & BC Hydro	$175	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	$33	Ongoing surveys with Direct Install program participants to gather feedback on their customer experience, satisfaction with the program and the program representatives. **To be completed Q1 2024**
Low Income Program Evaluation	Low Income	Process & Impact	none	$22	Evaluation of the Direct Install and Social Housing Programs from design to delivery including assessment of free-ridership, spillover, and identifying opportunities and areas for improvement. **To be completed Q3 2024**
PRESCRIPTIVE PROGRAM					
Low Income Program Evaluation	Low Income	Process & Impact	none	$22	Evaluation of the Direct Install and Social Housing Programs from design to delivery including assessment of free-ridership, spillover, and identifying opportunities and areas for improvement. **To be completed Q3 2024**

Table 11-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2023 (continued)[9]

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partners	Actual Evaluation Expenditure (000's)	Evaluation Status
RENTAL APARTMENT EFFICIENCY PROGRAM					
Participant and Building Owner Surveys	Commercial	Process	FortisBC Energy Inc. & FortisBC Inc.	$22	Surveys conducted with building owners and tenants to assess customer satisfaction, program awareness, and gather feedback for future program design. **2022 results: Completed April 2023 by Cohesium Research** **2023 results: To be completed Q2 2024**
Performance Testing	Commercial	Process	FortisBC Energy Inc. & FortisBC Inc.	$6	Ongoing performance testing for RAP participants.
COMMERCIAL PERFORMANCE PROGRAM					
Third Party Energy Study Reviews	Commercial	Measurement & Verification	none	$207	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.
M&V Project Management and Review	Commercial & Industrial	Measurement & Verification	none	$54	Ongoing management and review of Commercial and Industrial projects including review and verification of project savings, development of M&V Plans, and completion of a Year 1 and/or Year 2 M&V Reports.
Custom Efficiency Program (CEP) Evaluation	Commercial	Process & Impact	none	$71	Evaluation of the program from design to delivery, including assessment of free-ridership, and understanding the impact of program changes, and identifying opportunities and areas for improvement. **To be completed Q2 2024**
Commercial Energy Assessment Program (CEAP) Evaluation	Commercial	Process	FortisBC Energy Inc. & FortisBC Inc.	$36	Survey conducted with program participants, and key stakeholders to assess the delivery and implementation of the Commercial Energy Assessment Program measures. **To be completed Q2 2024**
COMMERCIAL NEW CONSTRUCTION PROGRAM					
Third Party Energy Model Reviews	Commercial	Measurement & Verification	none	$265	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.

[9] 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 11-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2023 (continued)

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partners	Actual Evaluation Expenditure (000's)	Evaluation Status
COMMERCIAL NEW CONSTRUCTION PROGRAM					
Commercial New Construction Program Evaluation	Commercial	Process & Impact	FortisBC Energy Inc. & FortisBC Inc.	$25	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** **Preliminary results reported in the 2022 Annual Report**
INDUSTRIAL PERFORMANCE PROGRAM					
Third Party Energy Study Reviews	Industrial	Measurement & Verification	none	$23	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	$25	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).
INNOVATIVE TECHNOLOGIES					
Carbon Capture Pilot	Innovative Technologies	Measurement & Verification	none	$1	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	$17	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. **Completed January 2023 by BES** **Phase 6 & 7:** Upgrading the boiler systems of the building and installing additional GAHPs to provide space heating to the building. **To be completed Q3 2024**

Table 11-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2023 (continued)

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partners	Actual Evaluation Expenditure (000's)	Evaluation Status
INNOVATIVE TECHNOLOGIES					
Thermal Compression Heat Pump Pilot	Innovative Technologies	Measurement & Verification	none	$8	Measurement of energy savings, installation and customer acceptance of the thermal compression heat pump technology for residential space heat and DHW applications. The Pilot identified some discrepancy and functional issues with the design of the equipment. Due to the issues identified, the pilot was put on hold and equipment were uninstalled and returned to the manufacturer. The new model will be available by 2025 and a future pilot could be developed.
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 2025**
Deep Energy Retrofit Pilot	Innovative Technologies	Measurement & Verification	none	$114	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	$98	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**
Hybrid Heating Early Adopter	Innovative Technologies	Measurement & Verification	none	$317	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 2025**
Gas Engine Heat Pump Pilot	Innovative Technologies	Measurement & Verification	none	$135	Measurement of energy savings, installation and customer acceptance of the gas engine-driven heat pump technology for commercial space heating, cooling and water heating applications. **To be completed Q1 2025**
CONSERVATION EDUCATION AND OUTREACH					
Customer Engagement Tool Service Quality Research	CEO	Process	FortisBC Energy Inc. & FortisBC Inc.	$41	Customer experience and satisfaction with the Home Energy Report. **Q1 though Q3 reports were completed in 2023** **Q4 report to be completed Q1 2024**

Table 11-1: Inventory of DSM Program Evaluation and Evaluation Research Activities Conducted in 2023 (continued)

Evaluation Name	Program Area	Type of Evaluation	Evaluation Partners	Actual Evaluation Expenditure (000's)	Evaluation Status
CONSERVATION EDUCATION AND OUTREACH					
Customer Engagement Tool Evaluation - Year 2	CEO	Impact	FortisBC Energy Inc. & FortisBC Inc.	$6	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 2023 by Econoler** **Preliminary results provided in the 2022 Annual Report**
Customer Engagement Tool Evaluation - Year 3	CEO	Process & Impact	FortisBC Energy Inc. & FortisBC Inc.	$74	Evaluation of the overall program, including a jurisdictional scan to better understand motivations for energy savings, validation of the treatment and control group selection of a new self-compare cohort, and calculation of net savings attributed to the distribution of the Home Energy Reports. **To be completed Q2 2024**
PORTFOLIO					
Measure Library Review	Portfolio	Process	FortisBC Energy Inc. & FortisBC Inc.	$96	Comprehensive review and update of the Measure Library workbook, including ongoing maintenance of the measure library inputs.
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. **Completed April 2023 by Tetra Tech**

Table 11-2: Summary of Key Findings and Methodology for 2023 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 (January to February; May to July, August to October 2023)	**Results:** Awareness of the advertisements remained strong throughout the year with 45% 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. Among all survey participants, two-thirds where aware of FortisBC's C&EM activities **Outcome of Key Findings:** Awareness of the advertisements remain strong and the creative is still effective. Consider ways to make the offers more memorable.
Rebate Uptake Research	Enabling Activities	Communications	A combination of a 10 minute phone survey and 8 in-depth interviews were conducted with residents who are responsible for paying their household's utility bills and choosing home energy-saving products. 250 residents from Princeton, Kaslo, Creston and Nelson completed the survey.	**Results:** Overall, 7-in-10 customers purchased at least one energy-savings products in the past 12 months and 64% said that they're aware of product rebates. Among these residents, only 10% recalled receiving a rebate for an energy-saving product. The top reason (70%) contributing to residents not being aware that the specific items they bought were eligible for rebates. The survey validated that a lack of access to energy-saving products is a common barrier. Residents are generally comfortable with purchasing energy-saving products online but have a strong preference to shop in store. **Outcome of Key Findings:** Continue to explore ways to increase awareness of the product rebate offers and accessibility of the energy-savings products.
Residential End Use Study	Enabling Activities	Communications	A random sample of 30,000 FEI and 10,500 FBC Residential customers were invited to participate in the 2022 Residential End Use Study (REUS) with 4,792 FEI and 1,933 FBC completed surveys. The survey was conducted jointly with FortisBC's electric division between June and August 2022. This allowed one survey to gather detailed dwelling, occupant, and energy end-use information for both residential electric and natural gas customers of FortisBC in the Shared Service Territory (SST).	**Results:** Nearly two-thirds (64%) of FEI residential customers completed one or more energy-related improvements to their homes in the last five years. The top three renovations included installing energy-efficient windows, installing weather stripping or caulking, and installing low-flow showerheads. Natural gas is used by 96% of FEI residential customers either as the main or secondary (supplementary) fuel for heating their homes, statistically unchanged since 2008. Combined space and water heating systems, queried for the first time in 2022, are popular in new construction, installed in 13% of dwellings constructed since 2015. Three-quarters (76%) of dwellings used natural gas for DWH in 2022, statistically unchanged from 2017. These data suggest the shift away from natural gas to electricity for residential domestic water heaters observed since 2008, may have stabilized. **Outcome of Key Findings:** Results were taken under consideration for future program design.
Low Income Customer Segmentation Study	Enabling Activities	Communications	Analysis of Census data and survey data by Environics to gather detailed insights on low income customers, and identify how FortisBC can successfully engage with this target audience.	**Results:** Based on FortisBC's service territory and desired target audience, the study provided a breakdown of the key participant traits and identified potential target audiences for energy efficiency communications. **Outcome of Findings:** Results will be used to inform the 2024 communications plan and marketing campaigns for the program team. The data will be used to better target customers and develop more relevant ad content.

Table 11-2: Summary of Key Findings and Methodology for 2023 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
CODES & STANDARDS				
Energy Code Compliance Studies	Enabling Activities	Evaluation Study	Evaluation conducted by an energy modeler to assess the compliance to changing building codes.	**Results:** The evaluation identified the impacts to different gas end-use equipment, with different combinations of Emissions Levels (EL), using 100% NG and 100% RNG. **Outcome of Findings**: Results were reviewed and recommendations were taken into future planning.
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 Home Rebate program. An expanded impact analysis of the gross and net natural gas savings was performed using the original data set, combined with additional data set for applications initiated by March 2022.	**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. Updated program energy savings were assessed for gross and net savings and results compared to the program business case. **Outcome of key findings:** Results were reviewed, and the program assumptions were updated. Program recommendations were reviewed and taken under considerations for future program design.
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 indicated that 69% of the tenants surveyed were "very" or "somewhat satisfied" with the overall program (71% in 2021). As with the tenants, the participants' overall impressions of the program remain favorable with 82% indicating "very" or "somewhat satisfied" with their overall program experience (88% in 2021). Majority of the participants remain pleased with both the program on an overall basis, as well as with each of the three components: direct install, energy assessment, and implementation support. However, most ratings have declined compared to 2021, particularly to the application process and communications. High level of inflation for the recommended equipment upgrades and a new online application process may be the contributing factor for the lower ratings. **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 795 program participants completed the survey between January 2023 to January 2024. 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 230 participants completed the survey between January and December 2023.	**Results:** The first survey showed that overall satisfaction of participants remained high at 83%, and is marginally higher than the previous year (79%). This is largely due to the participants' high regard towards the Energy Coach's service which is valued for its professionalism, work quality and useful energy conservation tips provided to homeowners. The most common products installed were energy-saving light bulbs and exterior door weather stripping. The second survey showed that 70% 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. The most common products installed were bathroom fan (79%) followed by insulation (76%). And while less than a third had a natural gas furnace installed, their overall satisfaction was at 75%. **Outcome of Key Findings:** Continue to conduct the participant surveys to assess the program's development and contractor experience.

Table 11-2: Summary of Key Findings and Methodology for 2023 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
INNOVATIVE TECHNOLOGIES				
Commercial Gas Absorption Heat Pump Pilot	Innovative Technologies	Measurement & Verification	**M&V Plan:** Complies with the International Performance Measurement & Verification Protocol. The selected IPMVP option and measurement boundary was Option A Retrofit Isolation Key Parameter Measurement	**Pilot Objective:** Stemming from the results of the DHW heating trial, FortisBC further investigated that a constant demand ventilation system connected to rightly sized GAHP and smart control system, which could result in greater energy saving potential and increased system efficiency. The existing two gas absorption heat pumps are integrated into a constant volume gas fired make up air unit (ventilation system) and DHW system complete with new controls. **Outcome of key findings:** The result of the Pilot shows good energy savings for the gas consumption associated with the ventilation system. The energy savings for 2023 were 44% compared to the historical average for ventilation air heating. The results demonstrate that the DHW system efficiency has increased by 4-11% over and above that of the original pilot when MUA heating is required. The system efficiency is therefore above 100% under normal operation when there is a heating load requirement of the MUA. This correlates to an outdoor air temperature between 0-15ºC. Further, under heavy peak load usage, when the MUA is SAT differential from the outdoor air is > 5ºC, system efficiencies of 125% (GUE 1.25) were consistently measured. In contrast the nameplate efficiency of a condensing makeup air unit serving the same ventilation purpose is between 94-96% efficient. This correlates to an approximate 30% increase in efficiency when compared to the industry standard base case installation of a condensing makeup air unit.
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:** The program introduced a 'self-compare' gas Home Energy Report (HER) in February 2023 that shows recipients how their home energy use compares to the same period of the previous year. Recipients in this group were generally more receptive of the information presented in the reports. In the first two quarters of the year, more than 80% found the home energy use information useful, compared with slightly more than half of the normative gas HER recipients and about half of the electric HER recipients. All recipient groups viewed the home energy use information easy to understand. In the first two quarters of the year, normative gas HER recipients and electric HER recipients rated it at about 90%; and above 96% for the self compare gas HER recipients. Similarly, energy savings tips were also viewed as easy to understand with all three recipient groups rating it about 95% in the same period. **Outcome of Key Findings:** Results and recommendations were reviewed and taken under consideration for future program design.
Customer Engagement Tool Evaluation - Year 3	CEO	Process & Impact	The study consisted of an impact evaluation and a process evaluation. The impact evaluation determined the natural gas energy savings of the normative and self-compare cohorts, and the savings are calculated using the monthly and cumulative savings from the natural gas billing data. The process evaluation builds on the results from the previous year's evaluation and focused on assessing the usage and perceptions of recipients, including identifying barriers to using the online portal. It included an analysis of the Home Energy Report quality research reports and in-depth interviews of users of the online portal.	**Results**: In 2023, the natural gas savings by recipients under the normative cohort have remained stable at 1.07 GJ per participant, which represents approximately 1.43% reduction in annual gas consumption exceeding the 1% program target. Recipients of the self-compare HERs, which was launched in late February, recorded less than a full year's energy consumption data and showed a lower calculated natural gas savings at 0.16 GJ per participant. The evaluation also showed that the recipients of the self-compare HERs were more satisfied with the program overall compared to recipients of the normative HERs and were very receptive with the information contained in these reports. The "My Energy Use" online portal was intended to complement the Home Energy Reports and encourage engagement through home assessments and information on savings opportunities and rebates, but overall use and visit remained low although gradually increasing from 48% in 2021 to 52% in 2023. The evaluation also identified the common barriers and challenges to using the online portal and presented recommendations to improve engagement. **Outcome of Key Findings:** Results and recommendations were reviewed and taken under consideration for future program design.

Table 11-2: Summary of Key Findings and Methodology for 2023 Completed DSM Program Evaluation Studies and Pilot Program Reports (continued)

Evaluation Name	Program Area	Type of Evaluation	Methodology	Outcome from Key Findings
Portfolio				
FortisBC EM&V Framework Review	Portfolio	Process	Interviews were conducted with industry experts and internal stakeholders. Additionally, a literature review of similar Framework or documents in the US and Canada were conducted to ensure consistency with industry standards.	**Results:** The results indicated FortisBC's EM&V Framework is in alignment with industry standards and guidelines. Recommendations were made to reorganize the "Evaluation Resources" section as the "Roles and Responsibilities" section, and the addition of a "Glossary" section. **Outcome of Key Findings:** Recommendations were taken under review and the EM&V Framework was updated to align with industry best practices.

11.2 EVALUATION COLLABORATION

In 2023, 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 11-1 and 11-2 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 2023, the BC Utilities and EMLI continued with the joint evaluation study to assess hybrid dual fuel heat pump, all electric heat pump, and window/doors measures.

FEI, FBC and BC Hydro held annual update meetings to review the evaluation plans and discuss future evaluation activities. FEI, FBC and BC Hydro continue to hold update meetings and explore opportunities for future collaboration on program evaluations.

12. DATA GATHERING, REPORTING AND INTERNAL CONTROLS PROCESSES

12.1 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.

12.2 INCENTIVE APPLICATIONS VETTED FOR COMPLIANCE WITH PROGRAM REQUIREMENTS

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

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

12.3 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 2024.

13. 2023 DSM ANNUAL REPORT SUMMARY

In 2023, FEI achieved 88 percent of its total approved DSM expenditures and estimated annual energy savings for the year, based on its 2023 DSM Plan. Annual energy savings were approximately 1.4 million GJ. Incentive expenditures at year-end were more than four times that of non-incentive expenditures, making up 78 percent of the overall portfolio expenditures. The resulting total lifetime energy savings for 2023 DSM activity is estimated at 10.1 million GJ and corresponding lifetime GHG emissions reductions of 687,104 tonnes CO2e.

The Report details how FEI cost-effectively delivered these programs as set out in the 2023 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.