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October 3, 2022

B.C. Sustainable Energy Association
c/o William J. Andrews, Barrister & Solicitor
70 Talbot Street
Guelph, ON
N1G 2E9

Attention: Mr. William J. Andrews

Dear Mr. Andrews:

Re: FortisBC Energy Inc. (FEI)

Project No. 1599352

Application for Acceptance of Demand-Side Management (DSM) Expenditures for 2023 (Application)

Response to the B.C. Sustainable Energy Association (BCSEA) Information Request (IR) No. 1

On July 5, 2022, FEI filed the Application referenced above. In accordance with the regulatory timetable established in British Columbia Utilities Commission Order G-219-22 for the review of the Application, FEI respectfully submits the attached response to BCSEA IR No. 1.

For convenience and efficiency, FEI has occasionally provided an internet address for referenced reports instead of attaching lengthy documents to its IR responses. FEI intends for the referenced documents to form part of its IR responses and the evidentiary record in this proceeding.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

cc (email only): Commission Secretary
Registered Parties



FortisBC Energy Inc. (FEI or the Company) Application for Acceptance of Demand-Side Management (DSM) Expenditures for 2023 (Application)	Submission Date: October 3, 2022
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1 **1.0 Topic: One Year Plan**

2 **Reference: Exhibit B-1,**

3 FEI states on page 1 of the Application:

4 “FEI is filing a one-year plan because new policy direction included in the late-2021
5 CleanBC Roadmap to 2030 (Roadmap) is anticipated to result in changes to the
6 Demand-Side Measures (DSM) Regulation before 2024 that are likely to have
7 implications for FEI’s DSM portfolio.”

8 1.1 If FEI is able to, please provide a high-level description of the types of changes to
9 the DSM Regulation that may have implications for FEI’s DSM portfolio.

10

11 **Response:**

12 Please refer to the response to CEC IR1 1.2.

13

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1 **2.0 Topic: One Year Plan**

2 **Reference: Exhibit B-1, section 3.1, Demand-Side Management Drivers &**
3 **Consistency With Government Policy**

4 FEI says this Application addresses only energy efficiency and conservation, the second
5 pillar of FEI’s Clean Growth Pathway. FEI also states:

6 “In 2021, the Roadmap introduced the concept of “a GHG emissions cap that will
7 require gas utilities to undertake activities and invest in technologies to further
8 lower GHG emissions from the fossil natural gas used to heat homes and buildings
9 and power some of our industries.” The Roadmap also noted that “the B.C. Utilities
10 Commission will have a mandate to review gas utilities’ plans, investments and
11 expenditures to ensure they’re aligned with the GHG emissions cap and cost
12 effective”. The new GHG emissions cap is a significant policy shift to a compliance-
13 based model and, at the time of this Application, supporting legislation has not
14 been introduced, although it is anticipated before the end of 2022 in the form of a
15 Greenhouse Gas Reduction Standard (GHGRS). ...” [Exhibit B-1, pp.4-5,
16 underline added, footnote omitted]

17 2.1 Please confirm, or otherwise explain, that the BCUC has not yet been given an
18 expanded mandate to review gas utilities’ plans, investments and expenditures to
19 ensure they’re aligned with the GHG emissions cap and cost effective.

20
21 **Response:**

22 Confirmed.

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24

25
26 2.2 In FEI’s view, given the connection between FEI’s 2023 DSM Expenditure
27 Schedule and the anticipated Greenhouse Gas Reduction Standard, is the BCUC’s
28 existing mandate sufficient to allow the BCUC to accept FEI’s 2023 DSM
29 Expenditure Schedule under s.44.1 of the UCA?

30
31 **Response:**

32 Yes, the BCUC’s existing mandate is sufficient. Please refer to Section 3 of the Application which
33 sets out the background for the 2023 DSM Plan and describes how the 2023 DSM Plan meets
34 the required considerations for approval under section 44.1 of the UCA. In particular, FEI’s
35 proposed DSM expenditure schedule is consistent with British Columbia’s energy objectives and
36 FEI’s 2022 Long Term Gas Resource Plan (LTGRP), meets the adequacy and cost-effectiveness
37 requirements of the DSM Regulation, and responds to government policy encouraging an
38 increase in DSM to support greenhouse gas (GHG) emission reduction targets.

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1 FEI is filing a one-year plan because it anticipates that new policy direction included in the
2 CleanBC Roadmap (released in late-2021) will result in changes to the DSM Regulation before
3 2024 that are likely to have implications for FEI’s DSM portfolio in the future.

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FEI states:

8 “The Roadmap’s stated direction for enhancing energy efficiency programs is to
9 include more support for building-envelope improvements and high efficiency heat
10 pumps, including gas heat pumps and hybrid dual fuel heating systems. The
11 Roadmap also stated that after 2030, all new space and water heating equipment
12 sold and installed in B.C. will be at least 100 percent efficient. The Roadmap further
13 indicates that there will be updated regulations to shift the focus of utility-funded
14 efficiency programs to support market readiness for future standards and codes
15 and that consumers will see more support for building-envelope improvements
16 such as insulation and better windows, and all kinds of high efficiency heat pumps
17 – electric, gas and hybrid.” [p.5, pdf p.10]

18 2.3 Please describe how the 2023 FEI DSM Plan enhances energy efficiency
19 programs to include more support for building-envelope improvements.
20

21 **Response:**

22 The 2023 DSM Plan allocates nearly \$5.5 million in incentives for building envelope prescriptive
23 measures across the Residential, Commercial, Industrial and Low Income Program Areas. This
24 includes measures such as high-performance windows and doors, attic insulation and draft
25 proofing.

26 Performance Programs and Pilot Projects add to this total with incentives on whole building or
27 bundled measures which include improvements to building envelope to meet a threshold,
28 package, or tier.

29 In addition, the 2023 DSM Plan also provides funding for training, education, and resources for
30 contractors and consultants on improving building envelope design, as shown in Section 9 of
31 Appendix A to the Application.

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35 FBC states:

36 “As the implications of this new policy direction to the DSM Regulation are still
37 being determined, FEI believes a one-year DSM Plan for 2023 is a prudent interim

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1 approach to allow time for the Roadmap-related provincial legislative and
2 regulatory process to proceed. This one-year DSM Plan includes activities that
3 support the transition to advanced DSM programming such as deep retrofits, gas
4 heat pumps and dual fuel hybrid heating systems. FEI views this DSM Plan as
5 year one of a five-year overall DSM vision and, assuming applicable legislation is
6 enacted in time, intends to follow this one-year plan with a four-year DSM Plan to
7 align with FBC's 2023-2027 DSM plan. This overall five-year DSM vision, in
8 alignment with the Roadmap, requires significant investment in the newer
9 advanced DSM areas, resulting in the increased expenditures being proposed in
10 the 2023 DSM Plan. Much of these increased expenditures are proposed to reside
11 within the Innovative Technologies program area as investigation and testing are
12 required to prove out these newer advanced DSM areas.” [p.5, pdf p.10, underline
13 added]

14 2.4 Does FEI's “overall five-year DSM vision” currently exist as a document? If so,
15 please file it.

16
17 **Response:**

18 No. While FEI's “overall five-year DSM vision” does not currently exist in one formal document,
19 many of the programming elements envisioned over this time period fall within FBC's 2023-2027
20 DSM Plan where joint FEI and FBC programs are proposed.

21 In addition to this proposed joint programming, during the consultation process for the 2023 DSM
22 Plan, FEI shared its longer-term vision regarding how the 2023 DSM Plan will align with the
23 CleanBC Roadmap with the Energy Efficiency and Conservation Advisory Group (EECAG). In
24 those EECAG sessions, FEI expressed its desire to continue to support high efficiency gas
25 equipment to meet the needs of British Columbia's energy infrastructure while, over time,
26 transitioning the focus of its DSM portfolio to advanced DSM areas such as deep retrofits, gas
27 heat pumps, and dual fuel hybrid heating systems.

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31 2.5 Please explain how FEI's “overall five-year DSM vision” relates to FEI's 2022 Long-
32 Term DSM Plan filed with FEI's LTGRP.

33
34 **Response:**

35 FEI's “overall five-year DSM vision” aligns with and has been informed by the DSM analysis and
36 the CPR Report filed with FEI's 2022 Long Term Gas Resource Plan (LTGRP). In the 2022
37 LTGRP, FEI examined demand and potential DSM savings under a broad range of possible future
38 scenarios and identified the Diversified Energy Future scenario, which implements FEI's Clean
39 Growth Pathway, as the scenario it is planning to. As a pillar of its Clean Growth Pathway, FEI
40 anticipates expanding its existing DSM activities over the planning horizon to support reducing

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1 GHG emissions to meet provincial GHG reduction targets. FEI's DSM vision has been guided by
2 the High DSM Setting analysed in the 2022 LTGRP.

3 FEI's more recent "overall five-year DSM vision" advances from the 2022 LTGRP in how the
4 transition to advanced DSM such as deep retrofits, gas heat pumps, and dual fuel hybrid heating
5 systems will be supported. FEI notes that much of the modelling for the 2022 LTGRP was
6 completed prior to the release of CleanBC's Roadmap. FEI's vision for its DSM activity over the
7 next five years has evolved to encompass greater exploration of what can be done to procure a
8 more rapid transition into these areas than what was able to be modeled at the time in the 2022
9 LTGRP, addressing barriers to implementation and developing full programming for advanced
10 measures in an accelerated time frame.

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FBC states:

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"FEI's 2023 DSM Plan continues to include incentives for highest efficiency gas equipment as significant opportunities still exist in the market to advance GHG emission reductions through customer adoption of these measures. While the 2023 DSM Plan and FEI's five-year DSM vision include testing and ultimately developing customer programs for the advanced DSM items cited in the Roadmap, incentives for high efficient gas equipment are still required in order to meet provincial objectives. FEI notes that with renewable gas supply growth, continuing to promote installation of this equipment in market will enable both short-term and long-term GHG emission reductions as in the short-term DSM measures will result in immediate GHG emission savings and in the longer-term more renewable gas will come online to further those emission savings." [Exhibit B-1, p.5, underline added, footnote omitted]

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Response:

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Yes, FEI takes into account life expectancy (i.e., measure life) in determining what natural gas energy efficiency opportunities are cost-effective.

37

38

FEI is not concerned that incentives in 2023 for customer adoption of highest efficiency gas equipment will create lost opportunities for non-gas heating solutions. In the absence of FEI's

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1 DSM incentives, customers will generally install the baseline, code-compliant gas appliance rather
2 than a non-gas heating appliance.

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6 2.7 Is FEI confident that when more renewable gas comes online in the longer-term
7 the GHG emissions reductions associated with highest efficiency gas equipment
8 adopted by customers due to incentives in 2023 will be sufficient to meet the
9 requirements of the anticipated Greenhouse Gas Reduction Standard?

10

11 **Response:**

12 FEI has undertaken high-level discussions with the provincial government to inform the approach
13 for the GHG Reduction Standard (GHGRS); however, FEI cannot comment on the sufficiency of
14 its actions to meet the GHGRS as it has not yet been finalized.

15 The objectives underlying this Application are, in part, designed to seek out and optimize energy
16 savings (and consequent GHG emissions reductions) within the DSM Regulation framework
17 through DSM investments that FEI anticipates will be needed in order to comply with the GHGRS.

18

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1 **3.0 Topic: Cost Effectiveness**

2 **Reference: Exhibit B-1, section 5.1.3.1 Zero-Emission Energy Supply Alternative**
3 **(ZEEA), pdf p.28**

4 FEI states on page 23:

5 “The benefits of demand side measures in the standard TRC calculation include
6 the avoided cost of new energy transmission capacity and the avoided cost of the
7 energy. In calculating the MTRC, the ZEEA is applied to these standard benefits
8 in determining the avoided cost of energy. Use of the ZEEA recognizes that
9 avoiding natural gas use has similar GHG emission reduction benefits to that of
10 employing clean electricity to meet that energy need. The ZEEA is defined in the
11 DSM Regulation as BC Hydro’s long run marginal cost (LRMC) of acquiring
12 electricity generated from clean or renewable resources in British Columbia.”
13 [underline added]

14 3.1 Please confirm, or otherwise explain, that the ZEEA applies to the calculation of
15 the TRC, as well as to the calculation of the MTRC, for natural gas savings.

16
17 **Response:**

18 The ZEEA applies to the calculation of the TRC for natural gas saving measures and programs
19 that are specifically intended to assist residents of low-income households. In addition, the ZEEA
20 applies to the calculation of the MTRC for up to 40 percent of natural gas saving measures and
21 programs.

22 Please refer to Sections 5.1.2 and 5.1.3 of the Application for additional details on how the ZEEA
23 is used in cost-effectiveness calculations.

24
25

26
27 3.2 Setting aside the current wording of the definition of Zero-Emission Energy Supply
28 Alternative in the DSM Regulation for the sake of discussion, and assuming the
29 Greenhouse Gas Reduction Standard is adopted as anticipated in the CleanBC
30 Roadmap to 2030, does FEI see a time when the avoided cost of the Zero-
31 Emission Energy Supply Alternative would be based on the cost of Renewable
32 Gas if it is higher than BC Hydro’s LRMC of clean or renewable BC generation?

33
34 **Response:**

35 FEI is unable to comment on prospective changes to the ZEEA. However, FEI believes that
36 renewable gas and zero-emissions electricity supply are complements not substitutes in pathways
37 towards net-zero futures in BC, meaning that baselining low-carbon fuels against one another
38 should be done so as to promote the adoption of both energy solutions.

39

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1 **4.0 Topic: Utilization of Increased Budget**

2 **Reference: Exhibit B-1, Figure 4-1: FEI Annual Total DSM Expenditures 2019 to**
3 **2022, pdf p.19**

4 FEI's proposed 2023 annual total DSM expenditures, at \$141 million, are approximately
5 30% higher than the approved 2022 figure, at \$112 million.

6 4.1 Is FEI confident that it can successfully ramp up its DSM activities in 2023 to fully
7 utilize the substantial increase in the budget over 2022? Please discuss any
8 challenges FEI anticipates in this respect.

9
10 **Response:**

11 FEI is confident that it can successfully ramp up its DSM activities in 2023 to fully utilize the
12 proposed increase in DSM expenditures.

13 FEI has successfully ramped up DSM activities at an even greater rate in the past. For example,
14 DSM expenditures in 2018 and 2019 were \$35.5 and \$64.5 million, respectively. This equates to
15 an increase of approximately 80 percent which is substantially higher than the approximately 30
16 percent increase planned for 2023.

17 Please refer to the response to BCOAPO IR1 2.4 for the factors that could impede FEI's ability to
18 ramp up DSM activities.

19

1 **5.0 Topic: Savings as a Percentage of Throughput**

2 **Reference: Exhibit B-1, Table 1-1: 2023 DSM Plan Expenditures and Savings, p.1**

3 Table 1-1 shows annual energy savings increasing from approximately 1,150,189 GJ in
 4 2022 to 1,601,360 GJ in 2023.

5 5.1 Please provide the accepted 2022 and proposed 2023 DSM annual energy
 6 savings as a percentage of throughput.

7
 8 **Response:**

9 Please refer to the table below which provides the accepted 2022 and proposed 2023 DSM annual
 10 energy savings as a percentage of throughput.

11

	2022 ¹	2023 ²
Annual Forecast Demand	234.1 PJ	221.3 PJ
Annual Energy Savings	1.150 PJ	1.601 PJ
Annual Energy Savings as a Percentage of Throughput	0.49%	0.72%

12

¹ Approved demand per FEI Annual Review for 2022 Delivery Rates.

² Forecast demand per FEI Annual Review for 2023 Delivery Rates.

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1 **6.0 Topic: Provisional Draft 2023 DSM Expenditures Plan**

2 **Reference: Exhibit B-1, Appendix A, FEI 2023 DSM Plan**

3 In June 2022, FEI provided a provisional draft 2023 DSM Expenditures Plan Report to the
4 Energy Efficiency and Conservation Advisory Group for comment.

5 6.1 Please identify and explain any material changes between the provisional draft
6 2023 DSM Expenditures Plan Report and the 2023 DSM Expenditures Plan.

7
8 **Response:**

9 No material changes were made from the provisional draft 2023 DSM Expenditures Plan Report
10 which was provided to the Energy Efficiency and Conservation Advisory Group (EECAG) in June
11 2022 and the 2023 DSM Plan filed as Appendix A in the Application in July 2022.

12

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1 **7.0 Topic: Residential Program Incentive Levels**

2 **Reference: Exhibit B-1, Appendix A, FEI 2023 DSM Plan, Exhibit 9 – Residential**
3 **Home Renovation Program Details by Measure, pdf 54; Exhibit 12 –**
4 **Residential New Home Program Details by Measures, pdf 57**

5 Exhibits 9 and 12 present information on, among other things, incremental cost and
6 incentive levels for the measures in FEI's residential programs.

7 7.1 Does FEI use guidelines or rules of thumb for the relationship between the
8 incremental cost of a measure and the incentive level offered?

9
10 **Response:**

11 FEI does not use a guideline or rule of thumb for the relationship between the incremental cost of
12 a measure and the incentive level offered. Please refer to the response to BCUC IR1 6.1 for the
13 factors FEI considers when determining incentive levels, in addition to incremental cost.

14
15

16
17 7.2 For each measure in Exhibits 9 and 12, please give a brief rationale for the
18 incentive level offered and FEI's assessment of the sensitivity of uptake of the
19 measure to the level of incentive offered. For example, why is the incentive level
20 for an EnerChoice Fireplace greater than the incremental cost, while the incentive
21 level offered for a Condensing Tankless Water Heater is less than one third the
22 incremental cost?

23
24 **Response:**

25 FEI provides the measures in Exhibits 9 and 12 by program offering and the rationale for the
26 incentive level in relation to incremental cost in the tables below.

27 Please refer to the responses to BCUC IR1 6.1 and 6.2 for further details regarding how FEI
28 determines rebate levels in consideration of incremental cost.



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Home Renovation Measures	Incremental Cost (\$)	Incentives (\$)	Rationale for Incentive Level in Relation to Incremental Cost
Furnace	\$1,900	\$840	The incentive amount takes into consideration historical rebate amounts, industry feedback and participation trends. Incentive level has been effective in influencing early replacement of existing equipment.
Communicating Thermostat	\$250	\$150	Incentive takes into consideration Smart Learning Thermostat Pilot results and the additional costs of having the thermostat installed by a licensed contractor.
Communicating Thermostat - Retail	\$250	\$100	Incentive takes into consideration Smart Learning Thermostat Pilot results.
Boiler	\$3,200	\$1,000	The incentive amount takes into consideration historical rebate amounts, industry feedback and participation trends. Incentive level has been effective in influencing early replacement of existing equipment.
Combination System	\$3,091	\$1,200	The incentive amount takes into consideration historical rebate amounts, industry feedback and participation trends. Incentive level has been effective in influencing early replacement of existing equipment.
EnerChoice Fireplace	\$132	\$600*	Please refer to the response to BCUC IR1 6.1.
Condensing Storage Tank Water Heater	\$1,800	\$1,000	The incentive takes into considerations overall market adoption of condensing storage tank water heaters, and alignment of condensing water heater technologies.
Condensing Tankless Water Heater	\$3,300	\$1,000	Industry consultation and historical participation trends indicate that \$1000 is an effective incentive level in driving market transformation toward condensing technologies.
Attic Insulation	\$1,326	\$717	Incremental costs vary across building archetypes, vintages and area being insulated. Incentive levels were determined in collaboration with program partners (FBC, BC Hydro and EMLI) to influence overall increases in R-value and square footage of insulation being installed. Note: Indicated incentives reflect the average rebate value. Insulation incentives are calculated as follows: <ul style="list-style-type: none"> • Attic: \$0.02 x square feet x R-value added • Wall Insulation: \$0.09 x square feet x R-value added • Crawlspace and Basement Insulation: \$0.09 x square feet x R-value added
Wall Insulation	\$2,714	\$900	
Crawlspace and Basement Insulation	\$838	\$824	
Drain Water Heat Recovery	\$738	\$250	Incentive levels take into consideration industry feedback, and alignment with the New Home Program offer. Note: This incentive is not currently available in the Home Renovation Rebate Program.
Bonus Offers	-	\$306	Bonus incentive levels were determined in collaboration with program partners (BC Hydro, EMLI and FBC) to ensure consistency across the Program and drive customers to participate in multiple measures.



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Home Renovation Measures	Incremental Cost (\$)	Incentives (\$)	Rationale for Incentive Level in Relation to Incremental Cost
Appliance Maintenance	-	\$35	Incentive level takes into consideration industry feedback and historical participation trends.
Air Sealing – Contractor Incentive	-	\$500	Incentive level takes into consideration industry feedback regarding costs of blower door tests. Note: This incentive is not currently available in the Home Renovation Rebate Program.
Draftproofing - Door Sweeps and Frame Kits	\$8	\$4	Incentive level takes into consideration historical incentive levels and participation volumes.
Draftproofing - Caulking, Foam, Tapes, Foam Rope	\$6	\$3	Incentive level takes into consideration historical incentive levels and participation volumes.
EnergyStar Washer (\$25)	\$77	\$50	The incentive amount is developed in collaboration with program partners (BC Hydro and FBC) based on providing an amount that would sway the purchase decision to choose an ENERGY STAR certified unit.
ENERGY STAR Dryers	\$50	\$100	Please refer to the response to BCUC IR1 6.1.
Showerheads and Aerators	\$21	\$8	Incentive level takes into consideration historical incentive levels and participation volumes.
High Performance Windows and Doors	\$475	\$100	Incentive takes into consideration industry feedback, and historical program volumes. The incentive was determined in consultation with program partners (BC Hydro, EMLI and FBC) to ensure consistency across the program.

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New Home Measures	Incremental cost (\$)	Incentives (\$)	Reason for an incentive greater than the incremental cost
STEP 2 (Single Family Dwelling)	\$2,632	\$3,000	Please refer to the response to BCUC IR1 6.1.
STEP 2 (Townhome/Rowhome)	\$5,204	\$150	Incremental costs vary across the province based on availability of materials and trade costs, also through variations in building forms. Incentive levels take into consideration industry feedback, as well as historical incentive levels and current participation trends.
STEP 3 (Single Family Dwelling)	\$4,955	\$100	
STEP 3 (Townhome/Rowhome)	\$6,928	\$1,000	
STEP 4 (Single Family Dwelling)	\$9,342	\$1,200	
STEP 4 (Townhome/Rowhome)	\$7,761	600*	
STEP 5 (Single Family Dwelling)	\$17,000	\$10,000	
STEP 5 (Townhome/Rowhome)	\$12,750	\$10,000	
Condensing Storage Tank Water Heater	\$1,590	\$1,000	
Condensing Tankless Water Heater	\$1,790	\$1,000	Please refer to the response reason above for the Home Renovation, Condensing Tankless Water Heater.
Combination Systems	\$3,091	\$1,200	Please refer to the response reason above for the Home Renovation, Combination System.
Drain Water Heat Recovery	\$580	\$250	Please refer to the response reason above for the Home Renovation, Drain Water Heat Recovery.
EnerChoice Fireplace	\$132	\$500	Please refer to the response to BCUC IR1 6.1.
Communicating Thermostat	\$250	\$100	Please refer to the response reason above for the Home Renovation, Communicating Thermostat – Retail.
ENERGY STAR Dryers	\$50	\$100	Please refer to the response to BCUC IR1 6.1.

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1 **8.0 Topic: High Performance Windows and Doors**

2 **Reference: Application, Exhibit B-1, Appendix A, 2023 DSM Expenditures Plan,**
3 **Exhibit 9 – Residential Home Renovation Program Details by**
4 **Measure, pdf 54**

5 Exhibit 9 presents information on High Performance Windows and Doors.

6 8.1 Please explain how FEI arrived at forecast 2023 participation of 15,000 for High
7 Performance Windows and Doors.

8

9 **Response:**

10 The 2023 participation forecast for High Performance Windows and Doors was determined based
11 on historical participation trends from the CleanBC Better Homes Program, which has provided
12 incentives for high performance windows and doors since 2018. Additionally, as a point of
13 clarification, the forecast of 15,000 participants indicates the number of individual new windows
14 or doors installed, as opposed to the number of individual residential buildings upgraded.

15

16

17

18 8.2 Why is the estimated annual gas saving for High Performance Windows and Doors
19 only 0.32 GJ?

20

21 **Response:**

22 For clarity, the estimated annual gas savings per upgraded individual window or door is 0.32 GJs.
23 This value is consistent with the savings value attributed to the High Performance Windows and
24 Doors incentive currently offered through the Home Renovation Rebate and CleanBC Better
25 Homes Program. The incentive is also structured in alignment with program partners FBC and
26 BC Hydro (per rough opening). For example, if 10 high performance windows are installed in a
27 residential building, the estimated annual gas savings for the building would be 3.2 GJs per year.

28

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1 **9.0 Topic: Gas Heat Pumps**

2 **Reference: Exhibit B-1, Appendix A, 2023 DSM Expenditures Plan, section 4.1**
3 **(Commercial) Key Changes in New Plan, p. pdf p.59**

4 The 2023 DSM Expenditures Plan states on page 17 that gas heat pumps have been
5 added to the Prescriptive program in the Commercial program area:

6 “Compared to the previous DSM Plan, the 2023 DSM Plan has the following key
7 updates in the Commercial program area:

8 ...

- 9 • Gas heat pumps and hybrid heating system measures, such as hybrid Rooftop
10 Units (RTUs) have been added under the Prescriptive program. ...”

11 9.1 Please provide justification for adding gas heat pumps to the Prescriptive program
12 in the Commercial program area for 2023.

13
14 **Response:**

15 Commercial gas absorption heat pumps (GAHP) are the next generation of high-efficiency gas
16 technology that can be used for space and water heating, as well as ventilation in the non-
17 residential sectors.

18 There are several factors that the Commercial Program Area considers prior to adding a measure
19 into its Commercial Prescriptive program. These include, but are not limited to:

- 20 • Cost-effectiveness;
- 21 • Market awareness and maturity;
- 22 • Availability of existing data and filling any information gaps (as required);
- 23 • Customer and contractor awareness and acceptance of the underlying technology;
- 24 • Ease of installation; and
- 25 • Supply chain availability and access to local distributor(s).

26 In the case of commercial GAHPs, the Commercial Program Area used actual measurement and
27 verification results from the commercial GAHP pilot projects conducted under the Innovative
28 Technologies Program Area between 2019 to 2021 to determine the feasibility of adding GAHPs
29 as a prescriptive measure for 2023. The pilot, in conjunction with industry data results, showed
30 that the commercial GAHPs are both cost-effective and achieve efficiencies greater than 100
31 percent, with an average Coefficient of Performance (COP) of 1.14. Moreover, the technology
32 achieved high levels of satisfaction among both contractors and pilot participants.



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- 1 Finally, as Commercial GAHPs are available to FEI's commercial and industrial customers, the
- 2 Commercial Program Area added the commercial GAHP measure to its Prescriptive program for
- 3 2023.
- 4

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1 **10.0 Topic: Industrial DSM**

2 **Reference: Exhibit B-1, Appendix A, 2023 DSM Expenditures Plan, Exhibit 4, pdf**
3 **49**

4 Exhibit 4 shows that the TRC for Industrial DSM measures collectively is 2.8 and the UCT
5 is 4.7.

6 10.1 What is FEI's biggest obstacle to achieving more industrial DSM?
7

8 **Response:**

9 FEI is not able to identify the biggest obstacle to achieving more industrial DSM as obstacles are
10 unique to each customer. Obstacles that customers experience are often related to those
11 customers having other priorities over energy efficiency. Examples of these other priorities are:

- 12 • Other productivity focused initiatives;
13 • Other demands on capital;
14 • Electricity energy savings opportunities relative to gas energy savings; and
15 • The need for continuous production processes, which is at odds with the common
16 requirement to interrupt the production process in order to implement energy efficiency
17 measures.
18
19

20
21 10.2 What is FEI doing to increase participation in its industrial DSM programs?
22

23 **Response:**

24 In order to increase participation in industrial DSM programs, FEI is actively engaging and
25 supporting its industrial customers through FEI's Industrial Key Account Managers and Energy
26 Solutions Managers. Through this engagement process, FEI informs industrial customers about
27 the latest FEI programs and offers that may help them reduce natural gas consumption in their
28 facilities. The Industrial Program Area is also evaluating developing case studies tailored toward
29 FEI's industrial customers which showcase successful projects in various sectors.

30 Further, FEI has proposed to increase its planned expenditure in the Strategic Energy
31 Management Program (SEM) under FEI's Industrial Program Area by more than 78 percent in
32 2023, compared to 2021. SEM is an effective way to focus participants on energy saving
33 opportunities and has been shown to increase participation in other Industrial programs outside
34 of SEM.

35

36



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1
2 10.3 Please discuss the sensitivity of participation rates to incentive levels in FEI's
3 Industrial Program area.

4
5 **Response:**

6 As natural gas intensive industries often face capital constraints, incentive levels help to reduce
7 total project costs, increase the motivation of industrial customers to implement energy saving
8 measures, and ultimately, improve participation of FEI's customers in the Industrial Program Area.

9

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1 **11.0 Topic: Rental Apartment Program**

2 **Reference: Exhibit B-1, Appendix A, 2023 DSM Expenditures Plan, Exhibit 26 –**
3 **Commercial RAP Program Details by Measure, pdf p.68**

4 11.1 Does “RAP – Water Heaters (Common Area)” include condensing water heaters?
5 If not, please explain why not.

6
7 **Response:**

8 Yes, the RAP - Water Heaters (Common Area) program includes condensing water heaters.

9

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1 **12.0 Topic: Innovative Technologies**

2 **Reference: Exhibit B-1, Appendix A, 2023 DSM Expenditures Plan, section 8**
3 **Innovative Technologies, pdf p.98**

4 The 2023 DSM Plan states that Deep Retrofits can reduce GHG emissions by 50% or
5 more in residential and commercial buildings:

6 “The Deep Retrofits activities aim to both assess and evaluate energy efficiency
7 technologies, a system of technologies and or building designs that can reduce
8 GHG emissions by 50% or greater in both residential and commercial buildings.”
9 [pdf p.98]

10 Regarding Innovative Technologies, the 2023 DSM Expenditures Plan states under the
11 heading “Key Changes in New Plan”:

12 “Compared to the previous DSM Plan, the 2023 DSM Plan has the following key
13 updates in the Innovative Technologies program area:

14 Expenditures have expanded with incremental expenditures focused on screening
15 and evaluating the following technologies:

- 16 • Residential hybrid heating systems and controls
- 17 • Residential and commercial gas heat pump technologies
- 18 • Deep retrofits
- 19 • Demand response natural gas solutions” [pdf p.98]

20 12.1 How do the other three technology types -- Residential hybrid heating systems and
21 controls, Residential and commercial gas heat pump technologies, and Demand
22 response natural gas solutions – compare with Deep Retrofits in terms of GHG
23 emissions reduction potential?
24

25 **Response:**

26 FEI considers that a portfolio of DSM solutions needs to be available for all different types of
27 customers to support maximizing energy savings regardless of whether one measure may have
28 a lower GHG emission reduction potential than another. FEI addresses each of the technologies
29 identified in the question below.

30 ***Residential Hybrid Heating Systems and Controls***

31 With respect to GHG emission reduction potential of hybrid heating systems and controls,
32 technology screening in the form of a prefeasibility study is currently underway to identify this
33 information including costing inputs and energy savings opportunity to support the development
34 of a hybrid heating early adopter offer for 2023. In addition, FEI is currently conducting field
35 evaluations to understand current state performance of hybrid heating systems that are in the

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1 field to support demand side management efficiency opportunities. FEI is expecting to complete
2 this analysis throughout Q4 2022-Q4 2023.

3 ***Residential and Commercial Gas Heat Pump Technologies***

4 According to a market estimate conducted by Posterity Group, Gas Heat Pumps (GHPs) across
5 FEI's service territory can save approximately 500,000 GJ per year – which converts to a GHG
6 emission reduction of 25,800 kgCO₂e/yr attributed to equipment with efficiencies ranging from
7 1.07 coefficient of performance to 1.4. Moreover, FEI's pilot project data has shown that GHPs
8 can maintain efficiencies greater than 100 percent throughout the year even in colder climates.

9 ***Demand Response Natural Gas Solutions***

10 With respect to the GHG emission reduction potential of demand response natural gas solutions,
11 technology screening in the form of a prefeasibility study is currently underway to identify this
12 information as well as additional information gaps such as costing inputs and energy savings. FEI
13 expects to complete this analysis by Q1 2023.

14 ***Deep Energy Retrofits***

15 According to market estimates conducted by Posterity Group, deep energy retrofits may save
16 approximately 2.9 million GJ per year (which converts into a GHG emission reduction of 149,640
17 kgCO₂e/yr). This estimate is based on the assumption that half of gas-heated, pre-1995 buildings
18 in both single-family and multi-unit residential segments may be suitable candidates for a deep
19 energy retrofit. This includes approximately 274,000 dwellings, representing 26 petajoules of
20 annual gas consumption.

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22

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24 12.2 Will the pilot projects evaluate the GHG emissions reduction performance of the
25 subject technologies?

26

27 **Response:**

28 Yes, the pilot projects will evaluate energy savings and related GHG emission reduction
29 performance of the subject technologies; namely, deep retrofits, hybrid heating, gas heat pumps,
30 and other technologies. These pilot projects will also measure customer acceptance, installation
31 challenges and costs in order to determine the feasibility of future DSM program offerings.

32

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1 **13.0 Topic: Innovative Technologies**

2 **Reference: Application, Exhibit B-1, Appendix A, 2023 DSM Expenditures Plan,**
 3 **Exhibit 65 – Technologies Evaluated for 2023 Pilot Projects, pdf p.99**

4 Exhibit 65 lists and briefly describes 13 projects that are being evaluated for pilot projects
 5 over the period of 2023.

6 13.1 Please indicate the status of each pilot project or potential pilot project in terms of:
 7 a) FEI’s commitment to pilot the project in 2023 and b) how close the technology
 8 or measure is to being able to be deployed in a DSM program.

9
 10 **Response:**

11 The following table provides a summary of the proposed pilot project activities across the 2023
 12 DSM Plan period along with the current status of each project and its forecast completion date.

13 Please note that at the time of filing, FEI does not know when the technology or measure will be
 14 deployed into a future DSM program as this decision will ultimately depend on a variety of outputs
 15 from the pilot project, including cost-effectiveness, customer acceptance, installation challenges
 16 and other programmatic considerations such as contractor training, supply chain constraints and
 17 customer education.

#	Technology	Description	Pilot Status	Forecast Pilot Completion Date
1	Gas Heat Pumps	Gas heat pumps are used for space heating, water heating, ventilation and cooling for commercial and residential sectors. Technology manufacturers are developing three types of gas heat pump technologies: engine-driven vapor compression, sorption (absorption / adsorption), and thermal compression. Each type uses different refrigerants and pressurization methods to essentially move heat from an external heat source to a heat sink (indoors) using natural gas resulting in system efficiencies greater than 100 percent.	Pilot activities are underway as well as currently planned for 2023.	2023-2025
2	Hybrid Heating	A dual fuel hybrid heating system consists of a gas and electric heating system that is sequentially operated to meet heating needs to reduce costs and GHG emissions for building owners. Using hybrid heating systems claims to reduce the number of hours that electric heat pumps are required to operate at lower efficiencies during colder days, leading to reduced electric peak demand. The system also supports annual system efficiencies greater than 100 percent, resulting in less GHG emissions.	Pilot activities are underway as well as currently planned for 2023.	2023

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#	Technology	Description	Pilot Status	Forecast Pilot Completion Date
4	Demand Response Natural Gas Solutions	Digital demand response technologies that can offer pathways to support events to reduce system capacity restraints with customers and reduce energy consumption and related GHG emissions.	Planned activity for 2023.	2025
5	Deep Retrofits	A deep energy retrofit, or ‘deep retrofit’ of a home or building, is a retrofit in which the envelope and energy systems are improved such that there is a reduction in overall energy consumption and GHG performance by at least 50 percent or more. Considering the home as a system and improving the thermal performance of the envelope will reduce the heat demand and therefore creates a potential opportunity to downsize the required energy system. Across FEI’s service territory, there is a significant base of buildings that are at least 25 years old and built before the adoption of the National Energy Code for buildings. The Conservation Potential Review study (CPR), conducted by Posterity Group (an energy consultancy company) estimates an eligible market of 274,000 dwellings and an annual energy savings potential of 890,000 GJ per year through leveraging comprehensive deep retrofit improvements.	Underway.	2024-2025
6	Prefabricated Panelized Solutions	Prefabricated panelized solution is a methodology to reduce the construction time by integrating several thermal performance improvement measures together into a prefabricated wall or roof panel. These panels are fabricated in advance in a controlled environment inside a factory. These prefabricated panels will be attached to the existing building envelope onsite and in a short period of time.	Planned activity for 2023.	2024-2025
7	AI-based Energy Performance Evaluation	Artificial Intelligence based energy performance evaluation combines publicly available information with machine learning and provides home energy performance evaluation with current average of 80 percent accuracy. Leveraging this technology can improve scalability of deep retrofits while driving the cost down.	Underway.	2023
8	Building Mapping Solutions	Most older existing buildings do not have current architectural and mechanical plans. This can be a barrier for energy performance evaluation and deep retrofit implementation. Building mapping solutions provides dimensional and visual information for existing buildings and facilitates documenting the post retrofit condition.	Underway.	2023

#	Technology	Description	Pilot Status	Forecast Pilot Completion Date
9	Non-intrusive Air Sealing Technologies	Improving airtightness is a deep retrofit measure that can provide significant impact on energy use reduction for a reasonable cost. Most often the destruction associated with improving the airtightness through conventional methods lowers the adoptability of this measure and non-intrusive Air Sealing technologies can remove such a barrier and improve market acceptance.	Underway.	2023
10	Thermal Bridging	Eliminating thermal bridging in existing buildings is one of the deep retrofit measures to improve thermal performance of the envelope. The improvement level depends on the archetype, construction assembly and current condition of the building.	Planned activity for 2023.	2024-2025
11	Embodied Carbon	Embodied Carbon is a relatively newer consideration for lowering energy use and its associated GHG emissions in new and existing buildings. FortisBC will explore whether implementing a deep retrofit enhances the life of an existing building as well as the prevention of embodied carbon attached to its demolition.	Underway.	2023-2024
12	Fault Detection and Diagnostics (FDD)	FDD supports buildings with identifying maintenance and design issues. The technology helps enhance operation sequencing and increasing awareness of building operators. This awareness can help optimize systems resulting in reduced consumption.	Underway.	2023-2024
13	Automated Analytics	Advanced building automated analytics in conjunction with energy management information systems (EMIS) is used to increase the implementation of energy conservation measures.	Underway.	2023

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13.2 How did FEI determine the budget for each pilot project or potential pilot project?

Response:

FEI determined the budget for each pilot project by gathering input from technology screening activities, including technology prefeasibility studies, historical pilots and benchmarking data, as well as gathering inputs from industry stakeholders such as manufacturers, utilities and trades. Although the budget may vary based on the level of information gaps that exist, the main contributors include the following:

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- 1 • Technology and installation cost;
- 2 • Participant sample size;
- 3 • Participant geographical location;
- 4 • Technology and installation training expenses;
- 5 • Technology measurement and verification equipment and evaluation reporting expenses;
- 6 • Program implementation and administration expenses; and
- 7 • Program communication and recruitment expenses.

8
9

10

11 13.3 Please describe the Hybrid Heating pilot project in greater detail, including what
12 types of equipment is being tested and under what conditions, how FEI expects
13 this technology would be deployed, and what FEI estimates as the potential
14 benefits to be, including energy and GHG reduction benefits.

15

16 **Response:**

17 Hybrid heating systems, also known as dual fuel systems, consist of an electric air source heat
18 pump and a natural gas furnace that are paired with controls to sequentially operate to meet the
19 cooling and heating needs for homeowners. Hybrid heating systems can reduce energy
20 consumption and GHG emissions by operating the electric heat pump for primary heating at
21 moderate to cooler outdoor temperatures and then switching over to a natural gas furnace during
22 colder winter temperatures, to have efficient, resilient and affordable heating. Using a hybrid
23 heating system with a natural gas back up reduces the number of hours that the electric heat
24 pumps are required to operate at a lower efficiency during colder days, leading to reduced electric
25 peak demand impacts, while also supporting system efficiencies greater than 100 percent.

26 At the time of filing, FEI has not confirmed the energy savings, GHG emission reduction or optimal
27 temperature set point estimates for hybrid heating systems, and as such, FEI is currently
28 conducting a dual fuel hybrid heating pre-feasibility study to address information gaps and inform
29 measure input assumptions and incremental costs. In addition, as described below, FEI is
30 conducting a two-phased pilot project to further assess and quantify energy savings, customer
31 acceptance and installation processes:

- 32 • **Phase 1:** Launching in 2022, the objective of this phase is to assess the performance and
33 customer acceptance of hybrid heating systems that are already installed in the field. Up
34 to 75 customers will participate in billing analysis and an evaluation survey which is
35 expected to be complete by Q4 2022. From the 75 customers, FEI will select 25 customers
36 to undergo sub-metered measurement and verification evaluation for a one-year period to
37 quantify energy savings and determine the performance of the dual fuel system. Results
38 are expected throughout Q4 2022-Q4 2023.

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- 1 • **Phase 2:** Launching in 2023, the objective of this phase is to support the development
2 and implementation of a hybrid heating early adopter offer. This phase will focus on the
3 installation of new hybrid heating systems as a “system approach” with integrated controls
4 to learn how to optimize system performance and efficiencies from a DSM perspective.
5 Installations will be targeted across climate zones 4, 5 and 6 and will be evaluated to
6 compare to Phase 1. Planning of this program will take place in Q4 2022 and will target to
7 be in market for Q2 2023.
8