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September 12, 2022

British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, B.C.
V6Z 2N3

Attention: Ms. Sara Hardgrave, Acting Commission Secretary

Dear Ms. Sara Hardgrave:

Re: FortisBC Energy Inc. (FEI)

Revised Renewable Gas Program Application – Stage 2 (Application)

Response to the British Columbia Utilities Commission (BCUC) Information Request (IR) No. 2

On December 17, 2021, FEI filed the Application referenced above. In accordance with the amended regulatory timetable established in BCUC Order G-165-22A for review of the Application, FEI respectfully submits the attached response to BCUC IR No. 2.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

cc (email only): Registered Parties

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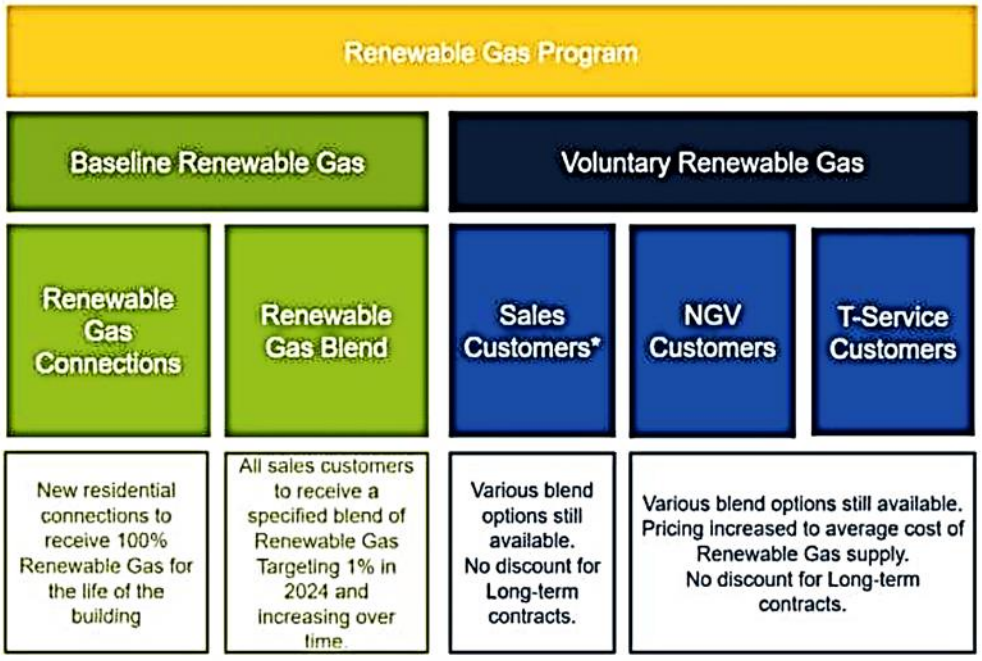
A. GENERAL

45.0 Reference: GENERAL

Exhibit B-11 (Application), Section 1.1, Figure 1-1, pp. 2-3 and Appendix D; BCUC Order G-165-22A, pp. 7-9 and Appendix C

Approval Sought

On pages 2-3 of the Application, FEI provides the following figure to illustrate its proposed Renewable Gas (RG) Program:



FEI has included Proposed Tariff Revisions in Appendix D of the Application.

As noted in Order G-165-22A dated June 16, 2022, FEI supports amending the Application to only focus on Renewable Natural Gas (RNG) to simplify the proceeding and to focus on the design of the revised program. The BCUC found that this proceeding should be scoped to include only RNG, as outlined in Appendix C of Order G-165-22A.

45.1 Considering this proceeding's scope now focuses on RNG, please explain how each of the FEI approvals sought will be affected, if at all.

Response:

None of the approvals sought in this Application are affected by limiting the focus of the current Application to RNG, rather than Renewable Gas more broadly. Please refer to the response to BCUC IR2 45.2 which discusses how FEI intends to file revised tariffs to reflect the revised scope and any other directions from the BCUC after its decision in this proceeding.

FEI will apply to the BCUC to incorporate other forms of Renewable Gas supply into the program design and tariff offerings at a future date.

45.1.1 Please confirm, or explain otherwise, that all proposed rates (or rate setting methodologies) in the Baseline Renewable Gas or in the Voluntary Renewable Gas programs remain unchanged.

Response:

Confirmed. All proposed rate-setting methodologies in the Baseline Renewable Gas and in the Voluntary Renewable Gas offerings remain unchanged. For clarity, FEI is not seeking an approval from the BCUC for specific rates in this Application, but rather the rate-setting methodologies and associated changes to FEI's General Terms and Conditions to implement the Renewable Gas Program rate design. After receiving approval of the rate-setting methodologies from the BCUC, the rates themselves will be set in a future proceeding.

Please refer to Sections 8.4.1 and 8.4.2 of the Application and the response to BCUC IR1 44.3 for a description of the annual rate-setting process.

45.1.2 Please discuss whether the RG Program, or any of its components including RG Connections, RG Blend and Voluntary RG Offering, should be renamed to "RNG." For example, RNG Program, RNG Connections, RNG Blend and Voluntary RNG Offering.

Response:

FEI does not believe that renaming any of the components of the revised Renewable Gas Program is required. As described in the Application,[1] FEI uses the term "Renewable Gas" to refer collectively to the low carbon gases or fuels that the utility can acquire under the *Greenhouse Gas Reduction (Clean Energy) Regulation* (GGRR), which are: renewable natural gas (RNG or biomethane), hydrogen, synthesis gas and lignin. FEI is not seeking approval of the program's naming conventions used in the Application and may include different terminology in its communications to the public when implementing the revised Renewable Gas Program.

45.2 Please confirm that FEI will file amended tariff revisions after the BCUC renders its final decision on FEI's application. If FEI wishes to file tariff pages now to reflect this proceeding's scope, please provide them.

Response:

Confirmed. FEI intends to file amended tariff revisions after the BCUC issues its final decision on the Application. These amended tariffs would remove references to hydrogen, lignin and syngas along with any additional amendment(s) arising from the BCUC's decision.

[1] Application, pg. 1, lines 10-13.

B. GAS SUPPLY AND DEMAND

46.0 Reference: EVOLUTION OF CLIMATE CHANGE POLICY

Exhibit B-11-1, Section 8.6, Figure 8-3, p. 122; Exhibit B-17, Section A, BCUC IR 1.1, Section D, IR 12.2.1

Clean BC Roadmap

The Application, along with several BCUC IRs, is premised on FEI acquiring approximately 30 petajoule (PJ) of RG by 2030 under the Greenhouse Gas Reduction Regulation (GGRR), as shown in Figure 8-3 of the Application:

Figure 8-3: Forecast Volumes of Renewable Gas Supply, Customer Demand and Allocation to Sales Customers (PJ)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Supply - H2, Syngas, Lignin	0.0	0.0	0.0	0.7	1.9	3.1	4.9	6.6	8.3	10.0	14.3	18.5
Supply - RNG	0.7	4.0	8.1	11.4	13.1	15.3	16.5	17.6	18.8	20.0	21.5	23.0
Demand - Renewable Gas Blend	0.0	0.0	0.0	5.5	6.4	6.9	8.2	9.3	10.6	11.8	16.1	20.2
Demand - Renewable Gas Connections	0.0	0.0	1.6	3.1	4.6	6.0	7.5	8.9	10.4	11.8	13.2	14.6
Demand - Voluntary Renewabe Gas	0.7	3.0	3.7	5.0	5.3	5.5	5.7	6.0	6.2	6.4	6.5	6.6

In its response to BCUC IR 1.1, FEI stated:

> The referenced cap of 6.11 Mt of CO2e refers to the cap on GHG emissions required from all gas utilities in British Columbia by 2030 in the CleanBC Roadmap, which FEI expects the provincial government will implement as the Greenhouse Gas Reduction Standard (GHGRS). […] To achieve the cap, a reduction from 2007 GHG emissions levels of 47 percent or approximately 5.5 Mt is required. FEI's portion of that reduction is approximately 5.3 Mt of CO2e per year. […] Based on these assumptions, approximately 59 PJ of Renewable Gas (50 kgCO2e/GJ X 59 PJ Renewable Gas = 2.950 Mt reduction) would be required to achieve the 2.9 Mt of reductions and, in combination with the other GHG reduction strategies, the GHG reduction cap. [Emphasis added]

46.1 Based on FEI's estimates, FEI will need approximately 59 PJs of RG to meet the Greenhouse Gas (GHG) reduction cap under the CleanBC Roadmap, instead of the 30 PJs modelled in the Application. Considering this almost doubling of RG required to be in the gas system by 2030, please revise the responses that were provided under the following BCUC IRs:

BCUR IR 12.3.1	If so, please estimate the resulting percentage of RG blend in FEI's system and the resulting [Storage and Transport Low Carbon] S&T LC rider in 2030, relative to the 2030 levels of both blend and S&T LC rider if the Application were to be approved as proposed (in real 2022 dollars).
BCUC IR 12.3.2	Please revise Figures 8-4 to 8-6 to reflect an RG Program with only the RG Blend and Voluntary RG offerings, adding the years 2022 and 2030 to these graphs. In estimating these annual bills, please consider the increase in delivery rates and storage and transport rates resulting from a loss of throughput due to losing the new construction sector. Please provide the calculations using real 2022 dollars, state all assumptions used, and provide a fully functioning Excel spreadsheet supporting the calculations.
BCUC IR 23.1/23.1.1	If the RG program consisted of only the RG Blend offering (meaning, there would be no RG Connections or Voluntary RG for sales customers offerings), […] please indicate what would be the percentage of RG in the RG Blend offering each year for the next 10 years.
BCUC IR 41.4	For each service type (Renewable Gas Connections, Voluntary Renewable Gas for sales customers and remaining sales customers), please calculate the percentage bill increase from 2022 to 2030 for customers in each of [Rate Schedule] RS 1, RS 2 and RS 3. **Please update Table 1.**

Response:

In the requested updates to the referenced IR responses provided below, FEI has limited its updates to the five-year supply and demand forecasts time period (i.e., up to the year 2028) in accordance with the BCUC's scoping decision in Order G-165-22A. Please also note that while FEI estimates that it will require 59 PJ of Renewable Gas to meet CleanBC targets FEI is still constrained by current legislation limiting Renewable Gas supply to approximately 30 PJ and has therefore not solidified plans on how the utility would acquire 59 PJ of Renewable Gas by 2030. For this response, FEI has used the acquisition curve from the Application, which was developed assuming FEI would acquire 30 PJ of Renewable Gas by 2030, and has applied that acquisition curve such that FEI would reach 59 PJ of Renewable Gas by 2030. This is a simplifying assumption which shows acquisitions of approximately 7.9 PJ in 2022 but, to be clear, FEI doesn't expect to be able to acquire 7.9 PJ of Renewable Gas in 2022.

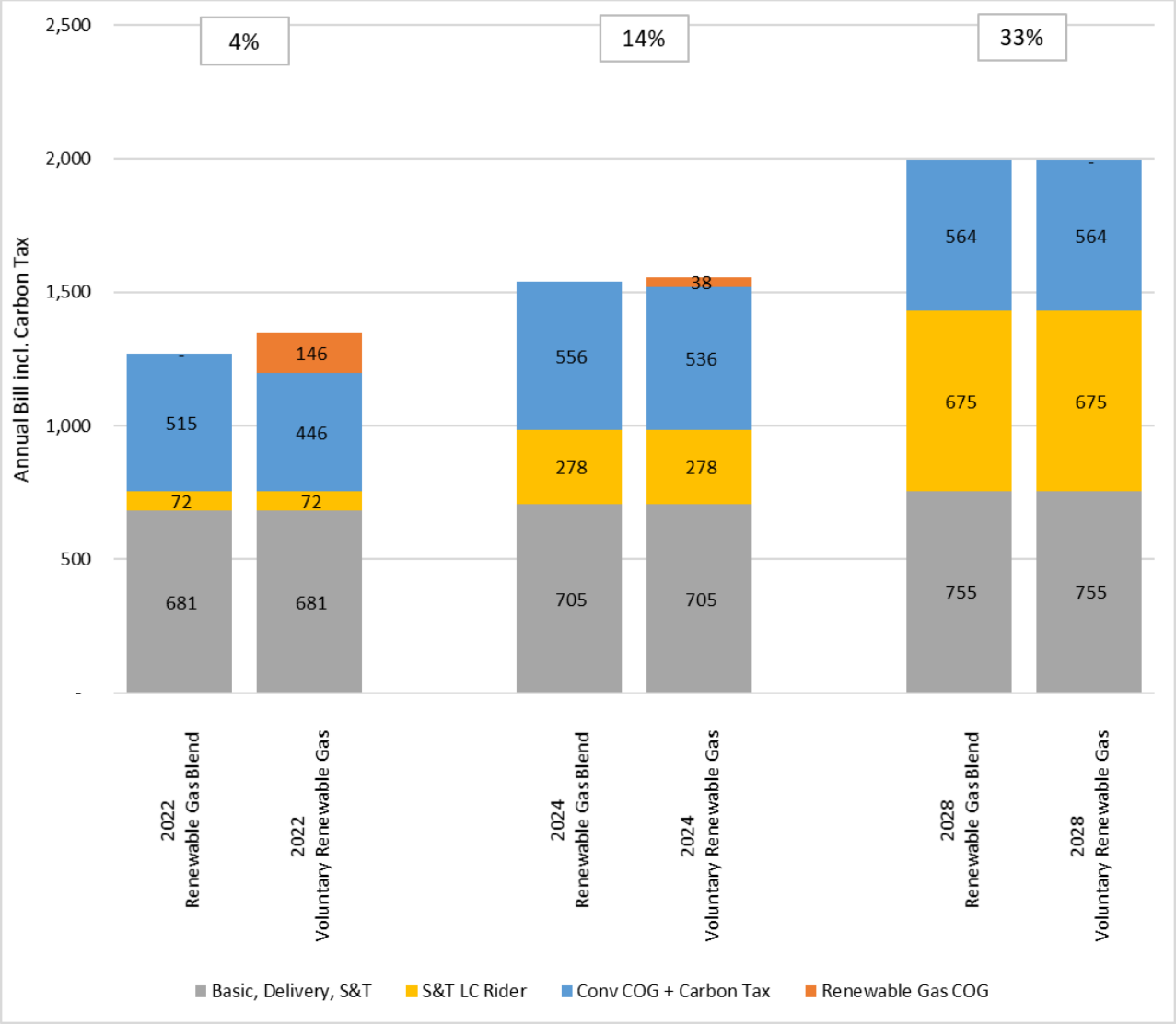
BCUC IR1 12.3.1

In the absence of the Renewable Gas Connections service, and based on FEI acquiring 59 PJ of Renewable Gas by 2030, FEI estimates that the Renewable Gas Blend for all sales customers would increase to 33 percent (from 6 percent) in 2028 (equating to 48 PJ of supply in 2028) and the S&T LC rider would increase from an estimated $2.17 to $7.21 per GJ (both in real 2022$) in 2028.

BCUC IR1 12.3.2

FEI has provided the requested Figures 8-4 through 8-6 below, reflecting the 59 PJ of Renewable Gas by 2030, constraining the final year to 2028 and under the assumption that there is no Renewable Gas Connections service.

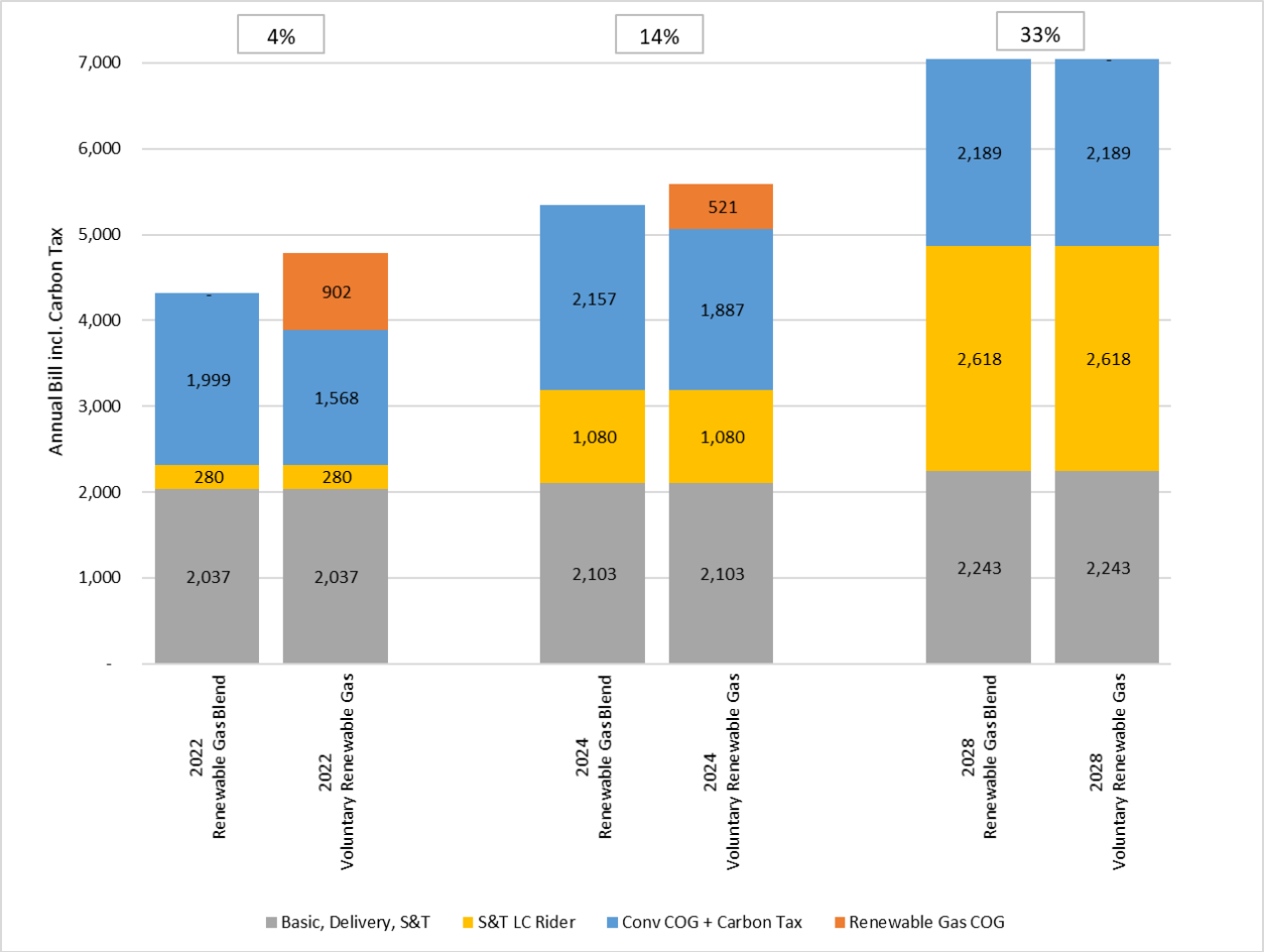
Requested Figure 8-4: Annual Bill for Rate Schedule 1 (Renewable Gas Connections Demand Removed)



With the loss of the new construction sector without the Renewable Gas Connections service, and if FEI acquires 59 PJ of Renewable Gas supply by 2030, the annual bill for an RS 1 customer in 2028 will equal $1,994 in real 2022 dollars or a 57 percent[2] increase from the 2022 annual bill.

[2] 57 percent increase is for an RS 1 Renewable Gas Blend customer whereas the increase is 48 percent for an RS 1 Voluntary Renewable Gas customer

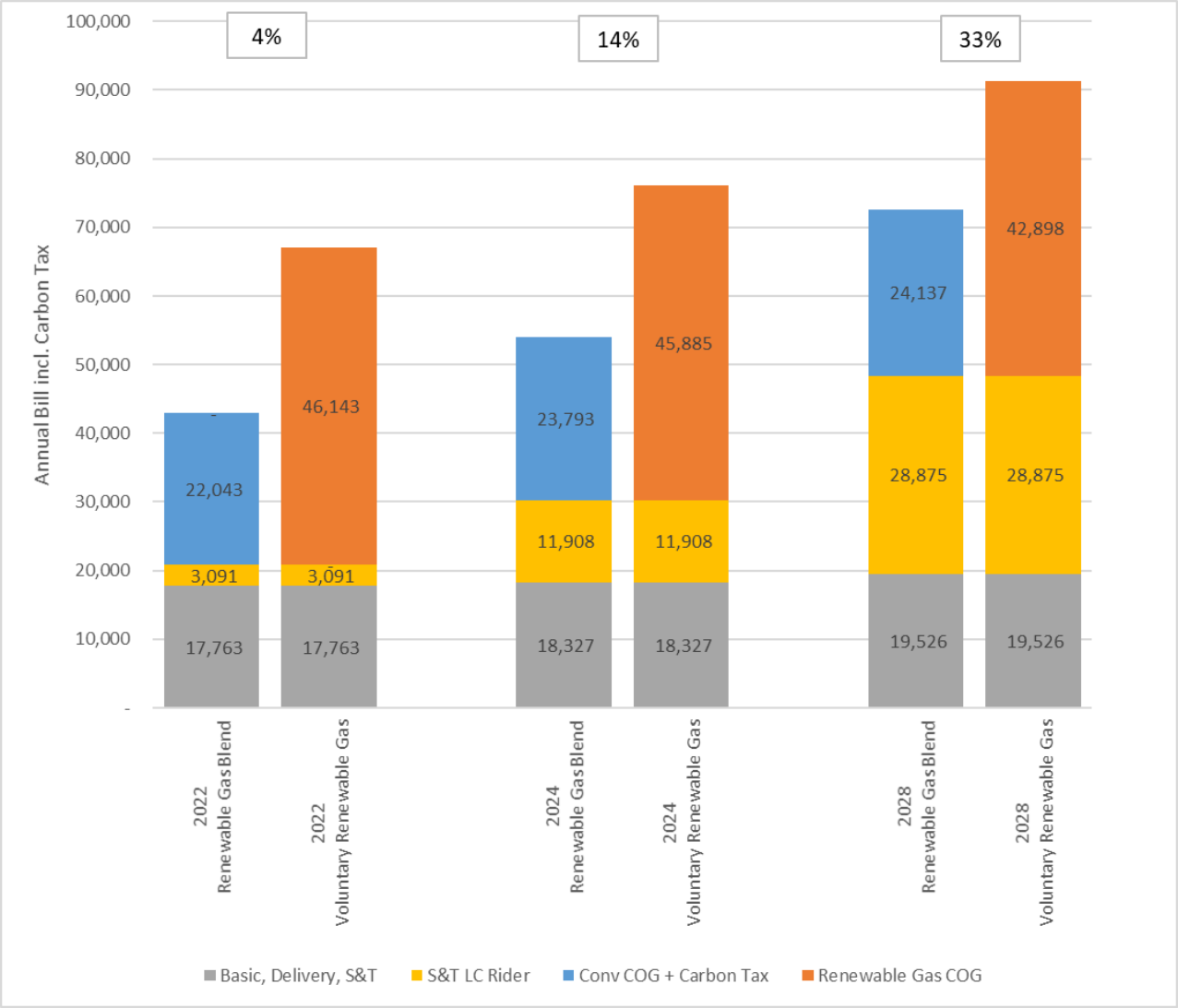
Requested Figure 8-5: Annual Bill for Rate Schedule 2 (Renewable Gas Connections Demand Removed)



With the loss of the new construction sector without the Renewable Gas Connections service and if FEI acquires 59 PJ of Renewable Gas supply by 2030, the annual bill for an RS 2 customer in 2028 will equal $7,050 in real 2022 dollars or a 63 percent[3] increase from the 2022 annual bill.

[3] 63 percent increase is for an RS 2 Renewable Gas Blend customer whereas the increase is 47 percent for an RS 2 Voluntary Renewable Gas customer

Requested Figure 8-6: Annual Bill for Rate Schedule 3 (Renewable Gas Connections Demand Removed)



With the loss of the new construction sector without the Renewable Gas Connections service and if FEI acquires 59 PJ of Renewable Gas supply by 2030, the annual bill for an RS 3 customer in 2028 will equal $72,539 in real 2022 dollars or a 69 percent[4] increase from the 2022 annual bill.

[4] 69 percent increase is for an RS 3 Renewable Gas Blend customer whereas the increase is 36 percent for an RS 3 Voluntary Renewable Gas customer

BCUC IR1 23.1/23.1.1

FEI has provided the Renewable Gas Blend percentages in the updated Table 1 below, assuming that FEI acquires 59 PJ of Renewable Gas by 2030, and assuming that the Renewable Gas Program consists of only the Renewable Gas Blend service.

Updated Table 1: Expected Renewable Gas Blend (%)

Year	2023	2024	2025	2026	2027	2028
Percent RG Blend	11%	17%	21%	27%	32%	36%

BCUC IR1 41.4

FEI has updated Table 1 from the response to BCUC IR1 41.4 assuming that FEI acquires 59 PJ of Renewable Gas by 2030, assuming that all three components of the Renewable Gas Program are in place and correcting carbon tax from nominal to real 2022$.

Updated Table 1: Annual Bill in Real 2022 Dollars and Yearly Percent Change

	2022	2023	2024	2025	2026	2027	2028
Percent of Renewable Gas Delivered via the S&T LC Rider	0%	0%	16.3%	16.6%	17.2%	19.4%	22.0%
Rate Schedule 1							
RG Blend Annual Bill	1,202	1,257	1,569	1,640	1,711	1,798	1,860
RG Blend Annual Bill Change		*5%*	*25%*	*4%*	*4%*	*5%*	*3%*
RG Blend Cumulative Annual Bill Change		*5%*	*30%*	*34%*	*38%*	*43%*	*46%*
RG Connections Annual Bill	1,202	1,257	1,569	1,640	1,711	1,798	1,860
RG Connections Annual Bill Change		*5%*	*25%*	*4%*	*4%*	*5%*	*3%*
RG Blend Cumulative Annual Bill Change		*5%*	*30%*	*34%*	*38%*	*43%*	*46%*
RG Voluntary Annual Bill	1,297	1,352	1,569	1,640	1,711	1,798	1,860
RG Voluntary Annual Change		*4%*	*16%*	*4%*	*4%*	*5%*	*3%*
RG Blend Cumulative Annual Bill Change		*4%*	*20%*	*24%*	*28%*	*33%*	*36%*
Rate Schedule 2							
RG Blend Annual Bill	4,070	4,284	5,494	5,768	6,045	6,384	6,622
RG Blend Annual Bill Change		*5%*	*28%*	*5%*	*5%*	*6%*	*4%*
RG Blend Cumulative Annual Bill Change		*5%*	*33%*	*38%*	*43%*	*49%*	*53%*
RG Connections Annual Bill	4,070	4,284	5,494	5,768	6,045	6,384	6,622
RG Connections Annual Bill Change		*5%*	*28%*	*5%*	*5%*	*6%*	*4%*
RG Blend Cumulative Annual Bill Change		*5%*	*33%*	*38%*	*43%*	*49%*	*53%*
RG Voluntary Annual Bill	4,613	4,827	5,670	5,937	6,198	6,489	6,668
RG Voluntary Annual Bill Change		*5%*	*17%*	*5%*	*4%*	*5%*	*3%*
RG Blend Cumulative Annual Bill Change		*5%*	*22%*	*27%*	*31%*	*36%*	*39%*
Rate Schedule 3							
RG Blend Annual Bill	40,255	42,621	55,967	58,987	62,034	65,779	68,401
RG Blend Annual Bill Change		*6%*	*31%*	*5%*	*5%*	*6%*	*4%*
RG Blend Cumulative Annual Bill Change		*6%*	*37%*	*42%*	*47%*	*53%*	*57%*
RG Connections Annual Bill	40,255	42,621	55,967	58,987	62,034	65,779	68,401
RG Connections Annual Bill Change		*6%*	*31%*	*5%*	*5%*	*6%*	*4%*
RG Blend Cumulative Annual Bill Change		*6%*	*37%*	*42%*	*47%*	*53%*	*57%*
RG Voluntary Annual Bill	65,143	67,510	76,803	79,752	82,630	85,835	87,815
RG Voluntary Annual Bill Change		*4%*	*14%*	*4%*	*4%*	*4%*	*2%*
RG Blend Cumulative Annual Bill Change		*4%*	*18%*	*22%*	*26%*	*30%*	*32%*

In calculating the bill impacts, FEI assumed that the Voluntary Renewable Gas customers were already electing a percentage of Renewable Gas. Because of this, the bill impacts in 2024 are lower for these customers than the bill impacts for Renewable Gas Blend customers. In contrast,

Renewable Gas Blend customers are moving from no Renewable Gas to approximately 16 percent in 2024.

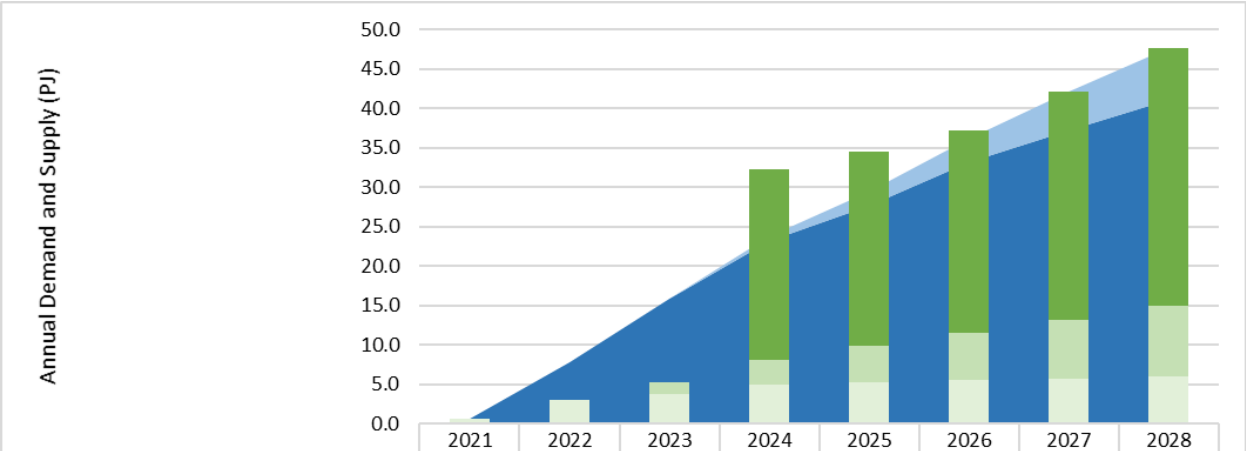
46.2 Please revise Figure 8-3 of the Application to consider the scope set out in Order G-165-22A to focus on RNG. In particular, please provide a graph with RNG supply only and with the associated demand for RG Blend, RG Connections and Voluntary RG for the next five years (e.g., 2023 to 2028) or through to 2030.

Response:

When FEI expressed its agreement with limiting the scope of this Application to RNG, FEI was clear that this was not an indication that FEI's plans to acquire hydrogen, syngas or lignin had changed. FEI continues to pursue the acquisition and utilization of all forms of Renewable Gas currently enabled by the GGRR, including hydrogen, syngas and lignin, among other pathways to reduce its carbon emissions. FEI will address the acquisition, utilization and pricing (rates) of the other renewable gases in future applications.

FEI has provided the following graph out to 2028 assuming FEI acquires 59 PJ of Renewable Gas by 2030 and that the additional 29 PJ of Renewable Gas (additional to FEI's 30 PJ of Renewable Gas as set out in the Application) will be acquired as RNG.

Revised Figure 8-3: Forecast Volumes of Renewable Gas Supply, Customer Demand and Allocation to Sales Customers (PJ)



	2021	2022	2023	2024	2025	2026	2027	2028
Supply - H2, Syngas, Lignin	0.0	0.0	0.0	0.7	1.9	3.1	4.9	6.6
Supply - RNG	0.7	7.9	15.9	23.1	27.6	33.1	37.2	41.0
Demand - Renewable Gas Blend	0.0	0.0	0.0	24.2	24.6	25.6	28.9	32.7
Demand - Renewable Gas Connections	0.0	0.0	1.6	3.1	4.6	6.0	7.5	8.9
Demand - Voluntary Renewabe Gas	0.7	3.0	3.7	5.0	5.3	5.5	5.7	6.0

FEI notes that the increased acquisition of Renewable Gas will not affect voluntary demand, nor the demand through the Renewable Gas Connections service, so the incremental supply will flow to customers through the Renewable Gas Blend service. For purposes of this response, FEI has assumed the Renewable Gas Blend is approved and FEI starts delivering inventoried and newly acquired Renewable Gas to customers through the Renewable Gas Blend service in 2024. As a result and as can be seen on the graph, FEI will be acquiring and inventorying RNG in 2022 and 2023 until a decision is made on this Application.

47.0 Reference: EVOLUTION OF CLIMATE CHANGE POLICY

Exhibit B-17, Section A, BCUC IRs 1.1 and 2.2

CleanBC Roadmap Targets

In response to BCUC IR 1.1, FEI stated:

The referenced cap of 6.11 Mt of CO2e refers to the cap on GHG emissions required from all gas utilities in British Columbia by 2030 in the CleanBC Roadmap, which FEI expects the provincial government will implement as the Greenhouse Gas Reduction Standard (GHGRS).

[….]

FEI first updated the GHG reduction potential of the key GHG mitigation strategies in the Pathways Report, other than volumes of Renewable Gas. These key GHG mitigation strategies are as follows:

- **Energy efficiency in buildings**: For residential and commercial energy efficiency, emission reduction potential was determined using the 2021 Conservation Potential Review (2021 CPR). The 2021 CPR estimates the energy savings and subsequent GHG reduction potential of different levels of utility energy efficiency incentives and consumer participation. The high scenario assumes that 1.3 Mt of GHGs could be reduced by 2030.
- **Energy efficiency and electrification in industry**: Energy efficiency and electrification of industrial load was guided by modelling conducted by Guidehouse and informed by the 2015 CPR. This was assumed to generate 0.3 Mt of GHG reductions for energy efficiency and 0.3 Mt of GHG reductions for electrification.
- **Carbon capture and sequestration (CCS)**: For CCS, Guidehouse estimated potential GHG reductions for end-use gas consumption such as in the cement sector. It was assumed that this could accomplish 0.6 Mt of GHG reductions.

Altogether, the GHG emissions reductions from the above-described GHG mitigation strategies amount to approximately 2.5 Mt. An additional 2.9 Mt of reductions is required to make up FEI's proportion of the cap to bring it to 5.4 Mt of reductions.

[…]

Further, FEI assumed that the carbon intensity of FEI's Renewable Gas supply portfolio as of 2021 would be approximately 10 kgCO2e per GJ until 2030, resulting in a net GHG reduction of 50 kgCO2e per GJ (which assumes a lifecycle carbon intensity of pipeline natural gas of approximately 60 kgCO2e per GJ).

Based on these assumptions, approximately 59 PJ of Renewable Gas (50 kgCO2e/GJ X 59 PJ Renewable Gas = 2.950 Mt reduction) would be required to achieve the 2.9 Mt of

reductions and, in combination with the other GHG reduction strategies, the GHG reduction cap. [footnotes omitted]

47.1 Please discuss whether there are barriers to achieving the forecast GHG reductions from energy efficiency in buildings, energy efficiency and electrification in industry, and CCS such that the forecast GHG reductions from these sources do not materialize in the amounts by 2030 or for the next five years (i.e., 2023-2028). What are FEI's plans to overcome these barriers?

47.1.1 Assuming the same assumptions used to derive the 59 PJ of renewable gas required to meet a 2.950 Mt reduction in GHG emissions, please explain how much renewable gas is needed to meet FEI's proportion of the CleanBC Roadmap cap of 5.9 Mt reduction in GHG emissions if the GHG reductions from energy efficiency in buildings, energy efficiency and electrification in industry, and CCS is:

a. 75 percent as effective as forecasted

b. 50 percent as effective as forecasted

c. 0 percent as effective as forecasted

Response:

FEI respectfully submits that measures of GHG reduction achieved from energy efficiency in buildings, energy efficiency and electrification in industry, and CCS are beyond the scope of this proceeding, as determined by scoping Order G-165-22A. The Order identifies that the Application is focused on the design of the revised Renewable Gas Program, the available service offerings and pricing of those offerings, and RNG supply and demand through to 2028. This IR is, however, relevant to FEI's 2022 Long Term Gas Resource Plan (LTGRP) where energy efficiency in buildings, energy efficiency and electrification in industry, and CCS are included as pathways to achieving GHG reductions as set out in the CleanBC Roadmap.

As it pertains to matters within the scope of this Application, FEI expects to procure sufficient RNG (biomethane) supply to meet Renewable Gas demand requirements and the forecast in GHG reductions, although barriers exist that need to be overcome. In the response to BCUC IR1 2.2, FEI describes supply strategies to overcome potential barriers to procuring RNG. For example, key RNG supply growth measures include those where:

- FEI is procuring and sourcing RNG from both within Canada and the United States. By purchasing RNG outside of Canada, FEI is diversifying supply, thus ensuring that pricing is competitive and that there will be ample RNG to meet the needs of its customers.
- FEI has developed a network of RNG suppliers to mitigate risk due to ramp-up time required for a project to reach expected volumes.
- FEI has added an additional assurance of supply by using a portfolio approach, such as with the Archaea agreement, where supply is provided from a number of sites.

- FEI is working to understand any potential policy barriers related to the accounting of environmental attributes across Canada that could impact supply and, if they exist, will identify how they can be overcome.

47.2 Please provide rationale for assuming that FEI's renewable gas portfolio will have a carbon intensity of 10kgCO2e per GJ until 2030 and discuss the likelihood that the carbon intensity of FEI's renewable gas portfolio could be significantly different by 2030.

Response:

The value of approximately 10 kgCO2e per GJ referenced in the response to BCUC IR1 1.1 reflects FEI's conservative estimate and it aligns with the burner tip carbon intensity of FEI's Renewable Gas supply portfolio over the 20-year term of the 2022 Long Term Gas Resource Plan (LTGRP). Although there is a likelihood that the carbon intensity could be lower in 2030 based on the current portfolio of RNG projects that FEI expects to come online over the next few years, but actual operational data will be needed to confirm the values. This value is aligned with calculations performed for the Province to assess the quantity of emissions reductions that could be achieved using renewable and low carbon gases that would include some higher carbon sources, such as syngas, as well as lower carbon fuels such as waste hydrogen and RNG derived from certain sources such as agricultural waste.

The value of -22.4 kg CO2e per GJ used in the response to BC Hydro IR1 1.6 is the 2021 lifecycle carbon intensity (including upstream emissions) of FEI's 2021 RNG supply portfolio, which at this time is only RNG. The value of -22.4 kg CO2e per GJ is therefore a more accurate point in time value to use when assessing the emissions of FEI's RNG portfolio in 2021.

47.2.1 Assuming the same assumptions used to derive the 59 PJ of renewable gas required to meet a 2.950 Mt reduction in GHG emissions, please explain how much renewable gas is required to meet FEI's proportion of the CleanBC Roadmap cap of 5.9 Mt reduction in GHG emissions if the carbon intensity of FEI's renewable gas supply portfolio is:

a. 5kgCO2e per GJ

b. 15kgCO2e per GJ

Response:

Although the ways in which FEI will meet the Greenhouse Gas Reduction Strategy (GHGRS) is not within the scope of this proceeding, FEI has provided the requested information to help the BCUC understand potential impacts on RNG supply in the next five years, which is in scope.

FEI's understanding is that it will be obligated under the GHGRS to reduce emissions associated with the use of gas in buildings and industry by approximately 5.3 Mt (and not the 5.9 Mt indicated in the question). As described in the response to BCUC IR1 1.1, FEI expects to achieve 2.9 Mt of this 5.3 Mt target through the acquisition of Renewable Gas. Were the overall portfolio carbon intensity of Renewable Gas to be 5 kg CO_2e per GJ, then the volume of gas required to achieve a 2.9 Mt reduction would be approximately 53 PJ. If the carbon intensity was 15 kg CO_2e per GJ, then volume of gas required would be approximately 64 PJ.

Please also refer to the response to BCUC IR2 47.1.

In response to BCUC IR 2.2, FEI stated:

> At this time, FEI does not expect demand for RNG in Canada to outpace supply by 2030. The most recent supply study, as discussed in the response to BCUC IR1 2.1, demonstrates that there is significant supply potential within BC. This also suggests that there are significant sources available throughout Canada. FEI is also procuring and sourcing Renewable Gas from both within Canada and the United States. Purchasing outside of Canada helps to diversify supply, ensure that pricing is competitive, and ensures that there will be ample Renewable Gas for BC's needs.

47.3 Please clarify if "demand for RNG" in the first sentence is intended to refer to demand for all "renewable gas" or only RNG.

Response:

FEI clarifies that this sentence was referring only to RNG.

Numerous jurisdictions in Canada and the United States have implemented or are discussing implementation of various carbon reduction schemes, including cap-and-trade and carbon emission taxes. For example, the Pan-Canadian approach to carbon pollution pricing is set to increase the minimum carbon pollution price from $50/tonne in 2022 to

$170/tonne in 2030,[5] and Cap-and-Trade Programs established in many states including California[6] and eleven Eastern states[7] have set emission caps on specific industries which will decline over the coming years.

47.4 Please discuss whether FEI's supply/demand forecasts and analysis provided in IR responses assumes a net inflow of RNG into BC from other provinces and the United States, and if FEI has accounted for potential increases in demand for RNG in other provinces and the United States arising from policy changes in other jurisdictions.

Response:

Although the location of the purchase of Renewable Gas and supply forecasts out to 2030 are out of scope, FEI has provided the requested information to help the BCUC understand potential impacts on RNG supply in the next five years, which is in scope. FEI's supply forecast assumes a mix of RNG supplied from inside and outside of BC. FEI is aware of the potential for increased demand from other jurisdictions that may compete for RNG supply from outside of BC; however, because FEI's supply forecast relies upon long-term contracts, FEI does not believe there will be a change in the forecast for existing supply.

FEI agrees that political ambition to reduce GHG emissions is likely to increase over time, leading to a commensurate increase in the stringency of low-carbon policies. However, the pace of implementing GHG-limiting programs has varied, and will likely continue to vary, across different jurisdictions, as will the role of RNG as a compliance tool under different GHG policy frameworks.

GHG reduction strategies are typically designed to develop an overall framework that stimulates the adoption of all types of renewable and low-carbon fuels, thus displacing fossil fuels. While the demand for RNG will likely increase, FEI does not believe it will increase relative to other low-carbon energy types. Further, studies in Canada and the United States confirm that there is still significant supply potential for RNG that would exceed the growth in demand associated with increasingly ambitious GHG-reduction policies to 2030. Increased demand for RNG will be met with additional market activity to expand supply.

47.5 Please discuss the risks and possible impacts to FEI's forecasts of supply availability of RNG within Canada and the United States given existing emission caps which are set to tighten, carbon taxes set to increase, and the potential introduction of further GHG-limiting programs. Include discussion of the impacts

[5] https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/carbon-pollution-pricing-federal-benchmark-information.html.
[6] https://ww2.arb.ca.gov/our-work/programs/cap-and-trade-program/resources.
[7] https://www.rggi.org/.

to FEI if RNG demand in other jurisdictions is significantly higher or lower than FEI forecasts.

Response:

Please refer to the response to BCUC IR2 47.4.

48.0 Reference: EVOLUTION OF CLIMATE CHANGE POLICY

Exhibit B-17, Section A, BCUC IR 4.2.1

BC Building Code Amendments and Municipal Government Policies

In response to BCUC IR 4.2.1, FEI stated:

> FEI understands that forthcoming amendments to the BC Building Code will incorporate a [Greenhouse Gas Intensity] GHGi limit, as outlined in the CleanBC Roadmap. Currently, however, local governments have chosen to adopt their own GHGi targets, using various emissions factors they consider to be appropriate. For example, the excerpt below from the City of Vancouver's Modeling Guidelines shows emissions factors by fuel type. The City of Vancouver does not identify the reference source for the emissions factors nor does it include Renewable Gas.

Table 1: Excerpt - City of Vancouver Energy Modeling Guidelines

Table 1.2 Emissions Factors by Fuel Type	
Fuel Type	Emissions Factor ($kgCO_2e/kWh$)
Natural Gas	0.185
Electricity	0.011
District Energy System	as provided by utility[1,2]

[1] The emissions factor of a district energy system shall be as provided by the utility (and as agreed by the utility and the AHJ).

[2] Where a district energy utility agrees to provide a development with energy at a carbon intensity that varies from that of the overall system, documentation of that agreement (or intent to enter an agreement), and any other measures or agreements required to secure the supply of low-carbon energy (such as those required by the CoV LCES Policy), shall be provided to the authority having jurisdiction.

48.1 Please confirm, or explain otherwise, that in the current City of Vancouver Energy Modeling guidelines, there is no difference between the carbon intensity of conventional natural gas and renewable natural gas when it is used outside of a district energy system.

Response:

The City of Vancouver does not include any reference to RNG, or its carbon intensity, in its Vancouver Energy Modeling Guidelines.

48.2 Please confirm, or explain otherwise, that the City of Vancouver maintains its own building bylaws and all other municipalities in BC adhere to the BC Building code.

Response:

Confirmed. Since 1953, the City of Vancouver has maintained its own building bylaws by way of the *Vancouver Charter* which grants the City of Vancouver different powers than other local governments in British Columbia. These other local governments are governed by the *Municipal Act*.

The *Vancouver Charter* gives the City of Vancouver unique planning and land-use tools, the authority to develop and pass bylaws in relation to building regulation with respect to both plan checking and building permit issuance, and the power to undertake building inspections. All other local governments in BC adhere to the BC Building Code and associated regulations.

Please also refer to the response to BCOAPO IR2 19.4.

48.2.1 If confirmed, please discuss whether FEI has considered tailoring the RG Connection service to meet the requirements for the City of Vancouver and for all other municipalities under the BC Building Code with two distinct services. If not, why not?

Response:

FEI has considered various options including one of having different service offerings in different municipalities, but rejected this approach for the reasons set out in Section 7.3.3 and Appendix A of the Application.

The proposed Renewable Gas Connections service meets the current emission requirements for the City of Vancouver and for all other local governments, and therefore, it is not necessary to set up two distinct services.

First, the general approach to emission requirements implemented by the City of Vancouver has been adopted by other local governments. As such, a single offering providing 100 percent Renewable Gas service across FEI's service territory (as proposed in the Application) meets GHGi targets across the province.

Second, a single offering creates certainty in the market for builders/developers at the planning stage of new residential construction without having to differentiate the requirements by municipal boundary, is easy to understand (including for FEI's customers), and meets the requirements of the City of Vancouver and other local governments.

48.2.2 Other than the City of Vancouver example cited in the preamble, please clarify which local governments have chosen to adopt their own GHGi targets. How would these GHGi targets reconcile with the BC Building Code?

Response:

To the best of FEI's knowledge, the local governments that have adopted GHGi targets are:

- City of Surrey;
- City of Burnaby;
- District of North Vancouver;
- City of Richmond; and
- District of West Vancouver.

FEI describes these targets in more detail in Section 1.4 of Appendix A to the Application.

Please note that there may be additional local governments that are contemplating implementing GHGi targets. Given the complexity of GHGi regulations at the local government level, it is difficult for FEI to know if a local government is considering a GHGi measure or emissions reduction regulation.

In addition to the local governments listed above, a number of local governments have included emission-related or other targets as part of re-zoning activities. As noted in the response to BCOAPR IR2 19.4, these specific bylaws and/or policies to reduce GHG emissions using a technical measure such as GHGi through rezoning or planning approvals are likely to influence future building code regulations and also signal the marketplace generally. As such, a service offering that reduces GHG emissions for local governments, while also being available across FEI's service territory, creates certainty and assurance to builders and developers at the planning stage of their developments.

Further, as described in Section 1.1, Appendix A of the Application, the Step Code requires modelling, which occurs at the design stage of a building, and then again on-site testing during construction to ensure the Step Code performance targets are met. Therefore, confirming that a GHGi target can be met takes place at the design stage and again during construction. Implementing a tariff option across FEI's service territory signals to the market that, when GHG measures are adopted in additional local governments, energy choice (including that of RNG) is maintained, thus enabling developments to be planned accordingly.

Finally, as noted in the response to BCOAPO IR2 19.4, the City of Vancouver is proposing to change its building code for commercial buildings to require a heat use intensity that gas equipment and gas heated buildings may not be able to meet, despite the GHG emissions from RNG potentially being lower than electrically heated buildings. Please also refer to the response to BCUC IR2 56.2.2 that describes FEI's consultation with local governments to ensure that the Renewable Gas Connections service can meet the local governments' requirements that new homes are served by a "low carbon" energy source.

48.3 Please discuss whether FEI is aware of any potential amendments to the City of Vancouver's building bylaws and discuss any anticipated changes regarding GHGi targets and include any supporting documentation.

Response:

FEI is aware of proposed amendments to the City of Vancouver's bylaws and climate policies that were presented to council on May 17, 2022. The proposed amendments contemplate changes to GHGi targets, bylaws restricting the use of gas appliances, and the addition of energy use metrics that have the effect of eliminating gas as an option. There is also a general direction that City of Vancouver staff prioritize electrification measures over Renewable Gas. If approved, these various measures would apply to new and existing buildings and are described in detail below.

While FEI's proposals in this Application remain compliant with the City of Vancouver's emission reduction targets and GHGi metrics, the additional bylaws and policy updates (which have not been finalized and are subject to change) currently focus solely on electricity use to meet the City's emissions targets, and therefore, would deliberately preclude the use of Renewable Gas.

The bylaws and policy updates proposed to city council at the May 17, 2022 council meeting are summarized below:

Quotes from City of Vancouver Meeting Minutes	Reference *City of Vancouver Council Meeting Minutes*	FEI Commentary
Bylaws and Policy Updates Applicable to New Buildings:		
FINAL MOTION AS APPROVED ... "F. THAT Council direct staff to explore options for the removal of the use of gas for cooking, fire places or any other purpose in all new residential buildings (multifamily and detached), undertake public consultation, and bring recommendations back to Council as soon as possible in 2023."	May 17, 2022; PDF pg 7	This sets out a strategy to ban gas appliances in all new residential buildings.

Quotes from City of Vancouver Meeting Minutes	Reference *City of Vancouver Council Meeting Minutes*	FEI Commentary
Bylaws and Policy Updates Applicable to Detached Homes:		
FINAL MOTION AS APPROVED ... "C. THAT Council direct staff to explore electrification of domestic hot water at time of replacement by aligning the domestic hot water requirement in the Vancouver Building Bylaw with the prescriptive requirement for new homes, and report back to Council at the earliest opportunity in 2023."	May 17, 2022 PDF pg 8.	This sets out a strategy to electrify domestic hot water heating in existing homes upon the replacement of equipment.
"FINAL MOTION AS APPROVED A. THAT Council approve amendments to the Building By-law, generally as described in the Report dated April 19, 2022, entitled "Climate Emergency – By-law Updates Applicable to Existing Detached Homes" and Appendix A of the same report, where changes for air conditioning and electrification requirements for major renovations are effective January 1, 2023, and minor housekeeping amendments are carried out, effective upon enactment;" Report April 19 2022, Appendix A PDF pg 10: "Table 11.2.1.4.(2) Energy Efficiency Upgrade Requirements for Residential Buildings containing not more than Two Principal Dwelling Units (except as permitted by Clause 11.2.1.2.(9)(d))" *(shows Electric Space & Hot Water Heating is required at or above $250k)* PDF pg 1 "Report Summary […] 2. Starting January 1, 2023, renovations with a construction value over $250,000 will be required to electrify their existing space heating and hot water systems to the same requirements in Building Bylaw for new construction. "	May 17, 2022 PDF pg 8. Refers to a report, Report Date: April 19, 2022 Appendix A PDF pg 10, summarized on pg 1	For major home renovations (effective January 1, 2023) renovations with a construction value over $250,000 will be required to electrify their existing space heating and hot water systems.
"FINAL MOTION AS APPROVED A. THAT Council approve amendments to the Building By-law, generally as described in the Report dated April 19, 2022, entitled "Climate Emergency – By-law Updates Applicable to Existing Detached Homes" and Appendix A of the same report, where changes for air conditioning and electrification requirements for major renovations are effective January 1, 2023, and minor housekeeping amendments are carried out, effective upon enactment; FURTHER THAT Council instruct the Director of Legal Services to prepare and bring forward for enactment the by-law necessary to implement these amendments, generally as outlined in Appendix A of the above-noted report."	May 17, 2022 PDF pg 8.	Two-way air conditioner equipment standards (effective January 1, 2023), require plumbed and/or hard-wired air conditioning (not including portable systems which are not hard wired). This would require the installation of an electric two-directional heat pump that also provides zero emissions heat, rather than the addition of an air conditioning unit to an existing gas heating system.

Quotes from City of Vancouver Meeting Minutes	Reference *City of Vancouver Council Meeting Minutes*	FEI Commentary
"FINAL MOTION AS APPROVED […] G.THAT Council direct staff to include the exploration of an interim Heat Energy Limit for 2032 as part of the Regulatory Roadmap and bring forward related recommendations in 2024."	May 17, 2022 PDF pg 11.	Another electrification measure being proposed, in the form of a penalty only applied to gas consuming equipment, called a "Heat Energy Limit". This will make it more difficult for gas appliances to be installed, regardless of if the gas is carbon neutral or not.
Bylaws and Policy Updates Applicable to All Buildings:		
"FINAL MOTION AS APPROVED B. THAT Council direct staff to prioritize electrification over renewable gas wherever possible in new and existing buildings." "FINAL MOTION AS APPROVED E.[...] FURTHER THAT Council direct staff to prioritize electrification over renewable gas wherever possible in the Regulatory Roadmap and associated work."	May 17, 2022. PDF pg 8 & PDF pg 10	The City of Vancouver Council directed city staff to prioritize electrification over Renewable Gas wherever possible in new and existing buildings, and in the Regulatory Roadmap and associated work.
"HEAT ENERGY LIMIT Beginning in 2040, the largest office and retail buildings will also be subject to a Heat Energy Limit of 0.09 gigajoules of energy equivalent per square meter of gross floor area per year (GJ/m2/year)."	Report Date: April 25, 2022. Meeting Date: May 17, 2022 PDF pg 4	The limit being explored is called a "Heat Energy Limit", which will likely only be met with the use of electric heat pumps as a heating source, thus effectively eliminating the option for gas equipment.
"FINAL MOTION AS APPROVED A.THAT Council approve, in principle, amendments to the Building By-law generally in the form attached as Appendix A of the Report dated May 5, 2022, entitled "Climate Emergency – By-law and Policy Updates Applicable to New Buildings", including reductions in the carbon emissions limit for new 4-6 storey residential buildings; requirement for air filtration, and reporting and initial limit of embodied carbon in new Part 3 buildings, all to come into force and effect on July 1, 2023; FURTHER THAT Council instruct the Director of Legal Services to prepare and bring forward for enactment the by-law necessary to implement these amendments, generally as outlined in Appendix A of the above-noted report." (Appendix A: Report Date May 5th) See Energy Use Intensities in the tables below. Table 10.2.2.5.A1 Maximum Energy Use and Emissions Intensities Table 10.2.2.5.C Maximum Energy Use and Emissions Intensities Table 10.2.2.5.A1 Maximum Energy Use and Emissions Intensities Forming part of Sentence 10.2.2.5.(2)	May 17, 2022 PDF pg 6. References Appendix A: Report Date: May 5, 2022. Meeting Date: May 17, 2022 PDF pg 12, 13, 15	Energy Use Intensity limits in the references tables, for new and existing commercial buildings and MURBs are such that they cannot be met with the use of gas equipment. This disregards the fact that Renewable Gas can achieve comparable (or greater) levels of emissions reduction to electricity, due to significantly lower Greenhouse Gas Emissions Factor of RNG vs. Electricity.

While FEI believes that the Renewable Gas offerings proposed in this Application will meet the emission reduction targets set by the City of Vancouver, other local governments and the

provincial government, these additional and more specific measures being contemplated by the City follow an electrification path as a means of achieving emissions targets, rather than the use of a broader suite of options. Further, FEI believes that the proposals in this Application are aligned with the announced policy measures of the CleanBC Roadmap.

The City of Vancouver's policy direction creates barriers for residents and businesses to access Renewable Gas and leads to an inconsistent approach to access gas service across British Columbia. These proposed amendments do not address how significant new investments in electricity supply and distribution infrastructure will be required to achieve the emissions reduction targets using an electrification-only approach. In particular, BC Hydro's 2021 Integrated Resource Plan illustrates insufficient capacity in its accelerated electrification scenario beginning in 2028. FEI is not aware of work or efforts on the part of local governments to ensure that there will be viable, cost-effective, low carbon electricity available to meet their electrification efforts, or to consider the cost implications to consumers, both in the specific municipalities and the province more broadly, to ensure adequate electric energy and capacity to meet the electrification objectives of local governments.

While FEI does not know the outcome of the CoV final bylaws / policies as they can change prior to final council, the Renewable Gas Connections service offering allows FEI to engage in conversations and have an offering available if these other strategies are not successful. FEI believes the ability of all customers in FEI's service territory to have consistent and continuous access to gas service is in the public interest. Please refer to the response to BCUC IR2 56.2.3, which describes the various activities FEI is undertaking to increase support for renewable gases and the gas system, along with the proposals in this Application.

As requested, links to supporting documentation are provided below:

- Council meeting on Agenda for May 17, 2022:
  https://council.vancouver.ca/20220517/regu20220517ag.htm
- Minutes – City of Vancouver Council meeting: May 17, 2022
  https://council.vancouver.ca/20220517/documents/regu20220517min.pdf
- Reports:
  1. Climate Emergency: Summary of Building Emissions Reduction Reports
     Staff Presentation
     a. Climate Emergency – By-law and Policy Updates Applicable to New Buildings
        Report
     b. Climate Emergency – By-law Updates Applicable to Existing Detached Homes
        Report
     c. Annual Carbon Pollution Limits for Existing Large Commercial and Multifamily Building
        Report

48.4 Please discuss whether FEI is aware of any potential amendments to the BC Building Code amendments may contain GHG emission factors for different fuel types and greenhouse gas intensity limits.

Response:

FEI is not aware of measures being contemplated in the BC Building Code amendments where there are GHG emission metrics that would vary by fuel type.

FEI is aware that the potential amendments to the BC Building Code will consist of maximum GHG emissions for a building, which is similar to the approach of the local governments listed in the response to BCUC IR2 48.2.2.

48.5 Please discuss the pros and cons for FEI to wait for the potential amendments to the BC Building code and/or the City of Vancouver bylaws prior to implementing a permanent renewable gas connection service offering for new connections.

Response:

To clarify, there are already bylaws in place in the City of Vancouver and the other local governments listed in the response to BCUC IR2 48.2.2 which prohibit the use of conventional natural gas. As such, customers in these jurisdictions moving into new residential developments do not currently have access to the gas system. FEI's Renewable Gas Connections service is needed now; FEI sees no benefit to wait for amendments to the BC Building Code prior to implementing the service. The fact that further bylaws are coming is one of the reasons why FEI designed the Renewable Gas Connections service to supply 100 percent RNG, so that it can meet the requirements of future bylaws and building code amendments.

In particular, customers in existing and future jurisdictions do not or will not have access to RNG in new buildings due to the lack of permanency required to provide emission reductions for the life of a building. Put simply, FEI's current service offerings cannot satisfy local government bylaws/policies with respect to new residential buildings and, as a result, new residential customers must take only electricity (as described in the response to BCUC IR1 13.4).

The benefits of moving forward with the proposals in this Application are numerous, and include:

- Energy choice for customers;
- Certainty of energy infrastructure availability for builders and developers at the planning stage;

- A variety of choices in mechanical systems to meet the building needs;
- Resiliency and meeting peak load requirements during cold weather, particularly since the gas system can deliver greater quantities of energy during periods of peak demand; and
- Optimization of the existing gas infrastructure.

Please also refer to Section 10.2.2 of the Application for the reasons why stakeholders, who provided letters of support, favour approval of this Application. FEI summarized these reasons as common themes, which are reproduced below:

- Stakeholders are seeking energy choice, including Renewable Gas.
- Stakeholders support providing 100 percent Renewable Gas for new residential service connections.
- Stakeholders support leveraging the existing energy system, reflecting the associated efficiency and resiliency benefits.
- Stakeholders are conscious of affordability of energy alternatives and value the choice of Renewable Gas.
- Stakeholders are seeking access to energy choices that meet their needs and those of their customers.
- Stakeholders value environmental stewardship and sustainability.
- Stakeholders are seeking offerings that enable and encourage innovation.

Finally, as described in the response to BCUC IR2 48.2.2, the BC Building Code amendments being developed are predicated on the local government's approach. FEI's proposals in this Application, including the Renewable Gas Connections service, align with this approach.

48.6 Please discuss whether FEI may be able to meet GHGi targets in upcoming BC Building Code amendments using conventional natural gas and emissions offsets. Would this combination meet the definition of "Low Carbon Gas" as outlined in FEI's proposed tariff? Please explain why or why not.

Response:

FEI cannot meet the GHGi targets in the upcoming BC Building Code with carbon offsets as they are not accepted by local governments as a viable GHG emissions reduction solution. Please refer to the response to BCUC IR2 60.5, where FEI explains why customers choose to buy RNG voluntarily instead of buying carbon offsets to meet GHG targets.

1 The combination of conventional natural gas and emissions offsets does not meet the definition
2 of “Low Carbon Gas” in FEI’s proposed General Terms & Condition, as it is defined to mean
3 “Biomethane, Hydrogen, Lignin or Synthesis Gas.”

4

C. PROPOSED PROGRAM – BASELINE RENEWABLE GAS

49.0 Reference: RENEWABLE GAS BLEND

Exhibit B-11, Section 7.4.1, p. 98; Exhibit B-11-1, Section 8.6, p. 123; Exhibit B-17, Section E, BCUC IR 22.1

Approvals Sought for RG Blend Offering

In Section 7.4.1 of the Application, FEI stated:

> Through its Renewable Gas Blend, FEI is proposing that all sales customers receive a percentage blend of Renewable Gas as part of their regular gas service. Based on projected supply, FEI anticipates that, beginning in 2024, the initial blend will be one percent Renewable Gas and 99 percent conventional natural gas. The percentage of Renewable Gas will increase as new supplies of Renewable Gas come online. FEI's sales customers would not need to sign up to receive the Renewable Gas Blend, nor would they have an option to decline the Renewable Gas Blend.

In the Errata to Section 8.6 of the Application, Footnote 114 stated:

> FEI currently estimates Renewable Gas supplied through the S&T LC rider to be at 4 percent in 2024, 6 percent in 2028 and 14 percent in 2032 based on the remaining forecasted supply.

49.1 With respect to FEI's RG Blend proposal, please clarify what specifically is FEI seeking BCUC's approval of. Please clarify by each component as follows:

a. The program offering to sell RNG to all sales customers

b. The methodology to recover costs associated with the program (e.g., through the S&T LC Rider)

c. The calculation for the rate to be charged under the ST& LC Rider

d. The amount of RNG expected to be blended over a certain number of years (e.g., 4 percent in 2024)

Response:

FEI is seeking approval of the Renewable Gas Blend service as described in Sections 7 and 8 of the Application, effective January 1, 2024 or such later date to be proposed by FEI based on sufficient RNG supply and the filing of amended rate schedules for review and approval by the BCUC three months prior to the actual implementation date. This includes:

a. The program offering to sell RNG to all sales customers: More specifically, the Renewable Gas Blend service as described in Sections 7 and 8 of the Application, whereby FEI would be able to designate a portion of the commodity supplied to all sales customers as RNG.

b. The methodology to recover costs associated with the program: More specifically, FEI is seeking approval of the mechanism by which the S&T LC rider is calculated and included on a customer's bill as the cost recovery mechanism for the volume of RNG delivered through the Renewable Gas Blend service, as described in Section 8 of the Application.

FEI is not seeking approval of c. the specific rate for the S&T LC rider or d. the blend percentages set out in the Application. Rather, based on the approvals granted in a. and b. above, FEI will determine the blend percentages annually for the subsequent year based on forecasts of supply and demand, which FEI will include in its Q4 Gas Cost Report, along with the calculation of the S&T LC rider for which it will seek approval.

49.2 Please explain whether FEI will seek BCUC approval each time when FEI is planning to change the RNG blend.

Response:

FEI will seek BCUC approval for the S&T LC rider each year, which will reflect any changes to the Renewable Gas Blend service percentage.

In response to BCUC IR 22.1, FEI stated:

> FEI only intends to increase the volume of Renewable Gas delivered to customers through the Renewable Gas Blend offering when it is confident that the supply of Renewable Gas allows this, without creating an imbalance between supply and demand. Once a given proportion of Renewable Gas is included in the Renewable Gas Blend, that proportion would be maintained in subsequent years. For example, once the proportion of Renewable Gas in the Renewable Gas Blend reaches 3 percent, FEI would not reduce the proportion of Renewable Gas to 2 percent in a subsequent year. As described in the response to BCUC IR1 10.2, FEI would then need to achieve balance between Renewable Gas supply and demand using another method.

49.3 In consideration for factors such as potential loss of suppliers and changes to GHG emission targets, please elaborate why FEI is not considering adjusting down the volume of RNG delivered to sales customers under the RG Blend service, should the supply of RNG be insufficient to sustain the level of RNG delivered.

Response:

For clarity, while FEI cannot entirely rule out the possibility that the proportion of Renewable Gas included in the Renewable Gas Blend service may need to be reduced at some future point to maintain the balance between supply and demand, FEI does not intend to adjust down the volume of Renewable Gas delivered to sales customers under the Renewable Gas Blend.

FEI only intends to increase the volume of Renewable Gas delivered to customers through the Renewable Gas Blend service when it is confident that the supply of Renewable Gas is adequate. However, FEI recognizes that it is possible that unforeseen circumstances, such as a loss of a supplier, or reduced supply volume from a supplier, could potentially adversely impact the available supply of Renewable Gas to FEI's customers, thereby necessitating a downward adjustment. FEI believes that this risk will decrease as the number of Renewable Gas suppliers increases. A further discussion on the active role FEI will play in managing the supply of and demand for Renewable Gas is described in the response to BCUC IR1 10.2. For example, during the planning phase for the following year, if FEI observes that the demand for Renewable Gas for the forecast year may exceed the supply, any planned increase for the following year to the Renewable Gas Blend service percentage would be deferred to a later year when FEI is confident that sufficient supply is available. If an extreme disruption of FEI's Renewable Gas supply occurred, FEI would consider reducing the proportion of Renewable Gas included in the Renewable Gas Blend service.

Finally, the structure of the revised Renewable Gas Program was developed within the current regulatory and policy context (as described in Section 3 of the Application), and as such, it is possible that future changes or updates to policy or regulations may necessitate a change to the proportion of Renewable Gas included in the Renewable Gas Blend service. FEI will assess any impact to the service at that time.

50.0 Reference: RENEWABLE GAS BLEND

Exhibit B-17, Section E, BCUC IRs 20.3.1, 23.1.1, Table 1, and 23.4

Benefits of RG Blend Offering

In response to BCUC IR 23.1.1, FEI stated:

> Below FEI provides the expected percentage of Renewable Gas embedded in customers' delivered energy between 2023 and 2032 assuming no Renewable Gas Connections or Voluntary Renewable Gas services.

Table 1: Expected Renewable Gas Blend (%)

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Percent RG Blend	4%	9%	11%	14%	17%	19%	22%	24%	29%	35%

> If Renewable Gas Blend was the only service approved FEI would not be able to add customers in the new construction sector and would forego the addition of approximately 2 percent of its residential and commercial customers each year as discussed in response to BCUC IR1 12.3.2.

50.1 Please clarify why the blend percentage is 4 percent in 2023 when the RG Blend is the only service and is also 4 percent in 2023 when all three service components are offered, as shown in the Corrected Figures 8-4 to 8-6 in the Errata dated May 27, 2022.

Response:

The Corrected Figures 8-4 to 8-6 which FEI provided in the Errata dated May 27, 2022 (Exhibit B-11-1) show 4 percent as the blend in 2024, not 2023.

FEI has forecast more RNG supply in 2024 than in 2023. With more supply forecast for 2024, FEI will be able to supply the Renewable Gas Connections and Voluntary Renewable Gas services, and also provide 4 percent as part of the Renewable Gas Blend service.

In response to BCUC IR 20.3.1, FEI stated:

> Prior to the introduction of GHGi targets, approximately 29 percent of FEI's new residential connections came from these municipalities. Therefore, in the requested Figure 8-3 below, the load from the Renewable Gas Connections offering is approximately 29 percent of the load presented in Revised Figure 8-348 [sic] of the Application.

50.2 Please confirm, or explain otherwise, that if the RG Blend was the only service approved, FEI would still be able to add 71 percent of the load it currently projects to serve under the RG Connections service (i.e., 100 percent less the 29 percent that is subject to GHGi targets).

Response:

This can only be confirmed if the 29 percent remains static. However, the load forecast provided in the response to BCUC IR1 20.3.1 represents a "snapshot" in time of FEI's load forecast based on current local government climate policies, the design of the revised Renewable Gas Program (including the Renewable Gas Connections service), and FEI being able to serve these customers. As more local governments adopt bylaws that restrict natural gas each year, the percentage will increase.

As described in the response to BCUC IR1 20.3.1, FEI would not be able to provide gas service to new homes in municipalities which have adopted stringent GHGi targets (i.e., the 29 percent cited in the question). In addition, new residential homes in the remaining municipalities may also be effectively barred from accessing the gas system as GHGi limitations are adopted by additional local governments, and/or incorporated into the BC Building Code. FEI believes that similar regulations will continue to be implemented throughout its service territory.

In response to BCUC IR 23.4, Concentric stated:

> Further, with no Voluntary Renewable Gas service, customers with GHG targets and no available Renewable Gas option to meet those targets may leave the system. FEI's customer base would shrink over time, causing its rates to rise as fixed costs FEI has invested in its distribution system on behalf of its customers are spread over a smaller number of customers.

50.3 Please confirm, or explain otherwise, that if FEI acquires 59 PJ of RG to meet the CleanBC Roadmap GHG target, the RG blend in the FEI system is expected to be about double the percentages shown in Table 1 above?

Response:

Confirmed. FEI would not expect demand from the Voluntary Renewable Gas service or the Renewable Gas Connections service to change substantially with the incremental supply. Therefore, the additional Renewable Gas supply would flow to customers through the Renewable Gas Blend service. Please refer to the response to BCUC IR2 46.1 (which provides an update to Table 1 from the response to BCUC IR1 23.1/23.1.1) showing the percent of Renewable Gas Blend by year to 2028 based on Renewable Gas supply of 59 PJs by 2030.

Please note that the amount of Renewable Gas FEI acquires to meet the CleanBC Roadmap GHG target could vary from the 59 PJ if, for example, the Renewable Gas acquired has a lower carbon intensity. The blend shown in the response to BCUC IR2 46.1 could potentially be lower if that were the case.

51.0 Reference: RENEWABLE GAS BLEND

Exhibit B-17, Section E, BCUC IRs 23.1.2, and 29.2.1

RG Revenues under an RG Program Consisting of RG Blend Service Only

In response to BCUC IR 29.2.1, FEI stated:

> As noted in the response to BCUC IR1 28.1, the BCUC has stressed the need to maximize revenues from Renewable Gas sales. Under the Renewable Gas Program, Voluntary Renewable Gas customers will pay more for Renewable Gas than Renewable Gas Connections customers and, in doing so, will increase revenues relative to what revenues would be in the absence of this service offering. This reduces the overall Renewable Gas acquisition costs recovered from all sales customers through the S&T LC rider.

In response to BCUC IR 23.1.2, FEI confirmed that it would recover all the costs of the RG Program (consisting of only the RG Blend) through the S&T LC rider.

51.1 Please compare the annual revenues from Renewable Gas sales under the following two scenarios: 1) the RG Program as proposed in the Application; and 2) the RG Program consisting of only the RG Blend, during the first 5 years of the RG Program.

Response:

In this scenario, because the amount of Renewable Gas that needs to be acquired will not change, the total annual revenues from Renewable Gas sales do not change; rather, the customer segment/offering that contributes to the revenues changes. If FEI's proposals are approved as filed, the revenue (costs recovered) from the Renewable Gas Blend service would be approximately $212 million in 2024 growing to $363 million by 2028. If Renewable Gas Blend was the only service approved, then no revenue (cost recoveries) would come from Voluntary or Renewable Gas Connections customers, and Renewable Gas Blend customers' revenues would account for approximately $327 million in sales in 2024, growing to $579 million in 2028.

Table 1: Program Revenue (Cost Recovery) Comparison

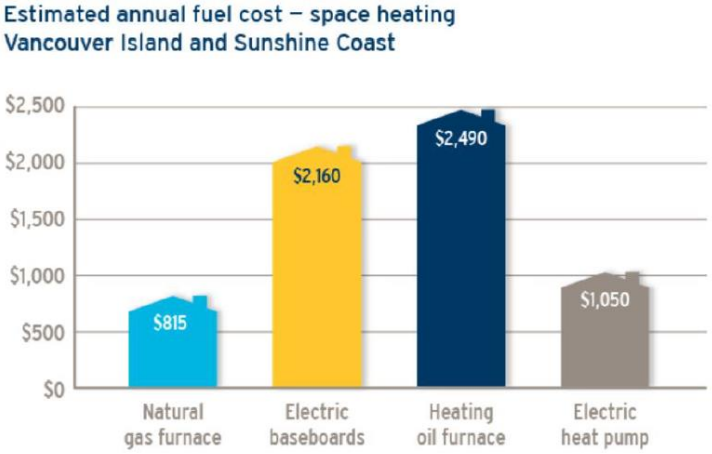
$ million	**2024**	**2025**	**2026**	**2027**	**2028**
As Proposed					
Revenue from RG Connections	24	39	56	75	96
Revenue from Voluntary	90	100	108	117	120
Revenue from RG Blend	**212**	**264**	**301**	**359**	**363**
Total Revenue	327	404	466	551	579
With RG Blend Only					
Revenue from RG Blend	**327**	**404**	**466**	**551**	**579**

52.0 Reference: RENEWABLE GAS BLEND

Exhibit B-17, Section E, BCUC IRs 24.1 and 24.2

Comparison between Gas and Electricity

BCUC IR 24.2 asked FEI to update for the year 2030 the following chart that can be found on FEI's website[8] comparing the annual fuel cost of space heating using a natural gas furnace compared with other alternatives, including electric heat pumps:



In doing so, BCUC IR 24.2 asked FEI to consider the four factors listed in BCUC IR 24.1, which are reproduced here for ease of reference:

- Increasing percentage of RG blend in FEI's system;
- Potential increase in RG supply costs for FEI as demand for RG may start exceeding RG supply by 2030;
- Increasing delivery rates and storage and transport rates due to normal FEI business (i.e., CPCNs and OIC-related capital expenditures, demand forecast, O&M expenses and other capital additions);
- Potential loss of throughput to electricity to meet the CleanBC Roadmap Greenhouse Gas (GHG) emissions reduction targets.

In response to BCUC IR 24.1, FEI stated:

> FEI notes that the "four factors listed above" would only impact the 2030 information that has been requested as all of those factors are already embedded in current rates. Further, FEI cannot complete the requested analysis for 2030 for the following reasons:
>
> - FEI does not have BC Hydro's rate forecasts for 2030.
> - FEI does not know what the cost of electricity will be in 2030.
> - BC Hydro has not determined and/or received approval for how it will treat costs related to the Site C project.

[8] FortisBC Inc., "Why choose natural gas", retrieved from: https://www.fortisbc.com/services/natural-gas-services/why-choose-natural-gas/annual-fuel-cost-comparison.

- FEI does not know how BC Hydro will treat the costs of additional acquisitions of clean power that may be needed to ensure an adequate supply of clean energy in 2030.
- FEI does not know what electrical infrastructure will be required to serve increasing and evolving electrical loads for the Electric Vehicle or other markets that BC Hydro expects to electrify.
- The evolution, development and adoption of heating equipment can change rapidly. FEI does not know what type of heating equipment will be in place in 2030, nor the costs associated with that equipment, in order to complete a reasonable analysis.

52.1 Please confirm, or explain otherwise, that the estimated annual fuel cost for space heating in the chart above also applies to the Mainland service area, as it pertains to natural gas furnace and electricity options.

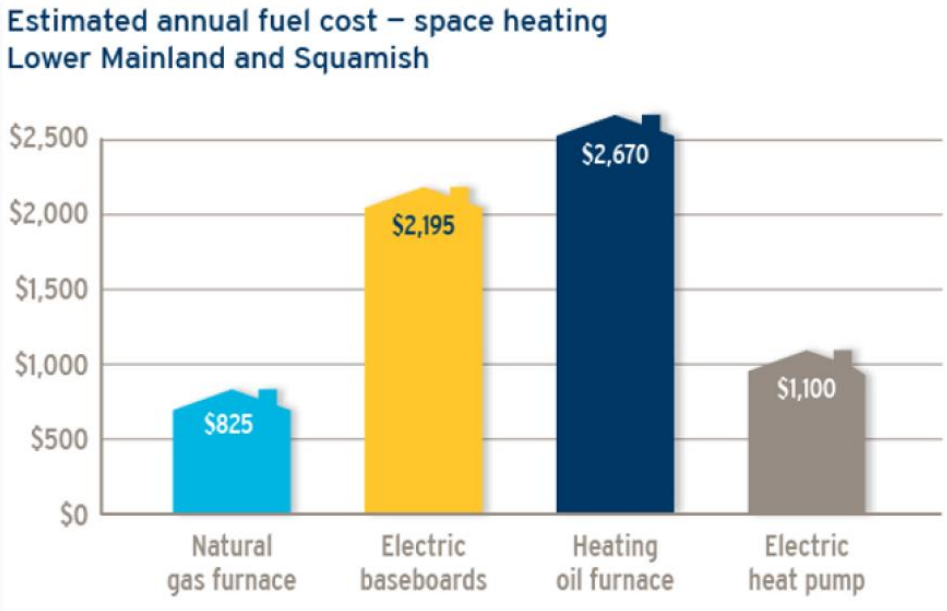
Response:

Not confirmed.

The chart in the preamble to the question shows an estimate of annual fuel costs for space heating on Vancouver Island and the Sunshine Coast. The annual energy use for space heating is higher in the Mainland service area as the winters are colder, when compared to Vancouver Island, and hence the UPC is higher.

FEI prepared the chart below using all of the same assumptions and rates, except changing the location from Victoria to Vancouver.

Figure 1: Estimate of Annual fuel costs for space heating in the Mainland Service Area



52.2 Please estimate the 2030 annual fuel cost for space heating based on the use of a 96 percent efficient natural gas furnace. Please take into account the four factors listed in BCUC IR 24.1 in providing the response.[9] Please confirm, or explain otherwise, that the resulting 2030 annual fuel cost for space heating is representative of the entire FEI service territory.

Response:

To estimate the 2030 annual fuel cost for space heating FEI used the Diversified Energy (Planning) Scenario bill impacts from the 2022 Long Term Gas Resource Plan (LTGRP). The Diversified Energy (Planning) Scenario includes the effects on customers' bills including the effects of Demand Side Management (DSM), Low Carbon Transportation (LCT), cost of gas with increasing amounts of renewables, carbon tax escalation to $170 per tonne and various approved and planned large capital projects. This scenario does not consider future rate design changes and is not indicative of a detailed rate forecast; rather, it provides a directional, 20-year view of how FEI's rates are influenced by this scenario over time.

The following bill increase estimate uses the cumulative effective rate (bill) impact for Rate Schedule 1 from FEI's 2022 LTGRP, Figure 9-11, filed with the BCUC on May 9, 2022 multiplied by the fraction of the UPC that is space heating multiplied by the average heating system efficiencies.

2030: estimated Average Residential Annual Bill @ 60 GJ/yr, from Figure 9-11 (LTRGP): $1,925

$1,925 * 63% space heating * efficiency ratios (92%/96%) = $1,262

Approximate space heating portion is $1,262. As the figure reproduced in the preamble does not include carbon tax, and the underlying rates used in the calculation reflect rates in effect at the time the figure was created, the $1,262 should not be compared to the $825 shown there.

Assumptions:

- 92 percent reflective of average space heating efficiency in FEI territory. This value is unknown but was estimated considering age of heating systems and minimum efficiencies in the past.
- 96 percent efficiency of equipment in 2030, as requested.

[9] FEI used a 96 percent efficient gas furnace in response to BCUC IR1 13.7.

- 63 percent of use will be space heating. In all likelihood this will change with time and is unknown for 2030, but it has been estimated based on REUS and MX test info.

As FEI's rates are the same throughout its service territory, with the exception of Fort Nelson, for a given UPC the resulting bill will be the same for FEI's entire service territory.

52.3 Please estimate the 2030 annual fuel cost for space heating based on the use of standard efficiency electric heat pump (200 percent efficiency) and based on the use of a high efficiency electric heat pump (272 percent efficiency)[10] in the FortisBC Inc. (FBC) service territory.

Response:

FBC does not have a long term rate forecast within its Long Term Electric Resource Plan (LTERP); however, FEI has used the following assumptions.

- Hypothetical annual electricity rate increases of 10 percent for high, 6.5 percent for medium, and 3 percent for low.
- A standard electric heat pump is 200 percent efficient and high efficiency heat pump is 274 percent efficient, which are intended to represent efficiencies seen in the field, as opposed to manufacturer's ratings (direct conversion from Heating Seasonal Performance Factor).[11]
- A detached home, with incremental electric load using FBC's current 100 percent Tier 2 rates, at $0.13713/kWh.
- No changes in heat load, floor area, or occupant behavior over time.
- Heat load was estimated using newer home end-use survey data from 2017, and an assumption of an average 92 percent space heating efficiency for those homes.

[10] Those are the two electric heat pump scenarios used by FEI in response to BCUC IR1 13.7.

[11] Average heating efficiencies were based on reviewing heat pump field studies. A 2.6 COP was estimated based field testing single stage, central cold climate heat pumps. "BC Cold Climate Heat Pump Field Study", RDH Building Science, 2020, PDF p. 43. This value corelates with a COP of less than 2.0 with non-cold climate heat pumps using a field study that tested both types (cold-climate & non-cold-climate) "Ductless Mini-Split Heat Pump Impact Evaluation", Cadmus, December 2016, PDF p. 102, Figure 55. The COP was rounded up to 2.0 to account for newer equipment on the market. As an aside, Ductless cold climate heat pump average seasonal COP were worse than 2.6 according to the BC field study mentioned above (2.4). An efficiency of 274% was based chosen for high end heat pumps, although from the above noted field studies, show cold climate heat pumps may not be that high on average.

	Standard Efficiency Electric Heat Pump			High Efficiency (Cold Climate) Electric Heat Pump		
	Electric Annual Space Heating Cost Simulation - Residential Detached Home ($/yr)			Electric Annual Space Heating Cost Simulation - Residential Detached Home ($/yr)		
	High	**Medium**	**Low**	**High**	**Medium**	**Low**
	10%	**6.5%**	**3%**	**10%**	**6.5%**	**3%**
2022	1,000	1,000	1,000	700	700	700
2023	1,100	1,100	1,000	800	800	800
2024	1,200	1,100	1,100	900	800	800
2025	1,300	1,200	1,100	1,000	900	800
2026	1,500	1,300	1,100	1,100	900	800
2027	1,600	1,400	1,200	1,200	1,000	900
2028	1,800	1,500	1,200	1,300	1,100	900
2029	2,000	1,600	1,200	1,400	1,100	900
2030	2,200	1,700	1,300	1,600	1,200	900

52.4 Please estimate the 2030 annual fuel cost for space heating based on the use of standard efficiency electric heat pump and based on the use of a high efficiency electric heat pump in the BC Hydro service territory, using a range of assumptions (low, medium, high) for electricity rate increases until 2030.

Response:

As noted in the response to BCUC IR1 24.1, it is not reasonable for FEI to forecast BC Hydro rates out to 2030. However, in order to be responsive FEI used the same assumptions as were used for the response to BCUC IR2 52.3, but using BC Hydro's current Tier 2 rate of $0.1408kWh.

	Standard Efficiency Electric Heat Pump			High Efficiency (Cold Climate) Electric Heat Pump		
	Electric Annual Space Heating Cost Simulation - Residential Detached Home ($/yr)			Electric Annual Space Heating Cost Simulation - Residential Detached Home ($/yr)		
	High	**Medium**	**Low**	**High**	**Medium**	**Low**
	10%	**6.5%**	**3%**	**10%**	**6.5%**	**3%**
2022	1,100	1,100	1,100	800	800	800
2023	1,200	1,200	1,100	900	900	800
2024	1,300	1,300	1,200	1,000	900	900

	Standard Efficiency Electric Heat Pump			High Efficiency (Cold Climate) Electric Heat Pump		
	Electric Annual Space Heating Cost Simulation - Residential Detached Home ($/yr)			Electric Annual Space Heating Cost Simulation - Residential Detached Home ($/yr)		
	High	Medium	Low	High	Medium	Low
	10%	6.5%	3%	10%	6.5%	3%
2025	1,500	1,300	1,200	1,100	1,000	900
2026	1,600	1,400	1,300	1,200	1,000	900
2027	1,800	1,500	1,300	1,300	1,100	900
2028	2,000	1,600	1,300	1,400	1,200	1,000
2029	2,200	1,700	1,400	1,600	1,300	1,000
2030	2,400	1,800	1,400	1,700	1,300	1,000

It is important to note that FEI does not have insight into: (1) how costs associated with BC Hydro's Site C dam project will be incorporated into rates; (2) where additional electrical demand, capacity and storage to meet future electrical demand will originate; and (3) the cost of these incremental resources.

53.0 Reference: RENEWABLE GAS CONNECTIONS

Exhibit B-17, Section D, BCUC IRs 12.2, 12.2.2, Table 1, 13.1, and 14.1; Exhibit B-15, BCH IR 1.3

Building Stock Turnover

In response to BCUC IR 14.1, FEI stated:

> The teardown rate in BC is estimated to be approximately 2 percent in FEI's 2021 Conservation Potential Review [38] meaning substantially all of British Columbia's building stock will be replaced within 50 years.
>
> Footnote 38: See Appendix C-1 of FEI's 2022 LTGRP: https://docs.bcuc.com/Documents/Proceedings/2022/DOC_66503_B-1-FEI-2022-LongTermGasResourcePlan.pdf

In response to BCUC IR 12.2, FEI stated:

> In a scenario which assumes that provincial building stock turnover is approximately 2 percent per year and none of those new buildings connect to the gas system, resulting in FEI losing 2 percent of its residential and commercial customers per year, FEI could expect the total volume of gas sold to residential and commercial customers to be 20 PJ or 18 percent lower than it would be if the Renewable Gas Connections service was approved.

In response to BCH IR 1.3, FEI stated:

> FEI's capture rate for residential new construction for the period 2018 to 2020 was between 78 and 82 percent, which represents a large proportion of this market. Assuming FEI's capture rates under the proposed Renewable Gas Connections service are comparable to these historical levels, Renewable Gas will largely displace natural gas and not electricity consuming equipment in those municipalities.

In response to BCUC IR 13.1, FEI stated:

> Historically, there have been two main sources of energy to heat buildings in British Columbia: natural gas and electricity.

53.1 Please briefly explain the method and data used by FEI to estimate the provincial building stock turnover to be approximately 2 percent per year in its Conservation Potential Review. Please provide the reference (page numbers) in the Conservation Potential Review.

Response:

The 2 percent value was originally derived by Posterity Group, a consultant engaged by FEI, when developing the base year and reference case under the 2017 Long Term Gas Resource Plan

(LTGRP). This information is outside FEI's subject matter expertise and FEI is reliant on organizations that more actively track this type of data to provide guidance on building activity.

Posterity Group used the draft data from the 2015 Conversion Potential Review (CPR) and, working backwards from this data, adding their own insights, estimated the demolition rate to be 2 percent. Then, for the 2021 CPR, this assumption was reviewed and checked against a high-level review of office space demolition rates for the City of Vancouver in recent years, based on a review of building permit data performed at the time.

The demolition rate implies a building effective useful life of 50 years which was deemed by the consulting team to be a reasonable and conservative estimate. During the development of the reference case in the 2022 LTGRP, the demolition rate was highlighted and acknowledged to be an area of uncertainty and has been flagged by the LTGRP team for more detailed study in future resource plans.

53.2 In the reference above, in what year is FEI expecting the total volume of gas sold to residential and commercial customers to be 20 PJ or 18 percent lower than it would be if the RG Connections service were approved?

Response:

As set out in the response to BCUC IR1 12.2, 2032 is the year that FEI expects that the total volume of gas sold to residential and commercial customers to be 20 PJ or 18 percent lower than it would be if the Renewable Gas Connections service were approved.

In BCUC IR 12.2.2, FEI provides a 10-year load forecast for residential and commercial customers assuming the RG Connections offering is approved.

Table 1: 10-Year Load Forecast based on Diversified Energy Future (Planning) Scenario

Rate Schedule	Category	Unit	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
RS 1	Residential	TJ	69,752	68,319	67,077	65,896	64,762	63,675	62,673	61,746	60,769	59,831
RS 2	Small Commercial	TJ	30,163	30,112	30,034	29,968	29,853	29,708	29,626	29,615	29,430	29,269
RS 3	Large Commercial	TJ	27,314	27,267	27,197	27,138	27,033	26,902	26,828	26,818	26,650	26,504
	Total	**TJ**	**127,229**	**125,698**	**124,308**	**123,003**	**121,649**	**120,285**	**119,128**	**118,179**	**116,848**	**115,604**

53.3 BCUC IR 12.2.1 asked FEI to provide a 10-year load forecast for residential and commercial customers similar to the one above assuming the RG Connections offering is not approved. Please provide the requested 10-year load forecast, with

consideration to any appropriate adjustment to the 2 percent per year rate of customer loss.

Response:

FEI provides the table below reflecting the Use Per Customer (UPC) from FEI's Diversified Energy Future (Planning) Scenario from its 2022 Long Term Gas Resource Plan (LTGRP) and a 2 percent loss of residential and commercial customer count per year reflecting the inability of FEI to add new customers.

Table 1: 10-Year Load Forecast based on Diversified Energy Future (Planning) Scenario

Rate Schedule	Category	Unit	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
RS 1	Residential	TJ	65,503	62,441	59,702	57,133	54,711	52,429	50,307	48,328	46,388	44,551
RS 2	Small Commercia	TJ	28,939	27,982	27,036	26,136	25,228	24,329	23,510	22,773	21,934	21,140
RS 3	Large Commercial	TJ	26,205	25,339	24,482	23,668	22,845	22,031	21,289	20,622	19,862	19,144
	Total	**TJ**	**120,647**	**115,761**	**111,220**	**106,936**	**102,784**	**98,788**	**95,107**	**91,723**	**88,183**	**84,835**

Please note that the loss of load shown here is greater than that discussed in FEI's response to BCUC IR1 12.2.1. The reason for the difference is that the response to BCUC IR1 12.2.1 held UPC constant over the analysis period where the Diversified Energy Future (Planning) Scenario from the 2022 LTGRP provides a more comprehensive view where UPC declines over time based on changes in equipment efficiencies and end points, and includes growth in customers based on population growth.

53.3.1 Please update the 10-year load forecast for residential and commercial customers provided in the above question as well as in BCUC IR 12.2.2 to reflect the change that this proceeding is now only considering RNG.

Response:

The 10 year load forecast does not change with the narrowing of scope of this proceeding as set out in Order G-165-22A. The narrowing of the scope allows the BCUC to make a determination on the proposed service offerings and pricing of RNG without contemplating how hydrogen, syngas or lignin will be accounted for, offered and priced.

For clarity, FEI's plans have not changed and it continues to consider the acquisition of hydrogen, syngas and lignin to be necessary pathways to achieving the GHG reductions set out by CleanBC.

53.4 Please clarify whether "capture rate" means that FEI is installing a new gas line, regardless of end use (e.g., BBQ, fireplace, cooktop or space heating) or whether it means that FEI will be providing space heating to the new building.

Response:

FEI uses the term "capture rate" to mean that FEI has connected a new residential building to the gas system regardless of end use. New residential buildings attached to the gas system may be using any combination of gas-fired appliances, and may or may not have gas-fired space heating.

53.4.1 Please indicate whether FEI's capture rate of 78 to 82 percent between 2018 and 2020 is an average capture rate for FEI's entire service territory. If not, which area is this capture rate representative of?

Response:

FEI's capture rate of 78 to 82 percent between 2018 and 2020 is the average capture rate for properties within 200 m from a main across FEI's entire service territory.

53.5 Since there have historically been two main sources of energy to heat buildings in BC, natural gas and electricity, please provide the historic share of the existing building stock connected to the FEI system vs. the share connected to electricity only and how that compares with the recent FEI's capture rate of 78 to 82 percent between 2018 and 2020.

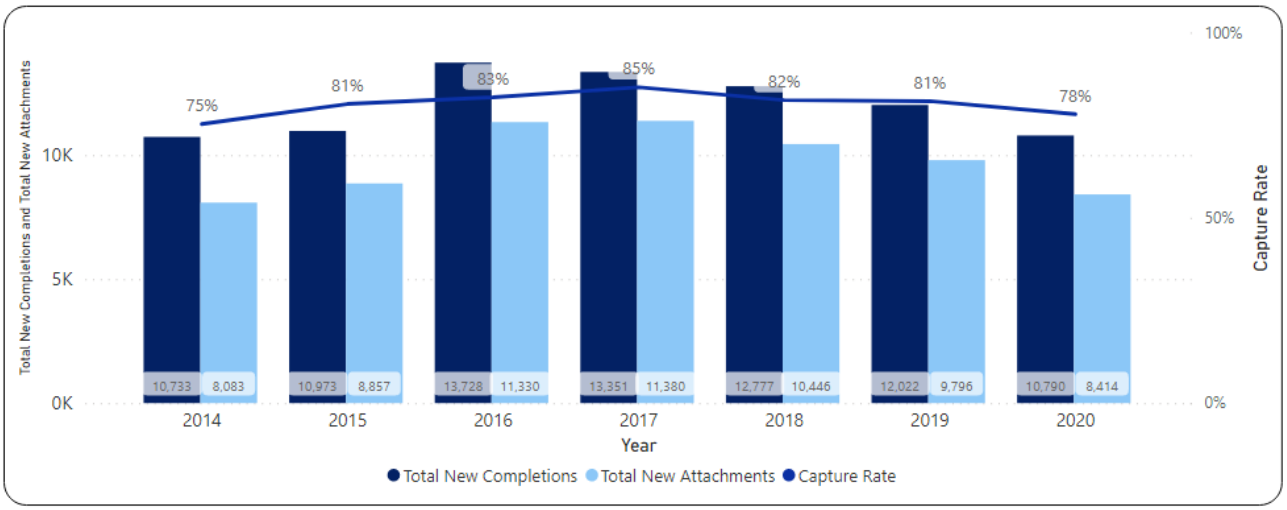
Response:

FEI does not possess the required information to provide an accurate response to this request. Specifically, FEI does not have a list of customer premises that have connected to the electric system in FEI's gas service territory, although FEI expects that substantially all homeowners connect to the electric system, except a small portion who select an off-grid solution. FEI does not have information indicating which homeowners have chosen grid-sourced electricity as their energy type to the exclusion of all others such as wood, propane, fuel oil, and solar. Therefore, FEI cannot confirm with any confidence the share of homeowners who connected to electricity only.

FEI is able to provide a comparison of its recent capture rate to its longer term capture rate, going back to 2014. In particular, over the longer term, FEI has seen an average annual capture rate of

81 percent. This number has varied from a low of approximately 75 percent to a high of approximately 85 percent.

Figure 1: Market Capture Rate (2007 to 2020)



53.6 Please clarify why FEI assumes that, with a provincial stock turnover of 2 percent, FEI would lose 2 percent of its residential and commercial customers per year if it cannot connect the new buildings to the gas system. Assuming that the share of the existing building stock connected to the FEI system is not 100 percent but approximately 80 percent (similar to FEI's recent capture rate), would FEI not lose only 1.6 percent of its customers per year (i.e., 80 percent * 2 percent) if it was not able to connect the rebuilds?

53.6.1 If so, please update the 10-year load forecast for residential and commercial customers assuming the RG Connections offering is not approved and please indicate the total volume of gas sold to residential and commercial customers (in PJ and percentage) FEI expects to lose by 2030 in the absence of the RG Connections service.

53.6.2 If using a rate of customer loss lower than 2 percent is appropriate, please revise the modelling done in the Application and in the IR No. 1 responses that would be impacted by a change in this assumption.

Response:

Using a turnover rate lower than 2 percent for FEI's system is not appropriate, as explained further below.

FEI's historical capture rate only represents the proportion of new homes located in FEI's service territory that elected to connect to the gas system in a particular year. However, the 2 percent building stock turnover rate applies to the entire housing stock in BC, which affects equally the share of the housing stock connected to the gas system, and the share that is not connected to the gas system.

While FEI does not know what proportion of BC's housing stock is connected to the gas system, the table below illustrates the calculation of the 2 percent reduction per year assuming the following:

1. At the outset, 80 percent of BC's housing stock is connected to the gas system.
2. There are 1 million homes in BC, and this value remains constant.
3. The 2 percent annual turnover rate is randomly/equally distributed throughout the entire building stock.

	Year									
Item	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
BC Total Housing Stock	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Annual Turnover Rate	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Total houses Turned Over	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Gas System % of Total Housing Stock	80.0%	78.4%	76.8%	75.3%	73.8%	72.3%	70.9%	69.5%	68.1%	66.7%
Gas System Total No. of Houses	800,000	784,000	768,320	752,954	737,895	723,137	708,674	694,500	680,610	666,998
Gas System Houses Turned Over	16,000	15,680	15,366	15,059	14,758	14,463	14,173	13,890	13,612	13,340
Remaining No. of Gas System Houses	784,000	768,320	752,954	737,895	723,137	708,674	694,500	680,610	666,998	653,658
Remaining Gas System % of Total Housing Stock	78.4%	76.8%	75.3%	73.8%	72.3%	70.9%	69.5%	68.1%	66.7%	65.4%
Gas System Relative Reduction in Houses	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

54.0 Reference: RENEWABLE GAS CONNECTIONS

Exhibit B-11, Section 8.6, p.122; Exhibit B-17, Section D, BCUC IRs 12.2; 18.2, 18.2.1, Table 1, and 20.2

Applicability of RG Connections Rate Schedules

In response to BCUC IR 18.2, FEI stated:

> FEI clarifies that any activity that drives the need for a new residential service line is eligible for the Renewable Gas Connections service. New construction (i.e., greenfield, tear down and rebuild etc.) will require a new service line. […] The defining feature for the applicability of the Renewable Gas Connections service is the need for a new service line, whether it be for new residential construction, rebuild, retrofit or conversion, […] (Emphasis added)

In response to BCUC 20.2, FEI stated:

> The case of a retrofit of a residential building already connected to the FEI system will not be covered under the Renewable Gas Connections service. As noted, the Renewable Gas Connections service only applies to residential customers who have a service line installed after the date of implementation of the service. In other words, homes that are not already connected to the gas system. With respect to retrofits, this means that, in practice, the New Residential Connections service only apply to situations where the retrofitted home requires a new service line which would indicate that the home at present is heated by an alternative energy type such as wood, oil, propane or electricity. (Emphasis added)

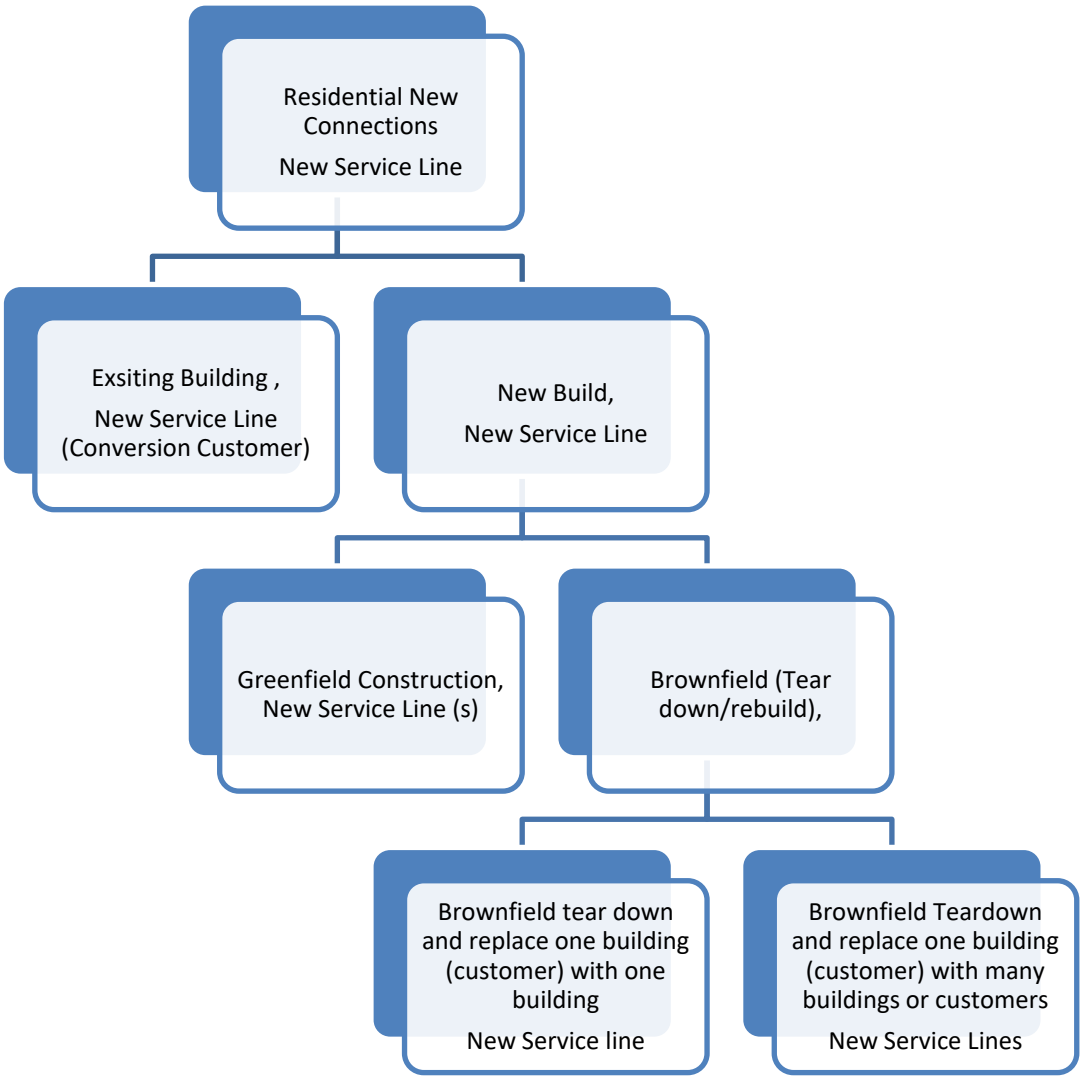
54.1 Please confirm, or explain otherwise, that the term "new construction" refers only to greenfield construction and 'tear down and rebuild'.

54.1.1 Please provide the split between greenfield construction and 'tear down and rebuild' in the BC new construction sector. Please provide the source for this data.

Response:

This response addresses BCUC IR2 54.1 and 54.2.

There are a number of different words that are used either in industry or by FEI that could create confusion when defining who is eligible for the Residential Gas Connections service. As such, FEI delineated that any residential dwelling that requires a new service line is a Residential New Connections customer. Many different construction or building activities result in the need for a new service line. New construction is a generic term to reflect that a new building is constructed. The hierarchy chart below lays out the various different activities that could result in the need for a new service line.



The first type of customer is one that resides in an existing building that currently does not have a gas connection, but is in the process of renovating or upgrading the building. From FEI's standpoint, they are a new customer and are treated as such under the System Extension Test or the Service Line Cost Allowance.

The second type of customer is one that resides in a new building that requires a new service line. his can be either via greenfield or brownfield development, as described below:

- Greenfield development generally occurs in less dense areas where there is ample land that is not currently part of the building stock. Land is cleared, new buildings are constructed and if the customer/s want gas, new service lines are installed.
- Brownfield development generally occurs in more dense areas where existing building(s) are torn down and new building(s) are constructed; if the customer(s) request gas, new service line(s) are installed. In teardown situations, one building could be torn down to create many buildings or housing units, or many buildings could be torn down to create one or more buildings with many housing units.

A further subcategory of brownfield development (not shown in the figure above) is where an existing building that has gas, undertakes extensive renovations to a degree where services to the building (gas/electricity/water/sewer) are removed and new services are installed. While less common, this can and does occur.

FEI does not track the split between brownfield (teardown/extensive renovation) and greenfield construction. As noted above, in more dense urban areas, most new construction is brownfield and requires the teardown and replacement of existing building stock. Metro Vancouver and the Capital Regional District are examples where brownfield development is more common. In less dense areas, greenfield construction is more common. The Fraser Valley and much of the interior of BC are areas where greenfield construction is common.

It is important to note that FEI does not treat the customers shown above in a different manner from the perspective of connecting to the gas system. The tariff lays out the process for customers connecting to the system but does not have different rules based on whether the connection is a greenfield or brownfield construction.

Finally, for clarity, an existing customer that has an existing gas connection could undertake renovations or retrofits that result in a change to gas equipment. However, as this customer does not require a new service line, they would not be eligible for the Residential Gas Connections service.

54.2 Please clarify what is meant by “a retrofit of a residential building already connected to the FEI system”. Does this refer to a building renovation?

Response:

Please refer to the response to BCUC IR2 54.1.

On page 122 of the Application, FEI states:

> Renewable Gas Connections are in the range of 14 thousand to 16 thousand per year.

54.3 Please state whether the 14,000 to 16,000 new RG Connections customers per year are greenfield construction only or a mix of greenfield construction and ‘tear down and rebuild’. How does this 14,000 to 16,000 new RG Connections customers per year compare to the average number of gas connections per year for the last 10 years.

Response:

The 14,000 to 16,000 customers per year are a mix of both greenfield and brownfield construction, as well as conversion customers (as described in the response to BCUC IR2 54.1). Conversion customers historically account for approximately 2,000 to 5,000 of FEI's annual gross new customer attachments, with the remainder being greenfield/brownfield construction customers. From 2012 to 2021, the average number of gross customer additions was 17,100 annually, while the average gross RS 1 (single family residential) customer additions was 15,700.

54.4 Please clarify, in the situation where an existing house connected to the FEI system with an existing gas line is torn down and rebuilt and the builder or owner chooses to continue using gas in the rebuilt house, whether the existing gas line would be used to connect the rebuilt house to the FEI system.

54.4.1 If yes, please confirm that all cases of 'tear down and rebuild' of buildings already connected to the FEI system would not be covered under the RG Connections service.

54.4.2 If not, please confirm that the existing gas line is removed when a gas-connected building is torn down, and the builder or owner needs to request a new service line to connect the rebuilt house.

Response:

In general, when a house/building is torn down to make way for a new building (residential or otherwise), all existing services (water, sewer, gas and electricity) are removed to allow for safe construction. In the context of the gas system, the service line is removed. If the new building owner wishes to use gas in the new building, a new service line must be requested and installed.

As explained in the response to BCUC IR2 54.1, where a building is torn down and replaced it may not be replaced with the same type of development. For example, a single detached house may be replaced with a fourplex or small apartment (with many units) depending upon permitting/property size. It is also common for a number of detached properties to be torn down and a single large high rise condominium building to be built with hundreds of units.

Also as noted in the response to BCUC IR2 54.1, any residential customer that requires a new service line will be part of the Renewable Gas Connections service.

54.4.2.1 If this is the case, please provide the rationale for the different treatment by FEI of a scenario where 'a building already connected to the FEI system is torn down and rebuilt' and a

scenario of a 'retrofit of a residential building already connected to the FEI system'.

Response:

As noted in the response to BCUC IR2 54.1, if a new service line is required (for a greenfield/brownfield development or for an existing house that does not yet have a service line), the customer would fall under the Renewable Gas Connections service.

The installation of a new service line to serve a residential building is the criterion required to enroll the customer into the Renewable Gas Connections service. New service line installations are tracked closely by FEI staff. New service lines must be requested by greenfield/brownfield as well as conversion attachments, and these requests are logged in FEI's IT systems. Therefore, FEI is able to identify and easily track this type of customer.

With respect to an existing customer that undertakes a building renovation that does not require the removal and replacement of a service line (in other words a customer that adds/removes a gas appliance but otherwise stays connected to the gas system the entire time), it is much harder to identify when this customer made the change. With the exception of energy efficiency rebates from FEI, it is not common for FEI to be informed when a home has changed out a gas appliance.

In response to BCUC IR 12.2, FEI stated:

> In a scenario which assumes that provincial building stock turnover is approximately 2 percent per year and none of those new buildings connect to the gas system, resulting in FEI losing 2 percent of its residential and commercial customers per year, FEI could expect the total volume of gas sold to residential and commercial customers to be 20 PJ or 18 percent lower than it would be if the Renewable Gas Connections service was approved.

In response to BCUC IR 18.2, FEI stated:

> GHGi regulations at the local government level are complex, and it is difficult for FEI to know if a particular connection is subject to GHGi regulations via a permitting process. <u>For example, a greenfield construction may be subject to GHGi regulations but not a tear down and rebuild</u>. (Emphasis added)

54.5 If the response to the previous question is that all cases of 'tear down and rebuild' of buildings already connected to the FEI system do not qualify under the RG Connections service, please clarify how the RG Connections service would help FEI retain the load associated with the existing stock of gas-connected buildings that get 'torn down and rebuilt' if:

54.5.1 Municipalities have implemented GHGi targets for a 'tear down and rebuild' where, if the rebuilt house does not qualify under the RG Connections service because of its existing gas line, the rebuilt house would have to connect to the electricity grid.

54.5.2 Municipalities have not implemented GHGi targets for a 'tear down and rebuild' where, if the rebuilt house does not qualify under the RG Connections service because of its existing gas line, FEI would not lose the customer anyway because the rebuilt house would not need to meet GHGi targets.

Response:

As explained in the response to BCUC IR2 54.4, tearing down and rebuilding a residential building requires the installation of a new service line. In all cases where a new residential service line is required, the customer will qualify for the Renewable Gas Connections service. Please also refer to the response to BCUC IR2 54.1.

54.5.3 Please discuss whether FEI's assumption that, without the RG Connections service, FEI would lose 2 percent of its residential and commercial customers is appropriate, in light of the responses to the two sub-questions above. If it is not appropriate, please provide a more appropriate assumption and revise the modelling done in the Application and in the IR No. 1 responses that would be impacted by a change in this assumption.

Response:

The potential for the gas system to lose residential customers annually due to BC's teardown rate of 2 percent remains an appropriate description of what could occur without the Renewable Gas Connections service, given that GHGi requirements continue to be discussed by local governments in FEI's service territory, and are to be included in the forthcoming update to the BC Building Code.

FEI has not included an assumption of a 2 percent loss to its residential customer base in any of the modeling or analysis included in the Application. Rather, a potential loss to the residential customer base due to BC's teardown rate of 2 percent is highlighted in Section 5.3.3 and 7.4.2.1 of the Application as a potential scenario if: (1) GHGi requirements are adopted throughout its service territory; and (2) FEI does not have a service offering that would allow customers to respect those requirements and connect to the gas system.

FEI did include the assumption of a 2 percent loss of residential and commercial customers in its responses to BCUC IR1 12.2, 12.2.3 and BCSEA IR1 8.5.

In its response to BCUC IR1 12.2, FEI indicated that it expects that, if the Renewable Gas Connections service were not approved as proposed, then some of the load would be served by conventional natural gas assuming that some local governments do not adopt GHGi requirements. To quantify a worst-case scenario for the potential loss in load, FEI described the reduction in its load where provincial building stock turnover is approximately 2 percent per year and none of those new buildings connect to the gas system, resulting in FEI losing 2 percent of its residential and commercial customers per year. FEI also used this scenario in its response to BCSEA IR1 8.5.

BCUC IR1 12.2.3 asked FEI to present the annual bill impact resulting from the loss of throughput due to losing the new construction sector. To respond to this IR as worded, FEI presented the scenario where no new residential or commercial customers could connect, with FEI's residential and commercial customer base shrinking by 2 percent per year based on building stock turnover.

With rapid and unforeseeable changes in local and provincial legislation, it is not possible to predict with certainty the resulting changes in customer additions, losses or demand if the Renewable Gas Connections service is not approved. As such, providing further scenarios will not produce more reliable results.

In response to BCUC IR 18.2.1, FEI provided the forecast proportion of demand from the RG Connections that pertains to conversions and retrofit (Conversion Customers), as opposed to new builds (Remainder):

Table 1: Forecast Residential Renewable Gas Demand for Conversion Customers and New Build Customers (PJ)

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Demand - Renewable Gas Connections	**0.0**	**0.0**	**1.6**	**3.1**	**4.6**	**6.0**	**7.5**	**8.9**	**10.4**	**11.8**	**13.2**	**14.6**
Demand - Conversion Customers	0.0	0.0	0.3	0.5	0.8	1.0	1.3	1.5	1.7	2.0	2.2	2.5
Demand - Remainder	0.0	0.0	1.3	2.5	3.8	5.0	6.2	7.4	8.6	9.8	11.0	12.2

54.6 Please confirm, or explain otherwise, that the 'tear down and rebuild' subset of new builds is included in the Remainder segment.

Response:

Confirmed.

54.6.1 Please split the Remainder segment into greenfield construction and 'tear down and rebuild'.

Response:

As explained in the response to BCUC IR2 54.1, FEI does not have this breakdown.

55.0 Reference: RENEWABLE GAS CONNECTIONS

Exhibit B-17, Section D, BCUC IR 12.2.3; FortisBC Energy Inc. And FortisBC Inc.'s Multi-Year Rate Plan Application for 2020 to 2024, Exhibit B-12, BCUC IR 165.5

Assumptions to Calculate Bill Impacts in 2030

In BCUC IR 12.2.3, FEI was asked to estimate the 2030 annual bills of residential and commercial customers relative to today resulting from a loss of throughput due to losing the new construction sector. The question asked FEI to take into account the relative share of fixed and variable costs to estimate the impact of this loss of throughput on delivery rates and storage and transport rates. As part of FEI's response, the following assumptions were provided:

- The delivery margin required from all customers in a rate schedule is held constant and is spread over less customers and less volume, resulting in delivery rate increases;

  Please note that FEI is unable to determine the impact on Storage & Transport charges and has therefore not included changes to these charges in its analysis.

In response to BCUC IR 165.5 in FortisBC's Application for Approval of a Multi-Year Rate Plan for 2020 through 2024, FEI stated:

> In the five-year timeframe [of the MRP], total O&M costs for FEI are estimated to be approximately 53 percent to 70 percent variable relative to the number of customers served, as this time period will allow FEI to adjust its costs to any significant change in the number of customers.

55.1 Does FEI consider that the timeframes to 2030 (and 2050 if applicable) provide enough time for FEI to adjust its costs to the loss of throughput due to losing the new construction sector? If not, please explain why not.

55.1.1 If yes, please explain why FEI kept the delivery margin constant until 2030 and 2050 and spread it over less customers and less volume?

Response:

In the timeframe to 2030, FEI believes that it could make some adjustments to reduce costs, while recognizing that many of FEI's costs are fixed over this relatively short time frame (8 years) and that there is a need for ongoing maintenance and investment in FEI's infrastructure which can increase costs significantly.

Historical capital or sunk costs cannot be eliminated with a change in customer numbers or throughput. Comparing capital sunk costs versus annual costs such as O&M, approximately 70 percent of FEI's annual delivery margin is caused by historical capital expenditures and 30

percent is related to O&M. FEI stated in the response to BCUC IR2 165.5 from its Application for Approval of a Multi-Year Rate Plan for 2020 through 2024 (2020-2024 MRP):

> In the five year timeframe, total O&M costs for FEI are estimated to be approximately 53 percent to 70 percent variable relative to the number of customers served, as this time period will allow FEI to adjust its costs to any significant change in the number of customers.

Thus, of the 30 percent related to O&M, 53 percent to 70 percent is variable relative to the number of customers served. Assuming then that FEI's customer base shrinks by a teardown rate of 2 percent per year until 2030 and that FEI is able to accurately forecast and reduce variable cost changes accordingly, FEI may be able to adjust 2.5 percent[12] to 3.5 percent[13] of FEI's delivery margin over that time frame.

As also discussed in FEI's response to BCUC IR2 165.5 in the 2020-2024 MRP proceeding, there are many considerations and assumptions required to determine whether costs are fixed or variable in the short term vs long term:

- Estimating the percentage of fixed costs versus variable costs is a complicated and contentious task and would require a significant amount of simplification, assumptions and judgement.
- The analysis of fixed versus variable costs relative to the number of customers may require a multi-dimensional analysis that would consider not only the time dimension, but also other factors such as the location of changes during the MRP. For instance, the increase in number of customers or the load in certain geographical locations in a utility's service territory may require capacity upgrades that would result in additional O&M expenditures while the same number of customer additions and load increase distributed in various locations would not have resulted in the same cost pressures. In this example, the estimate for the percentage of fixed costs versus variable costs in a five-year period would also depend on the change in the number of customers and load in certain locations.

The determination of why a cost that is fixed in the short term can become variable over the long term is dependent on the choice of the time period that is long enough for costs to be adjusted. This determination is a challenging and somewhat subjective exercise.

[12] 30 percent of delivery margin related to O&M x 53 percent O&M variable to customer number x 16 percent lost customers by 2030 (8 years at 2 percent per year)

[13] 30 percent of delivery margin related to O&M x 70 percent O&M variable to customer number x 16 percent lost customers by 2030 (8 years at 2 percent per year)

55.2 Please clarify why FEI is unable to determine the impact on Storage & Transport charges of a loss of throughput. What is the breakdown of charges included in the Storage & Transport charges? Are all these fixed charges?

55.2.1 If not, what is the proportion of charges that are variable and would be reduced with a loss of throughput?

Response:

FEI cannot provide a split between fixed and variable midstream costs as they relate to a loss in throughput on its system for the reasons discussed below.

The FEI commodity portfolio comprises the baseload natural gas supply required to meet the normalized annual demand for FEI sales customers (i.e., customers that choose to remain on the FEI standard system commodity offering). The forecast cost of the FEI commodity supply portfolio is based on the demand forecast and the current forward market natural gas prices. The commodity portfolio costs are generally variable in nature and for rate setting purposes are allocated on a fully commodity-related basis.

The FEI midstream portfolio, however, comprises the transportation capacity and storage resources, as well as the seasonal commodity supply, required to meet the forecast design peak day and manage the daily and seasonal variability in load for all the FEI sales customers. The FEI midstream portfolio also includes contingency resources to enhance gas supply resiliency. The forecast cost of the FEI midstream portfolio used in the determination of the Storage and Transport Charges is based on the normalized annual demand and is primarily composed of the costs associated with the contracted firm transportation capacity and storage resources. The forecast costs related to the midstream resources in excess of the normalized annual demand requirements are offset by the forecast recoveries related to the mitigation of those unneeded resources. Further, the transportation capacity and storage resources are generally contracted under medium-term (3-5 years) and long-term (greater than 5 years) agreements. The forecast midstream portfolio costs used in setting the Storage and Transport Charges are generally fixed in nature and for rate-setting purposes are allocated on a fully demand-related basis.

It is not feasible for FEI to determine the impact on Storage and Transport charges based on any material reduction in the forecast normalized annual demand without also understanding the impacts on the forecast design peak day, seasonal load, and resiliency resource requirements. Assumptions would have to be made with respect to the changes to each of those demand scenarios to then determine what changes may result to the overall gas supply resource requirements and, in particular, the transportation capacity and storage resources contracted within the midstream portfolio.

Prior to making any reductions to the level of firm transportation capacity and storage resources contracted, FEI would want to ensure such lower resource levels remain sufficient to provide secure gas supply that is safe, reliable, and cost-effective to its customers for the foreseeable future. The current limited availability of, and high winter demand for, regional transportation and storage resources means any reductions to the currently contracted levels would be extremely difficult and costly to reacquire or replace in the near term.

Nonetheless, FEI's midstream portfolio has held, and will continue to need to hold, transportation capacity and storage resources, as well as seasonal commodity supply, in excess of the normalized annual demand requirements. Absent any material changes to the underlying midstream portfolio resources, minor variations to normalized annual demand would likely result in minor changes to the forecast levels of mitigation activities, and the associated mitigation recoveries that offset the portfolio costs. This is not dissimilar to how FEI manages the gas supply resources on a daily basis, mitigating any unneeded resources. Variances between the recorded and the forecast midstream costs, including mitigation recoveries, are captured in the Midstream Reconciliation Cost Account (MCRA) and refunded to, or recovered from, customers as part of future rates via a rate rider; for rate setting purposes, MCRA surplus or deficit amounts are allocated on a fully demand-related basis.

55.3 By how much would the bill impacts in 2030 and 2050 be reduced if FEI reduced the delivery margin and the Storage and Transport charges to consider that variable costs may decrease with less customers served or less throughput? Please revise the annual bills in 2030 and 2050 provided in Table 1: Forecast Residential Renewable Gas Demand for Conversion Customers and New Build, if applicable.

Response:

FEI is unable to complete this analysis for the reasons set out in the responses to BCUC IR2 55.1 and 55.2.

56.0 Reference: RENEWABLE GAS CONNECTIONS

Exhibit B-17, Section D, BCUC IRs 17.1 and 17.3 Section E, IR 23.1.1

Municipalities' Support of the RG Connections Service

In BCUC IR 17.1, Concentric stated:

> If the BCUC rejects FEI's proposal and instead establishes vintaged rates where two similarly situated customers receive the same service through the same facilities but are charged different rates based on when they commenced service, a case of unjust discrimination is created that will further tilt the playing field toward electricity. [Emphasis added]

In BCUC IR 17.3, Concentric stated:

> While the CleanBC Roadmap proposes that all new residential buildings be net zero by 2030, FEI's proposal will assure achievement of this objective upon implementation, well before 2030.

In response to BCUC IR 23.1.1, FEI stated:

> Below FEI provides the expected percentage of Renewable Gas embedded in customers' delivered energy between 2023 and 2032 assuming no Renewable Gas Connections or Voluntary Renewable Gas services.

Table 1: Expected Renewable Gas Blend (%)

Year	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Percent RG Blend	4%	9%	11%	14%	17%	19%	22%	24%	29%	35%

56.1 Please confirm, or explain otherwise, that Table 1 shows what the expected RG blend will be in FEI's system regardless of how many service offerings are included in the RG Program since the actual blend percentage is a result of the RG supply that FEI may acquire under the GGRR.

Response:

The question asks about the gas in FEI's system (throughput) which consists of gas for Sales Service customers and gas for Transportation Service (T-Service) customers. Because of this, the percentages shown in Table 1, which represent the expected proportion of Renewable Gas as a percent of the gas in FEI's system for Sales Service customers only, will not equal the blend in FEI's system overall.

If the question was intended to ask whether the percentages above would equal the actual blend percentage of Renewable Gas supply for Sales Service customers, then FEI confirms that to be correct.

56.1.1 Please update Table 1 above to reflect the scope of this proceeding to only consider RNG.

Response:

Table 1 will not change based on the narrowed scope of this Application. FEI expects to have enough RNG in its system to meet Renewable Gas demand requirements and blend levels as set out in Table 1 in the preamble to this question for at least the years 2023 through 2028.

Of the 30 PJs of Renewable Gas that FEI will acquire annually by 2030, 20 PJs is expected to be RNG (or biomethane) which will allow FEI to meet the demand for Renewable Gas Connections service customers which is expected to grow to approximately 12 PJs annually by 2030.

56.2 Please confirm, or explain otherwise, that under the proposed RG Connections service, the RNG program remains notional, in that the newly connected customer will receive a blend of gas at its point of service that is identical to that received by an existing customer and will pay a rate that is identical to that paid for by the existing customer.

56.2.1 If so, please confirm that the newly connected customer would not receive at its point of service a “low carbon” energy source. Instead, it would receive a gas blend with a percentage of RG as shown in Table 1 above.

Response:

The proposed Renewable Gas Connections service uses a delivery by displacement model. This is consistent with the existing RNG Program, and energy transmission and delivery systems (electricity and gas) throughout North America more generally. The gas received by any customer is a function of the amount of conventional gas and biomethane injected into the gas system and each customer’s proximity to those sources of injection. Customers located in closer proximity to biomethane injection sites will likely receive more biomethane than conventional gas, and vice versa. The blend percentages shown in the preamble are meant to illustrate how, under a delivery by displacement model, the amount of Renewable Gas provided to customers through the Renewable Gas Blend service is projected to increase as FEI’s new sources of Renewable Gas begin providing new supply. These percentages are not necessarily indicative of makeup of the gas received by individual customers.

56.2.2 Has FEI consulted with municipalities to ensure that the RG Connections service can meet the municipalities' requirements that new homes are served by a "low carbon" energy source? If yes, please provide any feedback received and indicate which municipalities FEI has not heard from.

Response:

As noted in Section 10 of the Application, consultation with stakeholders including local governments, the provincial government, and customers was integral to the development of the Application. It is important to clarify that, while local governments have imposed individual GHGi metrics (bylaws/policies) to ensure that homes are served by "low carbon" energy, it is the provincial government that oversees building code requirements across the province (with the exception of Vancouver). Currently, there is no provision in the BC Building Code for a local government to implement a GHGi or other technical measure related to emission reductions; however, FEI understands that the provincial government will provide a pathway for local governments to reduce GHG emissions in new buildings.

The provincial government has been in discussions with the Step Code Council, FEI and other stakeholders on the implementation of a new Carbon Pollution Standard within the BC Building Code as announced in the CleanBC Roadmap[14]. The provincial government has also indicated that the proposed Renewable Gas Connections service will meet the requirements of the Carbon Pollution Standard.

Although the provincial government oversees building code requirements and has signaled a compliance pathway for Renewable Gas, FEI has engaged local governments on the importance of Renewable Gas in decarbonizing buildings and meeting local and provincial climate goals. As noted in Section 10.3.4.1 of the Application, general feedback received from local governments had included questions about Renewable Gas supply potential, the permanence of Renewable Gas for new buildings (Renewable Gas Connections) and the costs associated with Renewable Gas service. However, as noted in the response to BCOAPO IR2 19.4, there is an increasing focus from some local governments on electrification as their preferred mechanism to reduce emissions.

FEI's engagement with local governments on the topic of Renewable Gas and the proposals in this Application are ongoing across British Columbia. As noted in Section 10.2.1 of the Application, FEI has received support for the Application from the cities of Burnaby and Prince George, as well as the City of Delta's Climate Action and Community Livability Advisory Committee (Section 10.3.4.1 of the Application). Since submitting the filing, FEI has also received

[14] Page 2, https://www2.gov.bc.ca/assets/gov/environment/climate-change/action/cleanbc/cleanbc_roadmap_2030.pdf.

letters of support from the City of Coquitlam (Exhibit 3), the City of Kelowna (Exhibit 9), the City of West Kelowna (Exhibit 28), and the Regional District of Okanagan-Similkameen (Exhibit 29).

FEI notes that lack of feedback from additional local governments may be an indication that not all communities have the capacity to review and provide comment on the revised Renewable Gas Program. For example, while FEI engaged with the City of White Rock, the City indicated that they preferred not to provide comment due to lack of resources. This example indicates the importance of the provincial government in assuming a leadership role in establishing alignment between local and provincial GHG emission reduction efforts, including communicating to local governments that Renewable Gas is a viable energy source in the Carbon Pollution Standard, and its importance in supporting CleanBC's goal of zero-carbon new buildings by 2030.

56.2.3 If FEI's RG Connections service is approved as proposed, please discuss how FEI plans to engage with the municipalities to ensure this offering's success.

Response:

FEI continues to engage with local governments regarding its proposals in this Application. FEI tailors its approach to engagement with each local government, reflecting their respective needs and circumstances.

Please refer to the response to BCOAPO IR2 19.3 which describes FEI's engagement with stakeholders, including local governments, regarding the revised Renewable Gas Program's role in supporting the reduction of GHG emissions and the steps FEI has taken to transition to lower carbon energy that are specific to this Application.

While municipalities' preferences with respect to decarbonization solutions vary, FEI has identified a number of measures that will need to be undertaken more broadly to increase support for Renewable Gas and the gas system:

1. **Alignment of Local and Provincial Emissions Reduction Policies:** This includes advocating for the Province to take a leadership role in clearly communicating the critical role that Renewable Gas and the gas delivery system will play in reducing greenhouse gas emissions in British Columbia. In addition, advocating for the Province to create a uniform GHGi pathway within the Energy Step Code for all municipalities to align with and adopt.

2. **Education and Increasing Awareness:** This includes raising awareness amongst current and future customers and local governments about the benefits of Renewable Gas and the gas delivery system in decarbonizing their energy use, including the specific details related to FEI's Renewable Gas Program and how customers can access RNG.

3. **Increasing the Complementary Role of Energy Efficiency:** This includes ensuring FEI's investments in energy efficiency continue to play a vital, complementary role to the use of RNG and hydrogen in meeting customers' energy needs as well as helping achieve the climate objectives of provincial and local governments. For example, advancing gas fired heat pumps, dual fuel (hybrid) heating system technologies and deep energy retrofits and subsequently the related energy efficiency programs will be critical complements to FEI's Renewable Gas Program.

4. **Expanding Supply and Achieving Cost Reductions:** This includes advancing technology, innovation, business development and policy advocacy to expand the supply of RNG and hydrogen while also reducing its costs.

Finally, please refer to the response to CEC IR2 58.1 where FEI describes strategies to complement the approval of this Application and overcome misconceptions about RNG. This includes raising awareness with FEI's current/future customers, in addition to local governments, about the benefits of the gas system as a conduit to delivering Renewable Gas, including RNG and hydrogen and the specific details related to the proposals in this Application.

57.0 Reference: RENEWABLE GAS CONNECTIONS

Exhibit B-17, Section D, BCUC IR 13.7, Table 1 and 2; Section E, BCUC IRs 24.1 and 24.2

10-year NPV of Heating Costs – Comparison between Gas and Electricity

In response to BCUC IR 13.7, FEI provided the following table comparing the 10-year net present value (NPV) of heating costs with gas or electric equipment:

Table 1: Comparison of 10 Year NPV of Heating Costs

A	B	C	D	E	F	G	H	I	J
				10 Year NPV					
				RG Burner Tip Rate Comparison		BC Hydro T1:T2		FortisBC T1:T2	
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	Priced @ equivalent of NG	Priced @ weighted average cost of RG Supply	50:50	25:75	50:50	25:75
1	Low Bookend	200%	100%	$14,274	$25,627	$13,670	$15,036	$15,189	$15,581
2	High Bookend	272%	230%	$14,274	$25,627	$8,381	$9,219	$9,313	$9,553

However, in response to BCUC IR 24.2, FEI stated that it "does not have BC Hydro's rate forecasts for 2030" and that it "does not know what the cost of electricity will be in 2030."

57.1 Please clarify the assumptions used by FEI for the 10-year NPV including:

a. BC Hydro's electricity rates;

b. FBC's electricity rates; and

c. FEI's natural gas rates (delivery charges and commodity charges).

Response:

a. Assumptions for BC Hydro's Electricity Rates

The rates used were the current rates at the time of the writing the IR response (for BC Hydro as of January 1, 2022), and assumed no rate increases. They do not include any capital infrastructure upgrades required to maintain reliability of the electrical grid from expanded electrification.

	Tier 1	Tier 2
BC Hydro	0.0939	0.1408

b. Assumptions for FBC's Electricity Rates

The rates used were the current rates at the time of the writing the IR response (for FBC as of January 1, 2022), and assumed no rate increases. They do not include any capital infrastructure upgrades required to maintain reliability of the electrical grid from expanded electrification.

	Tier 1	Tier 2
FortisBC	0.1237	0.1371

c. Assumptions for FEI's Natural Gas Rates (Delivery and Commodity Charges)

FEI used its January 1, 2022 approved residential charges without escalation and used carbon tax escalating to $170 per tonne by 2030, and discounted them to 2022 dollars. These amounts are shown in the table below.

Jan 2022 Residential rates (RS1)	
Daily basic charge per Day	$ 0.4085
Delivery Charge per GJ (incl riders)	$ 5.526
Storage and transportation per GJ (incl riders)	$ 1.351
Cost of gas per GJ	$ 4.503

Year	Carbon Tax	
	Per Tonne CO2	Per GJ
2022	$ 50.00	$ 2.56
2023	$ 65.00	$ 3.29
2024	$ 80.00	$ 4.02
2025	$ 95.00	$ 4.75
2026	$ 110.00	$ 5.48
2027	$ 125.00	$ 6.21
2028	$ 140.00	$ 6.94
2029	$ 155.00	$ 7.67
2030	$ 170.00	$ 8.40
2031	$ 170.00	$ 8.40

In response to BCUC IR 24.1, FEI stated:

> FEI expects that BC Hydro electricity rates will also rise to account for the costs associated with acquiring and delivering new renewable energy to meet demand, in addition to costs such as large capital projects, O&M expenses, etc.

57.2 Please provide an additional analysis using a range of assumptions (low, medium, high) for electricity rate increases over the next 10 years.

Response:

FEI notes that the preamble to this question refers to BCUC IR1 13.7, 24.1 and 24.2. As FEI's responses to BCUC IR1 24.1 and 24.2 do not include analysis, FEI has assumed that the BCUC is requesting updates to the tables included in response to BCUC IR1 13.7. FEI provided two tables in response to BCUC IR1 13.7: Table 1 provided the comparison of the NPV of heating costs over 10 years and Table 2 provided the $/GJ premium determination.

FEI believes that using a low, medium, high electricity rate change assumption does not provide meaningful results. Changing electricity rates without changing the comparator costs of natural gas produces an unbalanced analysis and, as discussed in the response to BCUC IR1 24.2, FEI cannot reasonably predict BC Hydro electric rates into the future. Nonetheless, in order to be responsive, FEI has provided the tables below with low, medium and high electricity rates below. FEI assumed hypothetical increases of 3 percent per year in electricity rates for the low, 6.5 percent per year for medium, and 10 percent per year for high for this response.

Revised Table 1: Low Electricity Rate Change - Comparison of 10 Year NPV of Heating Costs

A	B	C	D	E	F	G	H	I	J
				10 Year NPV					
				RG Burner Tip Rate Comparison		BC Hydro T1:T2		FortisBC T1:T2	
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	Priced @ equivalent of NG	Priced @ weighted average cost of RG Supply	50:50	25:75	50:50	25:75
1	Low Bookend	200%	100%	$14,274	$25,627	$15,671	$17,237	$17,412	$17,862
2	High Bookend	272%	230%	$14,274	$25,627	$9,608	$10,568	$10,676	$10,952

Revised Table 2: Low Electricity Rate Change - Renewable Gas Premium (Discount) to Electricity ($/GJ)

A	B	C	D	E	F	G	H	I	J	K	L
				$/GJ							
				BC Hydro				Fortis BC			
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	50:50		25:75		50:50		25:75	
				RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ
1	Low Bookend	200%	100%	$1.81	($12.87)	$3.83	($10.85)	$4.06	($10.62)	$4.64	($10.04)
2	High Bookend	272%	230%	($6.03)	($20.71)	($4.79)	($19.47)	($4.65)	($19.33)	($4.29)	($18.97)

Revised Table 1: Medium Electricity Rate Change - Comparison of 10 Year NPV of Heating Costs

A	B	C	D	E	F	G	H	I	J
				10 Year NPV					
				RG Burner Tip Rate Comparison		BC Hydro T1:T2		FortisBC T1:T2	
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	Priced @ equivalent of NG	Priced @ weighted average cost of RG Supply	50:50	25:75	50:50	25:75
1	Low Bookend	200%	100%	$14,274	$25,627	$18,447	$20,290	$20,497	$21,026
2	High Bookend	272%	230%	$14,274	$25,627	$11,310	$12,440	$12,567	$12,892

Revised Table 2: Medium Electricity Rate Change - Renewable Gas Premium (Discount) to Electricity ($/GJ)

A	B	C	D	E	F	G	H	I	J	K	L
				$/GJ							
				BC Hydro				Fortis BC			
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	50:50		25:75		50:50		25:75	
				RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ
1	Low Bookend	200%	100%	$5.39	($9.28)	$7.78	($6.90)	$8.04	($6.63)	$8.73	($5.95)
2	High Bookend	272%	230%	($3.83)	($18.51)	($2.37)	($17.05)	($2.21)	($16.88)	($1.79)	($16.46)

Revised Table 1: High Electricity Rate Change - Comparison of 10 Year NPV of Heating Costs

A	B	C	D	E	F	G	H	I	J
				10 Year NPV					
				RG Burner Tip Rate Comparison		BC Hydro T1:T2		FortisBC T1:T2	
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	Priced @ equivalent of NG	Priced @ weighted average cost of RG Supply	50:50	25:75	50:50	25:75
1	Low Bookend	200%	100%	$14,274	$25,627	$21,786	$23,963	$24,207	$24,833
2	High Bookend	272%	230%	$14,274	$25,627	$13,358	$14,692	$14,842	$15,225

Revised Table 2: High Electricity Rate Change - Renewable Gas Premium (Discount) to Electricity ($/GJ)

A	B	C	D	E	F	G	H	I	J	K	L
				$/GJ							
				BC Hydro				Fortis BC			
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	50:50		25:75		50:50		25:75	
				RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ
1	Low Bookend	200%	100%	$9.71	($4.96)	$12.52	($2.15)	$12.84	($1.84)	$13.65	($1.03)
2	High Bookend	272%	230%	($1.19)	($15.86)	$0.54	($14.13)	$0.73	($13.94)	$1.23	($13.45)

57.3 Please provide an additional analysis using a range of assumptions (low, medium, high) for commodity gas rate increases over the next 10 years.

Response:

FEI notes that the preamble to this question refers to BCUC IR1 13.7, 24.1 and 24.2. FEI's response to BCUC IR1 24.1 and 24.2 do not include analysis, so for this response FEI has assumed that the BCUC is requesting updates to the tables included in response to BCUC IR1 13.7. FEI provided two tables in response to BCUC IR1 13.7: Table 1 provided the comparison of the NPV of heating costs over 10 years and Table 2 provided the $/GJ premium determination.

FEI believes that using a low, medium, high commodity change assumption does not provide meaningful results. Changing commodity costs without changing the comparator costs of electricity produces an unbalanced analysis and, as discussed in response to BCUC IR1 24.2, FEI cannot reasonably predict BC Hydro electric rates into the future. Nonetheless, to be responsive FEI has provided the tables below with low, medium and high commodity costs below.

FEI used a Sumas gas price forecast to derive the low, medium and high commodity cost for this response. These values represent an increase of 0.7 percent, 1.4 percent, and 2.7 percent to the cost of gas.

Revised Table 1: Low Commodity Rate - Comparison of 10 Year NPV of Heating Costs

A	B	C	D	E	F	G	H	I	J
				10 Year NPV					
				RG Burner Tip Rate Comparison		BC Hydro T1:T2		FortisBC T1:T2	
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	Priced @ equivalent of NG	Priced @ weighted average cost of RG Supply	50:50	25:75	50:50	25:75
1	Low Bookend	200%	100%	$14,311	$25,627	$13,670	$15,036	$15,189	$15,581
2	High Bookend	272%	230%	$14,311	$25,627	$8,381	$9,219	$9,313	$9,553

Revised Table 2: Low Commodity Rate - Renewable Gas Premium (Discount) to Electricity ($/GJ)

A	B	C	D	E	F	G	H	I	J	K	L
				$/GJ							
				BC Hydro				Fortis BC			
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	50:50		25:75		50:50		25:75	
				RG at $18.5/GJ	RG at $33.13/GJ	RG at $18.5/GJ	RG at $33.13/GJ	RG at $18.5/GJ	RG at $33.13/GJ	RG at $18.5/GJ	RG at $33.13/GJ
1	Low Bookend	200%	100%	$ (0.83)	$ (15.46)	$ 0.94	$ (13.69)	$ 1.14	$ (13.49)	$ 1.64	$ (12.99)
2	High Bookend	272%	230%	$ (7.66)	$ (22.29)	$ (6.58)	$ (21.21)	$ (6.46)	$ (21.09)	$ (6.15)	$ (20.78)

Revised Table 1: Medium Commodity Rate - Comparison of 10 Year NPV of Heating Costs

A	B	C	D	E	F	G	H	I	J
				10 Year NPV					
				RG Burner Tip Rate Comparison		BC Hydro T1:T2		FortisBC T1:T2	
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	Priced @ equivalent of NG	Priced @ weighted average cost of RG Supply	50:50	25:75	50:50	25:75
1	Low Bookend	200%	100%	$15,324	$25,627	$13,670	$15,036	$15,189	$15,581
2	High Bookend	272%	230%	$15,324	$25,627	$8,381	$9,219	$9,313	$9,553

Revised Table 2: Medium Commodity Rate - Renewable Gas Premium (Discount) to Electricity ($/GJ)

A	B	C	D	E	F	G	H	I	J	K	L
				$/GJ							
				BC Hydro				Fortis BC			
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	50:50		25:75		50:50		25:75	
				RG at $19.81/G	RG at $33.13/G	RG at $19.81/G	RG at $33.13/G	RG at $19.81/G	RG at $33.13/G	RG at $19.81/G	RG at $33.13/G
1	Low Bookend	200%	100%	$ (2.14)	$ (15.46)	$ (0.37)	$ (13.69)	$ (0.17)	$ (13.49)	$ 0.33	$ (12.99)
2	High Bookend	272%	230%	$ (8.97)	$ (22.29)	$ (7.89)	$ (21.21)	$ (7.77)	$ (21.09)	$ (7.46)	$ (20.78)

Revised Table 1: High Commodity Rate - Comparison of 10 Year NPV of Heating Costs

A	B	C	D	E	F	G	H	I	J
				10 Year NPV					
				RG Burner Tip Rate Comparison		BC Hydro T1:T2		FortisBC T1:T2	
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	Priced @ equivalent of NG	Priced @ weighted average cost of RG Supply	50:50	25:75	50:50	25:75
1	Low Bookend	200%	100%	$17,320	$25,627	$13,670	$15,036	$15,189	$15,581
2	High Bookend	272%	230%	$17,320	$25,627	$8,381	$9,219	$9,313	$9,553

Revised Table 2: High Commodity Rate - Renewable Gas Premium (Discount) to Electricity ($/GJ)

				$/GJ							
				BC Hydro				Fortis BC			
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	50:50		25:75		50:50		25:75	
				RG at $22.39/G	RG at $33.13/G	RG at $22.39/G	RG at $33.13/G	RG at $22.39/G	RG at $33.13/G	RG at $22.39/G	RG at $33.13/G
1	Low Bookend	200%	100%	$ (4.72)	$ (15.46)	$ (2.95)	$ (13.69)	$ (2.75)	$ (13.49)	$ (2.25)	$ (12.99)
2	High Bookend	272%	230%	$ (11.55)	$ (22.29)	$ (10.47)	$ (21.21)	$ (10.35)	$ (21.09)	$ (10.04)	$ (20.78)

In response to BCUC IR 13.7, FEI provided the following table showing the premium or discount (in red) that would need to be added to or subtracted from the RG price options in order to achieve energy cost parity with electricity:

Table 2: Renewable Gas Premium (Discount) to Electricity ($/GJ)

A	B	C	D	E	F	G	H	I	J	K	L
				$/GJ							
				BC Hydro				Fortis BC			
Scenarios	Description	Heat Pump Efficiency	Water Heater Efficiency	50:50		25:75		50:50		25:75	
				RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ
1	Low Bookend	200%	100%	$ (0.78)	$ (15.46)	$ 0.98	$ (13.69)	$ 1.18	$ (13.49)	$ 1.69	$ (12.99)
2	High Bookend	272%	230%	$ (7.62)	$ (22.29)	$ (6.54)	$ (21.21)	$ (6.41)	$ (21.09)	$ (6.10)	$ (20.78)

57.4 Please clarify which year the rates shown in Table 2 correspond to.

Response:

In Table 2, FEI used January 2022 rates throughout the 10 year NPV analysis and assumed escalating carbon taxes over 10 years to $170 per tonne by 2030.

57.4.1 For the High Bookend (high efficiency electric heat pumps), how much would the electricity rates need to increase annually over the next 10 years in order for the RG price options to achieve energy cost parity over the next 10 years (i.e., for the discount to be reduced to zero in the above Table 2)?

Response:

The table below shows the compound annual percent increase needed in the electric rates to reduce the values above to zero, thereby reducing the discount to zero.

It is important to note that the $ per GJ discount (and premium) are calculated based on the NPV of heating costs over 10 years. Since, using the assumptions in the response to BCUC IR1 13.7, the heating costs using electricity starts at a lower level than that of Renewable Gas (in order to achieve parity (i.e., eliminate the discount) over that time frame), the electrical bill at the end of year 10 must be greater than the Renewable Gas equivalent. This results in electrical bills that are much more expensive than the high or low bookend pricing for Renewable Gas.

Hypothetical Electrical Rate Increase, Compounded Annually							
BC Hydro				Fortis BC			
50:50		25:75		50:50		25:75	
RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ	RG at $18.45/GJ	RG at $33.13/GJ
11%	23%	9%	21%	9%	21%	9%	21%

58.0 Reference: RENEWABLE GAS CONNECTIONS

Exhibit B-17, Section D, BCUC IR 16.1

Bonbright Rate Design Criteria

In response to BCUC IR 16.1, Concentric stated:

> As discussed in the response to BCUC IR1 13.2, regulators, including the BCUC and other Canadian regulators, have applied Bonbright's principles in a manner that makes much greater use of rolled-in or average costs than vintaged or incremental costs in utility service ratemaking. In fact, ratemaking based on the rolled-in cost by customer class has been the dominant form of pricing in North America, even when incremental costs significantly exceeded average costs. This is precisely the situation today with the cost difference between Renewable Gas and conventional natural gas. [footnote omitted]

58.1 Please provide the cost difference between renewable gas and conventional natural gas in this Application and compare it with the cost difference underlying the NEB and BCUC decisions discussed in Concentric's response to BCUC IR 13.2.

Response:

FEI provides a table below setting out the incremental energy cost to serve a new customer Renewable Gas over conventional natural gas using the forecast of Renewable Gas cost from this Application, the current approved[15] cost of gas and carbon tax escalating to $170 per tonne by 2030, and assuming the new customer receives 100 percent Renewable Gas.

Table 1: Incremental Energy Cost per GJ for a New Customer

$/GJ	2023	2024	2025	2026	2027	2028	2029	2030
Renewable Gas	23.52	24.27	24.84	25.33	25.76	23.85	24.06	24.31
Conventional Gas	5.91	5.91	5.91	5.91	5.91	5.91	5.91	5.91
Carbon Tax	3.29	4.02	4.75	5.48	6.21	6.94	7.67	8.40
Incremental Energy Cost	14.33	14.34	14.19	13.94	13.65	11.00	10.49	10.00

The following response is provided by Concentric.

The current and projected differences in costs are greater than the cost differentials underlying most of the decisions referred to in the response to BCUC IR1 13.2. This is because the decisions dealing with rolled-in versus incremental cost ratemaking deal primarily with the ratemaking treatment to be accorded to facilities, which by its nature is less volatile than expenses such as purchased gas costs.

[15] Approved as at July 1, 2022

The decisions referred to in the response to BCUC IR1 13.2 also deal with the overall rate impact to customers from rolling in costs rather than treating them on a stand-alone basis, recognizing, however, in Canada that existing customers do not have an entitlement to rates that protect the customers from the costs of new projects. When viewed from the perspective of total customer impacts to the existing customers, the roll-in of gas costs on the FEI system are not expected to result in rate increases that are materially different than the rate increases that were considered in the cases cited in the response to BCUC IR1 13.2. The impact to existing customers from rolling in gas costs on the FEI system will depend on the number of new gas connections on the FEI system, however, based on past growth in new connections, which has been approximately 1.4 percent[16] per year, even with a gas cost differential as large as that shown in the table above, existing customers' rates will only increase by approximately 0.8 percent per year as a result of the proposed gas cost treatment.

58.2 Is Concentric aware of decisions by North American regulators that relied on vintaged or incremental costs in utility ratemaking? If so, please describe at a high level these decisions and provide the reference.

Response:

The following response is provided by Concentric.

Yes, Concentric is aware that there have been decisions in the US that adopted vintaged rates on gas transmission systems regulated by the FERC and the California Public Utility Commission. At a high level, these decisions represent a different regulatory philosophy between those regulators' views, at that time, and the prevalent views in Canada and the rest of the US on whether rolled-in or vintaged ratemaking is appropriate.

The regulatory philosophy underlying the use of vintaged rates is that new service, which is provided using a combination of new and existing facilities, should reflect the incremental cost of providing the new service if that incremental cost is higher than the embedded cost of existing service. This view is the product of regulators concluding that the rates of existing customers should be protected from increases associated with facilities expansions used to provide incremental service, even where the incremental service is provided under essentially the same terms as the existing service. This view, that existing customers have a right to rate protection from rate increases associated with service expansions, is directly contrary to the policy of the CER (and formerly the NEB) which has established a policy that new facilities reflect the joint demand of new and existing customers, and that incremental service should not be treated differently than existing service where the two reflect essentially the same service. The CER's

[16] Average of years 2017 to 2021 inclusive.

policy reflects its principle that customers do not have an "acquired right," associated with having taken service in the past, to be exempted from increases associated with new facilities.

Concentric has not compiled a complete list of cases in the US reflecting the use of vintaged rates. However, examples of the consideration of such rates include:

1. California PUC A-89-04-033;
2. California PUC A-92-04-031;
3. FERC RP93-14;
4. FERC RP94-149;
5. FERC RP04-360;
6. FERC RP15-65;
7. FERC RP 16-137;
8. NEB GH5-89; and
9. NEB RH1-2007.

D. PROPOSED PROGRAM – VOLUNTARY RENEWABLE GAS

59.0 Reference: VOLUNTARY RENEWABLE GAS OFFERING

Exhibit B-17, Section F, BCUC IR 28.1

Continuation of the 2015 BERC Rate for Voluntary RG Sales Customers

In response to BCUC IR 28.1, FEI stated:

> FEI has no reliable information on which to propose a change to the $7 per GJ premium for the Voluntary Renewable Gas service. Please refer to Sections 5.2.2 and 5.8 of the Application. Given the responses to the customer surveys, as well as the program history and anecdotal feedback collected by FEI staff, FEI's customers are sensitive to the price premium for Renewable Gas. The higher the price of Renewable Gas, the less likely they are to purchase it. This is especially the case for customers that have many options to reduce GHG emissions, including switching to electricity or other fuels, energy efficiency, renewable distributed energy resources, carbon offsets, or any combination thereof.

59.1 In absence of RG price elasticity data, for FEI to determine whether customers are more or less likely to purchase RG to meet their GHG targets, please confirm, or explain otherwise, that FEI would need to know the cost (in $/GJ) of the alternative options that customers can choose from: 1) switching to electricity; 2) investing in energy efficiency; 3) investing to acquire renewable DG energy resources; and 4) purchasing carbon offsets.

Response:

The question implies that cost is a customer's only consideration when choosing a low carbon energy type. FEI believes that cost is a primary consideration, but is not necessarily the only consideration. Please refer to the response to BCUC IR2 60.2.

Comparing the cost of Renewable Gas to that of alternative options, as presented in the question above, can be done for simple residential buildings such as detached homes, duplexes or townhomes, with the information described in the question. For example, FEI provided an analysis of the cost of choosing electricity versus Renewable Gas in the responses to BCUC IR1 13.6 and 13.7. However, these comparisons become increasingly complex and provide progressively less useful insights as buildings become larger and more complex. As FEI indicated in the responses to BCUC IR1 13.8 and 13.9, it could not provide a meaningful comparison between Renewable Gas and electricity when considering larger buildings.

The same principle of increasing complexity applies to the analysis of the other alternatives versus Renewable Gas as it does for electricity. In Section 5.5 of the Application, FEI indicated that customers with larger more complex buildings have a range of alternatives available to achieve their GHG emissions reduction targets, and all these alternatives can be combined in ways to suit

their buildings, their budgets, or their organizational objectives. There can, for example, be limits to the degree to which the alternatives may serve as reasonable substitutes for each other which can affect a customer's likelihood to purchase Renewable Gas. Investments in energy efficiency, for instance, can *reduce* GHG emissions to a degree, but generally cannot *eliminate* GHG emissions as can be done with Renewable Gas or electricity. Likewise, carbon offsets may not be viewed as a legitimate reduction in GHG emissions by some organizations. Alternatively, organizations may have policies that mandate electrification to the exclusion of other options, including Renewable Gas, irrespective of the cost.

Therefore, FEI believes that determining whether customers would be more or less likely to purchase Renewable Gas at a particular price is much more complex than is suggested in the question. In addition to the four data points described in the question, FEI would need additional information for each customer type such as, but not limited to:

1. The costs of any associated work required to adopt each alternative such as architectural or ventilation system modifications.
2. The availability and magnitude of incentives in support of the alternative options.
3. In existing buildings:
    a. The extent to which building owners would like to reduce their emissions; and
    b. The extent to which energy efficiency measures can technically be incorporated
4. Customers' perceptions of the relative merit of Renewable Gas versus other low carbon energy types, including the social acceptance of Renewable Gas.

FEI would also need to have a way of aggregating all of the various considerations described above to develop the likelihood of purchasing Renewable Gas versus the alternatives at various price points.

All of the above describe how the market considerations are complex. The market to lower the carbon emissions in buildings is made up of many market participants, making a continuous series of choices within the context of their organizations. FEI is ultimately of the view that the information described in the question would not serve as a feasible substitute for market based price elasticity data.

59.2 Has FEI conducted research to estimate the costs or the range of costs (in $/GJ) that customers would have to pay to implement any of these four options? If so, please provide the cost in $/GJ for each of these alternative options.

59.2.1 If not, please clarify why not, considering FEI's submission that it has no reliable information on which to propose a change to the $7/GJ premium.

Response:

FEI has not conducted research to estimate the costs or the range of costs that customers would have to pay to implement switching to electricity or other fuels, energy efficiency, renewable distributed energy resources, carbon offsets, or any combination thereof.

Please refer to the response to BCUC IR2 59.1. FEI believes that the significant differences between building types and customers would mean that the results of any such research would be of little value as the range of potential costs would vary considerably across customer types, according to their particular circumstances, need to reduce GHG emissions, and access to feasible alternatives.

Ultimately, the type of research described in the question is not a reasonable substitute for real market data describing how customers in aggregate act with respect to Renewable Gas in response to price changes.

60.0 Reference: VOLUNTARY RENEWABLE GAS OFFERING

Exhibit B-17, Section F, BCUC IRs 28.3, 28.4.1, 28.5.1, and 31.1

Just vs. Unjust Discrimination

In response to BCUC IR 28.3, Concentric stated:

> Differential pricing for the Voluntary Renewable Gas service is justified. Differential pricing is not unduly discriminatory in the context of the Voluntary Renewable Gas Service because voluntary customers have chosen to take the service and have the option to take the same service as all sales customers, including the Renewable Gas Blend.

60.1 If differential pricing for the Voluntary RG service is justified and not unduly discriminatory in the context of the Voluntary RG service, please explain why FEI should not try to set the RG premium at a price that would maximize revenue from this group? What information is necessary to determine this revenue maximization price, and can FEI or Concentric quantify this price or range of prices?

Response:

The following response is provided by Concentric.

As discussed in the response to BCUC IR1 28.1, the $7/GJ premium strikes a balance that seeks to maximize revenues, an objective noted by the BCUC, in a manner that also (1) enables FEI to increase the amount of Renewable Gas in the supply portfolio that is dedicated to customers that wish to, or are required to, purchase greater amounts of Renewable Gas than is in the blended rate; (2) advances GHG emission reduction goals; (3) reduces other customers' contributions to the S&T LC rider; and (4) retains customers and mitigates potential upward rate pressure if those customers left the system.

If the premium for the Voluntary Renewable Gas service were increased, it is not likely that revenues would likewise be increased. Given the responses to the customer surveys, as well as the program history and anecdotal feedback collected by FEI staff, FEI's customers are sensitive to the price premium for Renewable Gas. The higher the price of Renewable Gas, the less likely they are to purchase it. This is especially the case for customers that have many options to reduce GHG emissions, including switching to electricity or other fuels, energy efficiency, renewable distributed energy resources, carbon offsets, or any combination thereof. If the premium were increased, it is more likely that a smaller volume of voluntary Renewable Gas would be purchased.

FEI has no reliable information on which to propose a change to the $7/GJ premium for the Voluntary Renewable Gas service. Please refer to Sections 5.2.2 and 5.8 of the Application. FEI has indicated that it cannot perform a price elasticity analysis to reasonably determine what customers may actually be willing to pay for Renewable Gas, and what effect changes in price may have on the demand for Renewable Gas under the Voluntary Program.

BCUC IRs 28.4.1 and 28.5.1 asked FEI to explain why it would be just, fair and reasonable for entities that either need to comply with increasingly stringent emissions reduction regulations or want to improve their ESG score, to be subsidized by all sales customers for their increased cost of doing business. FEI stated:

> Further, while FEI has no information regarding the particular price sensitives of these customers, FEI is aware that these customers are price sensitive generally and have other options to reduce GHG emissions, including energy efficiency, fuel switching, renewable distributed energy resources, carbon offsets, or any combination thereof. Therefore, charging these customers a rate higher than the current $7 per GJ premium can only make it more likely that these entities will choose an option other than Renewable Gas to reduce GHG emissions, and potentially leave the gas system, which would reduce program participation and volumes, and increase the Renewable Gas costs borne by other sales customers.

60.2 Please confirm, or explain otherwise, that entities that either need to comply with increasing stringent emissions reduction regulations or want to improve their ESG score would more likely choose another option only if that other option is less costly than choosing RG.

Response:

Confirmed that, based on conversations with customers, FEI believes that cost is a primary consideration when such customers choose a low carbon energy type. For clarity, cost in the preceding sentence refers to the all-in cost associated with a particular energy type, including the capital costs, maintenance costs, cost of energy and so on.

60.3 Please explain why it would be just, fair and reasonable for entities that must comply with increasing stringent emissions reduction regulations or want to improve their ESG score to potentially be subsidized by all sales customers for their increased cost of doing business.

Response:

The following response is provided by Concentric.

Please refer to the response to BCUC IR2 60.1. In order to advance clean energy policies, departures from strict cost-based ratemaking may be appropriate.

Further, as discussed in the response to BCUC IR1 28.4.1, while FEI has no information regarding the particular price sensitives of these customers, FEI is aware that these customers are price sensitive generally and have other options to reduce GHG emissions, including energy efficiency, fuel switching, renewable distributed energy resources, carbon offsets, or any combination thereof. Therefore, charging these customers a rate higher than the current $7/GJ premium can only make it more likely that these entities will choose an option other than Renewable Gas to reduce GHG emissions, and potentially leave the gas system, which would reduce program participation and volumes, and increase the Renewable Gas costs borne by other sales customers.

Accordingly, FEI proposes to continue to price the Voluntary Renewable Gas service on a stand-alone cost basis using $7/GJ as a proxy for the Renewable Gas cost differential over the cost of conventional natural gas. This approach is just, fair and reasonable because it helps to achieve provincial goals for decarbonization while limiting the premium paid by Voluntary Renewable Gas customers to one which keeps these customers on the gas network and sustains their contribution to the recovery of fixed costs.

60.4 If entities that either need to comply with increasingly stringent emissions reduction regulations or want to improve their ESG score opt for an alternative option to reduce their GHG emissions, for instance investing in energy efficiency, transitioning to electricity, acquiring renewable DG energy resources or buying carbon offsets, please confirm, or explain otherwise, that the risk of cross-subsidization by all sales customers will be mitigated in doing so.

Response:

The following response is provided by Concentric.

Please refer to the responses to BCUC IR2 60.1 and 60.3. While increasing the premium for the Voluntary Renewable Gas service will mitigate cross subsidization, it will do so at the expense of program participation. This in turn would detract from achieving the Province's energy policy goals and may ultimately increase costs to other sales customers.

Under FEI's proposal, Voluntary Renewable Gas customers will pay a greater share of the Renewable Gas acquisition costs than other sales customers. This is because Voluntary Renewable Gas customers will pay the S&T LC rider to recover costs associated with the Renewable Gas Program and a premium on the volumes of Renewable Gas that they purchase. Voluntary Renewable Gas customers will reduce the costs of Renewable Gas to be borne by all other sales customers. If participation in the Voluntary Renewable Gas service declines, the cost of Renewable Gas to be borne by all other sales customers increases.

Further, if Voluntary Renewable Gas customers leave the gas network, so does their contribution to the recovery of fixed costs, which will increase costs to be borne by all other sales customers.

In response to BCUC IR 31.1, FEI indicated that the average price of carbon offsets ($/GJ) from 2017 to 2022 was $1/GJ.

60.5 Since carbon offsets at $1/GJ are less expensive than RG at a premium of $7/GJ, please explain why FEI expects Voluntary RG customers to choose to buy RG voluntarily instead of buying carbon offsets to meet their GHG targets.

Response:

Traditionally, the attributes of energies have been recognized in relationship to affordability, resilience, and safety, among others. However, in the relatively emerging context of emissions reductions, additional energy attributes are sought after by customers. These attributes include recognition of certifications, ease of administration, reliability of supply and emissions abatement certainty, and perceived level of directness between investment and emissions abatement. FEI expects Voluntary Renewable Gas customers to choose to buy Renewable Gas instead of carbon offsets for the following reasons:

- First, Renewable Gas provides customers with an accessible and understandable means of reducing their emissions. In particular, customers can easily request to enroll in the Renewable Gas Program. The costs associated with the Voluntary Renewable Gas service are transparent and the service offers flexibility for customers to select the amount of Renewable Gas (and associated emissions reductions) they would like to undertake with blends of Renewable Gas increasing in 5 percent increments up to a 100 percent.
- Second, the supply of Renewable Gas provided through the Voluntary Renewable Gas service is contracted and vetted by FEI, regulated by the BCUC, and recognized by the provincial government in the *Greenhouse Gas Reduction (Clean Energy) Regulation*. Customers who purchase Renewable Gas therefore have assurance that their purchase equates to a direct displacement of traditional fossil gas.

Customers will be able weigh the above benefits, including the direct displacement assurance provided and the associated cost, against the relatively nascent product of carbon offsets which offer less certainty of certification, regulation, and recognition in the policy framework under which customers operate.

Importantly, many customers and businesses whose policy framework for guiding emissions measurement requires emissions factors from the provincial government's 2020 B.C. Best

Practices Methodology for Quantifying Greenhouse Gas Emissions[17] would not be able to use carbon offsets. Carbon offsets are not included in the document and consequently could not be included in any formula for deriving the carbon impact of a customer based on their industry's requirements. Moreover, similar to the voluntary aspect of FEI's existing RNG Program, the absence of permanence for the lifetime of a building or building's operations may not fulfill a key criteria of an emissions reduction policy.

While carbon offsets are less expensive than RNG today, the price of carbon offsets is not static and is expected to increase over time as more difficult to abate sectors are required to reduce their GHG emissions. For example, with respect to carbon abatement pricing, the current credit pricing in the LCFS market is resulting in a potential offset/reduction of the cost of Renewable Gas of approximately $20/GJ.

In contrast to the Voluntary Renewable Gas service, the carbon offset market is difficult to navigate for less sophisticated customers and the lack of regulation and certification of the market at this time may dissuade customers from purchasing carbon offsets out of concern that their purchases will not be recognized in the future or that the offset they purchased was ineligible. FEI also expects there could potentially be skepticism from customers as to whether net zero emissions can be accomplished exclusively through the purchase of offsets. The cost differential between RNG and offsets becomes immaterial if customers are unable to purchase carbon offsets, or do not feel they are meaningfully reducing emissions or getting credit for doing so.

Ultimately, FEI believes customers value the benefits of Renewable Gas and the strong link between their own investments and emissions reduction. Furthermore, from a utility perspective, the exclusive purchase of offsets in lieu of replacing conventional natural gas with cleaner and renewable energy sources does not assist the utility in transition to a low-carbon economy. Over time, FEI expects an approach that uses both tools will be necessary.

60.5.1 Is FEI aware of any limits placed on the amount of carbon offsets that can be purchased by entities to meet their GHG targets?

Response:

No, FEI is not aware of any limits placed on the amount of carbon offsets that can be purchased. Please also refer to the response to BCUC IR2 60.5 that describes how some customers cannot use carbon offsets to meet their emissions targets.

[17] https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2020-pso-methodology.pdf.

60.6 If customers choose to invest in energy efficiency and/or buy carbon offsets among the alternatives to reduce their GHG emissions, please confirm, or explain otherwise, that these customers do not need to leave the gas system when doing so, and thus, can continue contributing to the recovery of the fixed costs of the gas system.

Response:

While investments in energy efficiency or carbon offsets or both present customers with the potential of continuing to remain on the gas system and contribute to the recovery of fixed costs, in practice, the availability of these options is limited due to three key factors:

- the customer's applicable policy framework must recognize carbon offsets;
- the customer's investment in energy efficiency measures would need to be sufficient to meet the emissions targets; and
- the customer would need to overcome obstacles created by the preference of policy makers for electrification as the only method for GHG reductions.

The first challenge for customers choosing to invest in carbon offsets is determining if either their own corporate ESG measures or the policy framework under which they operate recognizes carbon offsets. As described in the response to BCUC IR2 60.5, for those customers and businesses whose policy framework for guiding emissions measurement requires emissions factors from the provincial government's 2020 B.C. Best Practices Methodology for Quantifying Greenhouse Gas Emissions,[18] they would not be able to use carbon offsets. Carbon offsets are not included in the document and consequently could not be included in any formula for deriving the carbon impact of a customer based on their industry's requirements.

Second, energy efficiency alone may be insufficient to meet a customer's emissions related targets. As outlined in Section 3.5.1 of the Application, a building using natural gas for space and water heating cannot meet some of the more stringent GHGi targets. The District of North Vancouver passed a bylaw adopting a low carbon energy approach requiring 3kg $Co_2e/m^2/yr$. The current GHGi baseline for new construction using conventional natural gas is in the range of approximately 11 to 27 kg $Co_2e/m^2/yr$. Carbon offsets are not recognized as a potential option for these home builders and energy efficiency alone is insufficient to meet required GHGi target.

Third, while policies may be presented to be energy neutral, a preference for electrification may send signals to the marketplace to abandon the choice of energy efficiency and carbon offsets in favour of an energy choice that has greater perceived ease of doing business. Please refer to he response to BCUC IR 2 48.3. Consequently, the practice of selecting emissions reducing measures is not based on the attributes of the measures alone. Operating within a marketplace's varying regulations will guide commercial, industrial, and residential customers towards a narrower field of options.

[18] https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2020-pso-methodology.pdf.

61.0 Reference: VOLUNTARY RENEWABLE GAS OFFERING

Exhibit B-17, Section F, BCUC IRs 28.7 and 30.1

Evaluation of Alternative Rate-Setting Mechanisms for Voluntary RG Sales Customers

In response to BCUC IR 30.1, Concentric stated:

> The "cost-based" rate-setting option will result in fewer customers without GHG mandates participating in the program. Moreover, it would drive customers with GHG mandates away from Renewable Gas and toward the use of electricity given the unlevel playing field that exists today, as discussed in the response to BCUC IR1 17.1. Such a result is not only inconsistent with the BCUC's objective of maximizing revenues, but will also likely put upward pressure on gas rates as customers with GHG mandates substitute electricity for Renewable Gas to meet their clean energy needs. It also increases the potential for underutilized assets and increasing rates. Such outcomes are not in the long-term interests of FEI's existing customers or the public. [Emphasis added]

In response to BCUC IR 28.7, FEI stated:

> In practice, FEI expects that participation in the Voluntary Renewable Gas service by these customers would be limited to those with firm and committed GHG emission targets, and who also face high capital cost or technical barriers to electrification. However, the use of lower cost purchased carbon offsets, instead of higher cost Renewable Gas, may ultimately be a better option for many of these customers, further limiting potential demand for Renewable Gas from these customer groups. [Emphasis added]

61.1 Please explain whether a new building owner would more or less likely to be in favour of investing in electric equipment rather than gas equipment as compared to an existing building owner who is already connected to the natural gas distribution system. Include supporting evidence resulting from FEI's customer consultation process and a summary of its GHG mandates.

Response:

For purposes of this response, FEI has assumed that the question's reference to a "new building owner" refers to a newly constructed building and the decisions by the builder and/or developer to install certain equipment. This is as compared to the owner of an existing building that is already connected to the gas system.

Traditionally, from an equipment, technology, and likely, a capital cost perspective, an existing building owner would most likely prefer to choose like-for-like equipment. This means that if the pre-existing equipment used electricity, the most cost-effective retrofit would likely be electric equipment. The same is true of gas for an existing gas building. This would result in a high likelihood that an existing building connected to the gas system would continue to use gas, as

compared to a new building where the owners has more variables to consider and is less constrained by existing equipment and design.

However, other factors, including policies that restrict gas options, now influence existing customers' decision-making processes. Some such customers, especially in the public sector, may select electrification as a result of a policy which favours electrification at the exclusion of other low carbon energy types (such as RNG), despite lower costs and easier installations.

When selecting gas or electric equipment in new buildings, builders/developers will not necessarily always choose the same energy or mechanical equipment option for each building or development. Their selection process for energy and equipment revolves around market preferences, costs, location, changes and innovations in technology. Developers want the ability to choose different energy and mechanical equipment as it suits their business and construction projects, be that gas or electric equipment.

While new buildings are not constrained by existing design and equipment parameters and notionally have many options when it comes to the equipment in their new building, GHG mandates/policies/bylaws (please see Appendix A Section 1.4 of the Application), in addition to incentives from the federal, provincial and local governments and BC Hydro, impact the developers/builders choice when it comes to equipment.

Ultimately, there are a range of unique business drivers for existing property owners and developers when making their energy and equipment selection. Based on FEI's consultation, the commonality for both new building and existing building owners is the desire for energy choice in the marketplace that allows the customer to determine their priorities and key characteristics of the building when making their energy and equipment selection, including the choice to use RNG.

.

61.2 Please clarify why existing customers with GHG mandates would invest in a transition toward more costly electric equipment rather than continuing to use their gas equipment and purchasing lower cost carbon offsets to meet their GHG mandates, thus continuing to contribute to the recovery of the gas distribution's fixed costs.

Response:

FEI's customers may invest in more costly electricity equipment and building upgrades, rather than use their gas equipment and lower cost carbon offsets, due to a number of factors that are effectively limiting the choice of customers, including the regulation of buildings, local, provincial and federal incentives, tax preference for electrical equipment, and policy direction, as carbon offsets are not well-accepted by either the public or policy makers as a tool for reducing GHG emissions. Please refer to the responses to BCUC IR2 60.5 and 60.6 for further discussion.

62.0 Reference: VOLUNTARY RENEWABLE GAS OFFERING

Exhibit B-17, Section F, BCUC IRs 26.1.1, 28.1, 28.3 and 28.4.1; Exhibit B-19, BCSEA IRs 4.9, 4.15, 4.18, and 4.19

Natural Gas Vehicle (NGV) and Transportation (T-Service) Customers

In response to BCSEA IR 4.9, FEI stated:

> Yes, FEI continues to view its proposed Renewable Gas Program, which encompasses T-Service customers, NGV customers and non-NGV sales customers, as being instrumental in maintaining the long-term viability of the gas delivery system and energy choice for British Columbians.

In response to BCSEA IR 4.18, FEI stated:

> While the laws and regulations relating to how to account for GHG reductions, and to whom GHG reductions are attributed, are not yet finalized, FEI understands based on the CleanBC Roadmap, that when it delivers Renewable Gas to a non-NGV customer (whether sales or T-Service), the associated GHG reductions will count towards the policy target of 47 percent emissions reduction in the CleanBC Roadmap, whereas the Renewable Gas FEI sells to NGV customers will not contribute to that target.

In response to BCUC IR 28.1 in discussing non-NGV and T-Service Voluntary RNG Program customers, FEI stated:

> Given the sensitivity of customers to price, and the availability of options to reduce GHG emissions, increasing the rate for Voluntary Renewable Gas can only increase the likelihood that customers will not purchase Renewable Gas or leave the gas system altogether in favour of other options to reduce their GHG emissions. This result will have a detrimental impact on all sales customers.

In response to BCUC IR 28.4.1 on the topic of Public Sector Organizations, municipalities, public transportations and corporations, FEI stated:

> Under FEI's proposal, Voluntary Renewable Gas customers will pay a greater share of the Renewable Gas acquisition costs than other sales customers. This is because Voluntary Renewable Gas customers will pay the S&T LC rider to recover costs associated with the Renewable Gas Program and a premium on the volumes of Renewable Gas that they purchase. Voluntary Renewable Gas customers will reduce the cost of Renewable Gas to be borne by all other sales customers.
>
> […]
>
> This approach is just, fair and reasonable because it helps to achieve provincial goals for decarbonization while limiting the premium paid by Voluntary Renewable Gas customers to one which keeps these customers on the gas network and sustains their contribution to the recovery of fixed costs.

62.1 Please confirm, or explain otherwise, whether there are benefits to FEI and FEI's customers related to retaining NGV and T-Service customers through their throughput to which FEI's fixed costs are recovered from.

Response:

Confirmed. FEI does not expect charging NGV or T-Service customers the average acquisition cost of RNG will cause these customers to leave the system. NGV customers that purchase RNG will receive the benefits of credits under the BC-LCFS. T-Service customers can purchase RNG at a lower cost if it is available or always have the option of becoming a sales customer.

62.2 Please confirm whether any premium above the conventional natural gas rate (e.g., Commodity Cost Recovery Charge (CCRC) plus carbon tax) charged for the RNG sold under the Voluntary RNG Program for NGV and T-Service customers will reduce the cost of the RG Program to be borne by all other sales customers.

62.2.1 If not confirmed, please provide the minimum rate at which sales to NGV and T-Service customers through the Voluntary RG offering will reduce the cost of the RG Program to be borne by all other sales customers.

Response:

Confirmed.

62.3 Please explain why T-Service customers are treated differently for the determination in Low Carbon Gas (LCG) Charge considering that any RNG deliveries to T-Service customers will contribute to the CleanBC Roadmap GHG emission target.

Response:

Customers that select or choose to be in T-Service are larger commercial and industrial customers, who are sophisticated energy users. These customers have two distinct options for service from FEI: either T-Service (Rate Classes 22, 23, 25, and 27) or Sales Service. These customers can elect to be in Sales rate classes and pay the LCG charge for RNG applicable to those rate classes in addition to paying the Storage and Transport charge applicable to Sales rate classes. Alternatively, these customers can choose to be in a T-Service rate class and, if so, they would not pay any LCG or Storage and Transport charges applicable to Sales rate classes. Since T-Service customers are not charged the S&T LC rider, they should not receive any discount on

pricing of RNG. Alternatively, if the S&T LC rider were extended to T-Service customers, then they should not be given the complete choice on how to procure their gas, including any RNG, which is the purpose of T-Service.

If T-Service customers wish to use RNG, they have two alternatives: procure their own RNG, or pay FEI for RNG via the LCG charge applicable to T-Service Customers. This is consistent with the purpose and design of T-Service in general which provides the customer the choice on how they want to procure gas service.

Ultimately, these larger commercial and industrial customers have options when procuring RNG, and therefore, have the opportunity to weigh the options and decide for themselves what makes the most sense for their business needs.

As laid out in the CleanBC Roadmap, the utility would be responsible for achieving GHG emission reduction targets; however, it is currently unclear how T-Service and industrial customers will be treated under this mechanism. Discussions are ongoing with the Province and no determination has been made in this regard.

In response to BCUC IR 26.1.1, FEI provided the following table:

Table 1: Voluntary Renewable Gas Annual Demand Forecasts (PJ)

Sector	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Residential	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4
Commercial	0.5	1.8	2.4	3.1	3.2	3.3	3.3	3.4	3.5	3.6	3.7	3.8
Industrial	-	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
NGV	0.1	0.8	0.9	1.4	1.6	1.7	1.9	2.0	2.1	2.2	2.2	2.2
Total	**0.7**	**3.0**	**3.7**	**5.0**	**5.3**	**5.5**	**5.7**	**6.0**	**6.2**	**6.4**	**6.5**	**6.6**

62.4 Given the sensitivity of customers to price, please discuss whether there is a risk that the forecast demand from NGV and T-Service customers may not be realized and how FEI has factored in this risk as part of the forecast.

Response:

The forecast of NGV volumes of Renewable Gas shown in Table 1 includes the expected impact of the change to the Renewable Gas price being sought in this Application. As discussed in the responses to Translink IR1 7.2 , City of Richmond IR1 9.2, and Brightside IR2 3i, FEI expects that, even with the higher proposed Renewable Gas price, NGV customers will still find value in purchasing Renewable Gas.

However, should the actual volume of Renewable Gas sold to T-Service and/or NGV customers underperform compared to forecast, any residual amounts will ultimately be available to all sales customers through the Renewable Gas Blend service. This in turn would contribute to achieving the GHG emissions cap, as described in the CleanBC Roadmap.

62.4.1 Assuming the LCG Charge is set as proposed by FEI, please provide the impact on the S&T LC Rider for the next five years (e.g., 2023 to 2028) or through to 2030 if the demand for the Voluntary RG offering from NGV and T-Service customers are:

a. 75 percent of the forecast amount

b. 50 percent of the forecast amount

c. 0 percent of the forecast amount

Response:

FEI provides the table below setting out the S&T LC rider which assumes Renewable Gas demand for the Voluntary Renewable Gas, NGV and T-Service customers is 100 percent (this equals the demand for these customer groups set out in the table provided in the preamble from the response to BCUC IR1 26.1.1), then at 75 percent, 50 percent and 0 percent. As demand for these other customer groups decreases, the S&T LC rider increases as more Renewable Gas supply is included in the Renewable Gas Blend.

Table 1: Calculation of S&T LC Rider per GJ at Various Voluntary, NGV and T-Service RG Demand Levels

$/GJ	2023	2024	2025	2026	2027	2028
S&T LC Rider @ 100% forecast Voluntary, NGV & T-Service	0.265	1.429	1.777	2.025	2.415	2.441
S&T LC Rider @ 75% forecast Voluntary, NGV & T-Service	0.587	1.509	1.815	2.207	2.612	2.643
S&T LC Rider @ 50% forecast Voluntary, NGV & T-Service	0.690	1.661	1.984	2.390	2.808	2.844
S&T LC Rider @ 0% forecast Voluntary, NGV & T-Service	0.896	1.964	2.321	2.754	3.200	3.248

62.5 Please explain whether it is possible for NGV customers to switch to a commercial or industrial rate schedule in order to obtain a lower LCG Charge for the Voluntary RNG offering. What are the implications to FEI and the customer of such a switch?

Response:

It is not possible for NGV customers to switch to alternative rate schedules to obtain a lower LCG Charge for the Renewable Gas they consume. As set out in Appendix D of the Application, FEI has added language to its non-NGV Sales Service rate schedules excluding NGV customers from taking service under those rate schedules. If an NGV customer were to switch to a T-Service rate schedule they could acquire RNG through Rate Schedule 11LC which, as proposed in the Application, has the LCG Charge set to the full acquisition cost of Renewable Gas along with the NGV rate schedules.

In response to BCSEA IR 4.15, Concentric stated:

> As discussed in Section 7.4.3.2 of the Application, the CleanBC Roadmap introduced a new cap on natural gas utilities to reduce GHG emissions from the use of conventional natural gas in certain sectors of the economy, including buildings and industry (but not transportation), to 47 percent lower than 2007 levels, by 2030. As a result of this policy, any volume of Renewable Gas sold to NGV customers means that FEI ratepayers must purchase additional Renewable Gas in order to achieve the reduction target. Should these volumes be sold to NGV customers at less than the cost of acquisition, FEI sales customers will also bear the cost of reducing the emissions of the transportation sector, in addition to the cost of reducing the emissions for the proposed GHG emissions cap for gas distribution utilities. FEI's proposal addresses this concern by having NGV customers pay the full Renewable Gas acquisition cost.
>
> It is also important to recognize that Renewable Gas has a higher value to NGV customers than to other customer types. NGV customers receiving CNG service and LNG service in British Columbia are eligible for Part 3 fuel supplier status under the BC-LCFS. NGV customers who purchase their own gas supply from a gas marketer are also eligible. Part 3 fuel suppliers that reduce the carbon intensity of their fuel relative to the baseline carbon intensity identified in the BC-LCFS can generate credits which can be sold in the credit market. In effect, the current BC-LCFS provides these customers with a financial incentive to reduce their GHG emissions by purchasing Renewable Gas, as discussed in Section 5.7.2 of the Application.
>
> Under FEI's proposal, T-Service customers will also pay the full cost of Renewable Gas if they choose to purchase Renewable Gas under Rate Schedule 11LC. T-Service customers have elected to purchase their own commodity, rather than receive it from FEI, and therefore are not similarly situated to sales customers. T-Service customers also have the option to move to sales service and receive Renewable Gas via the S&T LC rider and, if they wish, incremental volumes through the Voluntary Renewable Gas service.

Overall, this information indicates that NGV customers are not similarly situated to non-NGV sales customers. Charging a different price for a different service is just discrimination where that service is distinguishable from the default service, and where the value of that service to the customer is materially different. In FEI's proposal, NGV customers voluntarily pay FEI to acquire fully-decarbonized supply, which is distinguishable both as a matter of cost causation and value. Therefore, charging the directly assigned stand alone cost to those customers is "just discrimination". Similarly, T-Service customers are not sales customers, unless they elect to purchase renewable gas from FEI, and will not contribute to any shortfalls in the recovery of Renewable Gas costs. Therefore, their exemption from the S&T LC rider does not amount to unjust discrimination.

In response to BCUC IR 28.3, Concentric stated:

> […] However, one cannot generally make the statement that discriminatory pricing can be justified if the objective is to avoid cross subsidization between "old" and "new" customers, where those two customer groups are otherwise provided with the same or nearly the same service.

62.6 Please confirm that NGV customers who are eligible to generate LCFS credits for the purposes of retaining them for their own use or for sale in the credit market imply that FEI would not be eligible to claim any financial benefits or environmental attributes.

62.6.1 If confirmed, please elaborate on how the transaction will take place between FEI and its own NGV customer. Does this type of transaction require validation through the LCFS?

62.6.2 If not confirmed, please explain whether there is a risk of double counting of financial benefits or environmental attributes in the LCFS or other GHG targets.

Response:

Confirmed. However, FEI notes that this principle is not specific to NGV customers. FEI is not eligible to claim any financial benefits or environmental attributes when RNG is sold to any gas customer(s). This is because the environmental attribute of RNG passes to the customers, for their use and benefit, at the sale of RNG.

Under the BC-LCFS, customers who have purchased RNG would claim the LCFS credits directly through the BC Ministry of Energy, Mines, and Low Carbon Innovation (Ministry). FEI will provide the NGV customers with Ministry approved fuel codes for any RNG they have purchased. The NGV customers must inform the Ministry of the amount of RNG they have consumed and the associated Ministry-approved fuel codes for review and acceptance by the Ministry. Upon acceptance, the Ministry awards credits to the customer for use in the LCFS Credit Market. Ministry-approved fuel codes are created when FEI submits compliance filings, including carbon intensity information, for its RNG supply to the Ministry and these are subsequently validated and approved by the Ministry.

62.7 Please confirm, or explain otherwise, that the RNG sold to NGV and T-Service customers through the Voluntary RG offering is identical to the RNG sold to other sales customers through the same program.

Response:

Confirmed.

62.7.1 If confirmed, please explain how the RNG sold to NGV and T-Service customers is distinguishable from the default service to other sales customers such that any pricing differential would not be considered unduly discriminatory.

Response:

The following response is provided by Concentric.

Both the NGV and T-Service markets are workably competitive. The NGV market has various options available to it, including hydrogen, gas, diesel, electric vehicles and CNG and RNG. T-Service is both voluntary and customers have competitive alternatives to buy gas, including conventional natural gas and RNG. In markets that are workably competitive, market pricing is not unduly discriminatory.

62.8 Please discuss the pros and cons of setting the LCG Charge for NGV and T-Service customers in the Voluntary RG offering to be equal to other sales customers (e.g., CCRC + $7/GJ premium + carbon tax).

Response:

As described below, the cons of setting the LCG Charge for NGV and T-Service customers in the Voluntary Renewable Gas service equal to other sales customers outweigh any pros.

Pros

Setting the LCG Charge for NGV and T-Service customers to be equal to other sales customers would enhance the consistency of pricing across the proposed service offerings within the revised

Renewable Gas Program. A consistent approach would be simple to manage in terms of rate setting and general administration as all customers would be under the same rate.

Cons

The LCG Charge for NGV and T-Service customers equal to other sales customers would lead to financial harm to all other ratepayers.

First, as T-Service customers do not pay Storage and Transport charges, FEI would be unable to recover Renewable Gas Blend service costs through the S&T LC rider from this group, effectively affording this group a discounted price for RNG compared to Voluntary and non-Voluntary Sales Service customers. FEI notes that T-Service customers can access the Voluntary Renewable Gas service at the same LCG Charge as other customers if they elect to move to a bundled (sales) rate schedule, such as Rate Schedule 5B.

Second, FEI would be required to purchase RNG volumes to serve the demand from NGV customers, in addition to the that required to achieve the GHG emissions cap outlined in the CleanBC Roadmap. The volumes to serve NGV demand would have to be paid for in part by all ratepayers paying the S&T LC rider and, importantly, would not help the utility achieve the GHG emission reduction cap described in the CleanBC Roadmap.

Third, the volume of RNG consumed by NGV customers could be significant. According to the Canadian Energy Regulator, in 2019, the transportation sector accounted for 31 percent of all energy used in BC.[19] In the same year, natural gas delivered 29 percent of all energy used in BC. The adoption of RNG by a significant portion of the medium to heavy duty on road, and marine transportation sector could significantly exacerbate the costs being borne by all other customers. In contrast, as described in the response to Brightside IR2 3i, with the current pricing of BC-LCFS credits, the all-in net cost of RNG for NGV customers that are being charged the LCG charge results in in negative energy price for these customers. Therefore, NGV customers could be making money by consuming RNG, rather than being charged for RNG.

Because of all of these factors that are present in the current environment, FEI is not amenable to offering the Voluntary Renewable Gas service to NGV or T-Service customers if the LCG Charge for these customers were set to match that of all other sales customers

62.9 Please confirm whether FEI would offer the Voluntary RG offering to NGV and T-Service customers if the LCG Charge for those customers is set to match that of all other sales customers.

[19] https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-british-columbia.html#:~:text=Total%20Energy%20Consumption,10%25%20(Figure%205).

Response:

Please refer to the response to BCUC IR2 62.8.

62.10 Please provide and compare the annual bill impact for an average NGV and T-Service customer for the next five years (e.g., 2023 to 2028) or through to 2030 if the LCG Charge was set to:

a. FEI's proposed LCG Charge: 100 percent of the average cost of Renewable Gas supply

b. LCG Charge matching that of other sales customers (e.g., CCRC + $7/GJ premium + carbon tax)

Response:

As discussed in the responses to BrightSide IR1 13.i and BC Transit IR1 11.c, there are a variety of T-Service and NGV customers, which makes a bill impact analysis unlikely to be reflective of the customers in these classes. In particular, these customers have a high variation in the volumes that they consume and they may also elect low or high percentages of RNG depending on individual considerations. Further, many of these customers would not elect to use RNG no matter the cost and, as such, there would be no bill impact to these customers from changes to the price of RNG.

In response to BC Transit IR1 11.c, FEI provided a table that set out the difference between the forecast acquisition cost of Renewable Gas provided in the Application and the forecast Biomethane Energy Recovery Charge (BERC), which represents what NGV and T-Service customers would pay[20] for RNG using the current price setting mechanism.

In the revised table below, FEI has added a low, high and average[21] volume for both NGV and T-Service customers[22], assuming that they elect to acquire 100 percent of their energy as RNG, and has calculated the low, high and average bill impacts.

Please note that the NGV bill impacts are before the monetization of any credits available to those customers under the BC-LCFS. Monetization of credits under the BC-LCFS will reduce their overall bill impact. At the current credit value of approximately $20 per GJ, in a scenario where NGV customers are charged the LCG charge rather than FEI's acquisition cost, the NGV customers' acquisition cost is negative. This is further described in response to Brightside IR2 3i.

[20] Commensurate with other IRs in this set, FEI has updated the table with carbon tax in real 2022$.
[21] FEI used a simple average of all NGV and T-Service customers to derive the averages for these two groups.
[22] Low, average and high delivered volumes are based on 2021 actuals for these customer classes.

Line No.			2022	2023	2024	2025	2026	2027	2028	2029	2030
1	**RG Acquisition Cost**	**$/GJ**	**23.293**	**23.523**	**24.267**	**24.843**	**25.328**	**25.762**	**23.847**	**24.064**	**24.311**
2											
3	Cost of Gas	$/GJ	4.503	4.503	4.503	4.503	4.503	4.503	4.503	4.503	4.503
4	Carbon Tax	$/GJ	2.305	2.509	3.161	3.787	4.388	4.963	5.514	6.041	6.546
5	Premium	$/GJ	7.000	7.000	7.000	7.000	7.000	7.000	7.000	7.000	7.000
6	**LCG Charge**	**$/GJ**	**13.808**	**14.012**	**14.664**	**15.290**	**15.891**	**16.466**	**17.017**	**17.544**	**18.049**
7											
8	**Difference**	**$/GJ**	**9.48**	**9.51**	**9.60**	**9.55**	**9.44**	**9.30**	**6.83**	**6.52**	**6.26**
9											
10											
11	**NGV Customers**										
12	**Volume**										
13	Low	GJ	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
14	Average	GJ	36,495.7	36,495.7	36,495.7	36,495.7	36,495.7	36,495.7	36,495.7	36,495.7	36,495.7
15	High	GJ	993,407.5	993,407.5	993,407.5	993,407.5	993,407.5	993,407.5	993,407.5	993,407.5	993,407.5
16											
17	**Approximate Bill Impact at Average Acquisition Cost**										
18	Low	$000	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0
19	Average	$000	766.0	766.9	770.3	768.4	764.3	759.1	669.1	657.7	648.3
20	High	$000	20,849.2	20,875.4	20,966.4	20,916.5	20,802.8	20,662.4	18,212.5	17,903.4	17,647.3
21											
22	**Approximate Bill Impact at LCG Charge of Cost of Gas + Carbon Tax + 7**										
23	Low	$000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	Average	$000	419.8	419.8	419.8	419.8	419.8	419.8	419.8	419.8	419.8
25	High	$000	11,427.2	11,427.2	11,427.2	11,427.2	11,427.2	11,427.2	11,427.2	11,427.2	11,427.2
26											
27	**Difference**										
28	Low	$000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	Average	$000	346.1	347.1	350.5	348.6	344.4	339.3	249.3	237.9	228.5
30	High	$000	9,422.0	9,448.3	9,539.2	9,489.3	9,375.6	9,235.2	6,785.3	6,476.2	6,220.2
31											
32											
33	**Transport Service Customers**										
34	**Volume**										
35	Low	GJ	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
36	Average	GJ	35,375	35,375	35,375	35,375	35,375	35,375	35,375	35,375	35,375
37	High	GJ	3,251,084	3,251,084	3,251,084	3,251,084	3,251,084	3,251,084	3,251,084	3,251,084	3,251,084
38											
39	**Approximate Bill Impact at Average Acquisition Cost**										
40	Low	$000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41	Average	$000	742.4	743.4	746.6	744.8	740.8	735.8	648.5	637.5	628.4
42	High	$000	68,232.3	68,318.1	68,615.9	68,452.6	68,080.4	67,621.0	59,603.3	58,591.7	57,753.7
43											
44	**Approximate Bill Impact at LCG Charge of Cost of Gas + Carbon Tax + 7**										
45	Low	$000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46	Average	$000	406.9	406.9	406.9	406.9	406.9	406.9	406.9	406.9	406.9
47	High	$000	37,397.2	37,397.2	37,397.2	37,397.2	37,397.2	37,397.2	37,397.2	37,397.2	37,397.2
48											
49	**Difference**										
50	Low	$000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
51	Average	$000	335.5	336.4	339.7	337.9	333.9	328.9	241.6	230.6	221.5
52	High	$000	30,835.1	30,920.9	31,218.6	31,055.4	30,683.1	30,223.8	22,206.1	21,194.4	20,356.5

62.11 For the Voluntary RG offering for NGV and T-Service customers, please evaluate the alternative rate-setting mechanisms against the Bonbright rate design criteria, as well as by assessing the impact of each against the following metrics: maximizing revenues from the RG Program, minimizing cross-subsidization from FEI's sales customers, and ability to attract new voluntary customers. To do so, please complete the following table:

	FEI's proposed LCG Charge: 100 percent of the average cost of Renewable Gas supply	**LCG Charge matching that of other sales customers (e.g., CCRC + $7/GJ premium + carbon tax)**
Bonbright Criteria		
1. Recovery of the revenue requirement		
2. Fair apportionment of costs		
3. Efficient price signals		
4. Customer understanding and acceptance		
5. Practical and cost-effective		
6. Rate stability		
7. Revenue stability		
8. Avoid undue discrimination		
Additional Criteria		
9. Maximizing revenues from the RG Program		
10. Minimizing cross-subsidization from FEI sales customers		
11. Ability to attract new voluntary customers		
12. Meeting Government policy		

Response:

The following response is provided by Concentric.

Please see the requested table below, and also refer to the response to BCUC IR2 62.7.1.

	FEI's proposed LCG Charge: 100 percent of the average cost of Renewable Gas supply	**LCG Charge matching that of other sales customers (e.g., CCRC + $7/GJ premium + carbon tax)**
Bonbright Criteria		
1. Recovery of the revenue requirement	√	N

	FEI's proposed LCG Charge: 100 percent of the average cost of Renewable Gas supply	**LCG Charge matching that of other sales customers (e.g., CCRC + $7/GJ premium + carbon tax)**
2. Fair apportionment of costs	√	N
3. Efficient price signals	√	N
4. Customer understanding and acceptance	√	√
5. Practical and cost-effective	√	√
6. Rate stability	N	N
7. Revenue stability	√	N
8. Avoid undue discrimination	√	N
Additional Criteria		
9. Maximizing revenues from the RG Program	√	√
10. Minimizing cross-subsidization from FEI sales customers	√	N
11. Ability to attract new voluntary customers	√ -	√
12. Meeting Government policy	√ (there are multiple government policies)	√ (there are multiple government policies)

1
2

63.0 Reference: VOLUNTARY RENEWABLE GAS OFFERING

Exhibit B-17, Section C, BCUC IR 11.6, Section D, IR 17.6; FEI Application for Approval of Biomethane Energy Recovery Charge Rate Methodology Decision to Order G-133-16, p.3

Long Term Voluntary RG Sales Contracts

In response to BCUC IR 11.6, FEI stated:

> If approved, FEI's proposal to set the long-term contract rate equal to the short-term rate would render two of the long-term contract provisions described in Table 7-1 redundant. These are described below:
>
> 1. The rate escalation provision would no longer apply. Under FEI's proposal, the rate charged to customers under the long-term contract would match the short-term rate and consequently would be updated annually, in January of each year.
> 2. The take or pay provision would no longer be required, both because the discounted rate would no longer be available, and because under the revised program FEI has other means of selling Renewable Gas to customers and recovering all Renewable Gas supply costs.

63.1 Please elaborate on how the proposed pricing for long term contracts will function for subsequent years following the initial contract date. For example, will the LCG Charge for long term contracts subsequent to the initial contract date be set to match the short term LCG Charge every January of each year?

Response:

Confirmed. In subsequent years following the initial contract date, the LCG Charge for long term contracts will be set to match the short term LCG Charge January of each year and the rate escalation provision would no longer be required. FEI does not foresee any other changes to how the proposed pricing for long term contracts would function.

In Directive 2 of Order G-133-16, the BCUC approved the Long Term BERC Rate to be set at a $1 per GJ discount to the Short Term BERC Rate subject to the following:

a. In order for a contract to be eligible for the Long Term BERC Rate, the contract must be for a commitment to purchase no less than 60,000 GJ in aggregate over the term of the contract and must be for a term of no less than five years and no more than ten years;

b. Long term contracts shall be subject to a Minimum Contract Strike Price of $10 per GJ; and

c. Long term contracts must include a Contract Floor Price provision that results in the price of Renewable Natural Gas in any period beyond year five of a contract that is not less than the prevailing Conventional Gas Cost.

63.2 Please discuss whether the additional requirements discussed in Directive 2 of Order G-133-16 are still applicable going forward for new contracts and whether any new requirements should be considered as a result of changes in the program design and other market factors (e.g., GHG emission reduction targets, supply availability, etc.).

63.2.1 If new requirements are appropriate, please provide them and explain.

Response:

FEI considers that the provisions of Directive 2 of Order G-133-16 remain relevant and should be maintained with respect to long-term contracts under the revised Renewable Gas Program.

FEI also considers that it would be appropriate to include a Contract Ceiling Price which would cap the price of the LCG charge at the average cost of Renewable Gas acquisition. This would ensure that, if the cost of conventional gas and carbon tax escalate to the point where the LCG charge would exceed the average cost of Renewable Gas acquisition, Voluntary Renewable Gas service customers would not pay more than the average cost of Renewable Gas acquisition. FEI considers that this ceiling price should apply to all Voluntary Renewable Gas service customers, both long and short-term. The contract provision would be included in future long term contracts submitted for approval to the BCUC.

E. ACCOUNTING TREATMENT, PROGRAM MECHANICS, RATE SETTING AND CUSTOMER BILL IMPACTS

64.0 Reference: LOW CARBON GAS CHARGE AND STORAGE AND TRANSPORT LOW CARBON RIDER

Exhibit B-17, Section G, BCUC IR 37.1

Recoveries via LCG Charge and S&T LC Rider

In response to BCUC IR 37.1, FEI stated:

> Since the S&T LC rider is calculated by dividing the costs to be recovered by all volume delivered to sales customers, it must then be applied to all volume delivered to sales customers to adequately recover the costs, and therefore, not only to 1 percent of the volumes. (Emphasis added)
>
> […]
>
> Renewable Gas Connections customers are paying an LCG Charge of $6 for 99 percent of their supply and the S&T LC rider of $0.63 for the remaining 1 percent, resulting in the effective rate of $6.57. [Emphasis added]

64.1 If the S&T LC rider must be applied to all volumes delivered to sales customers and not only to 1 percent of the volumes, please clarify why FEI states that the S&T LC rider of $0.63 is applied to the remaining 1 percent.

Response:

To clarify, FEI's response to BCUC IR1 37.1 does not state that the S&T LC rider of $0.63 is applied to the remaining 1 percent, but that the S&T LC rider is used to recover the costs of the 1 percent Renewable Gas that the customer receives. The S&T LC rider is applied to all volume delivered to the customer in order to recover the 1 percent Renewable Gas received by the customer.

65.0 Reference: CUSTOMER BILL IMPACTS

Exhibit B-17, Section D, BCUC IR 12.2.3; Section G, IR 41.1, Table 1, IR 41.3, Figures 8-5 and 8-6, and IR 41.4, Table 1; Exhibit B-11-1, Section 8-6, Figures 8-4 to 8-6

Customer Bill Impacts

In response to BCUC IR 41.1, FEI stated that not all $ amounts in Figures 8-4 and 8-6 are expressed in real 2022 dollars.

In response to BCUC IR 12.2.3, FEI stated:

> Regarding real dollars, please note that in the Application the Basic, Delivery, Storage & Transport and Cost of Gas charges did not include inflation so were already in real dollars. The forecast of Renewable Gas supply costs is without consideration for inflation so was also in real dollars. The only charge embedded in the figures within the Application that is nominal is carbon tax. Therefore, FEI has discounted carbon tax by 2 percent per year to calculate real 2022 dollars.

65.1 Please clarify how readers should interpret the annual bill calculations for RS 1, RS 2 and RS 3 provided in Corrected Figures 8-4 to 8-6 when some costs are in real dollars (Basic, Delivery, Storage & Transport, Cost of Gas and Renewable Gas supply costs) and others are in nominal dollars (carbon tax).

Response:

FEI acknowledges that expressing the carbon tax in nominal dollars instead of real dollars within its bill impact tables and figures provides inconsistent information. Overall, the differences in annual bills in 2032 are overstated by 4 to 6 percent, depending on the service offering and rate schedule.

The table below sets out the 2032 annual bill and percent difference by service offering and rate schedule when carbon tax is left in nominal dollars and also in real 2022 dollars using the data that produced Corrected Figures 8-4 to 8-6.

Table 1: Comparison of 2032 Annual Bills with Carbon Tax as Nominal$ and Real 2022$

Service	Rate Schedule	Carbon Tax Nominal$	Carbon Tax Real 2022$	% Difference
RG Blend	1	1,914	1,822	-5%
RG Blend	2	6,833	6,474	-5%
RG Blend	3	70,727	66,771	-6%
RG Connections	1	1,914	1,822	-5%
Voluntary RG	1	1,930	1,837	-5%
Voluntary RG	2	7,069	6,710	-5%
Voluntary RG	3	92,228	88,272	-4%

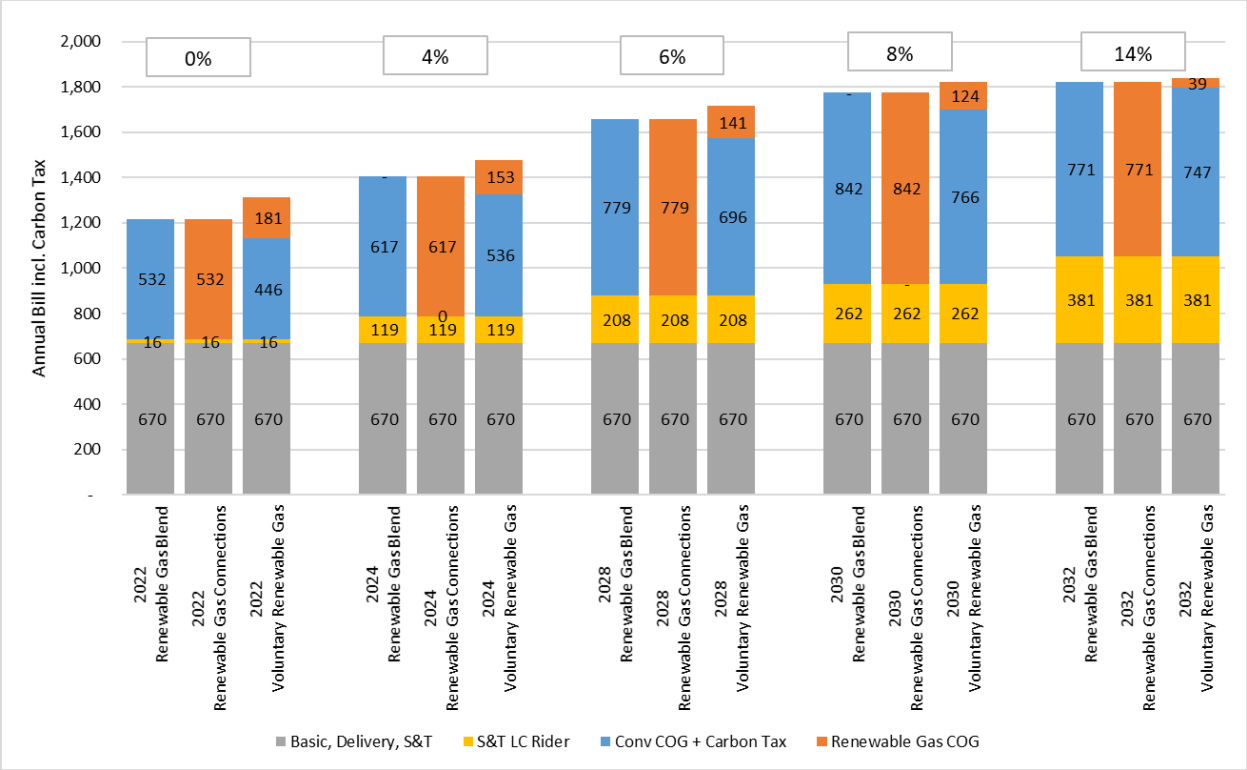
65.2 Please re-state Figures 8-4 to 8-6 of the Application with the carbon tax in real 2022 dollars. Please add the years 2022 and 2030 to these figures. For Figures 8-5 (RS 2) and 8-6 (RS 3), please also add the annual bill for the RG Connections customers.

65.2.1 In these updated figures, please clarify the percentage of RG elections by Voluntary RG customers in Figures 8-4 and 8-5. (i.e., 10 percent, 25 percent, etc.)

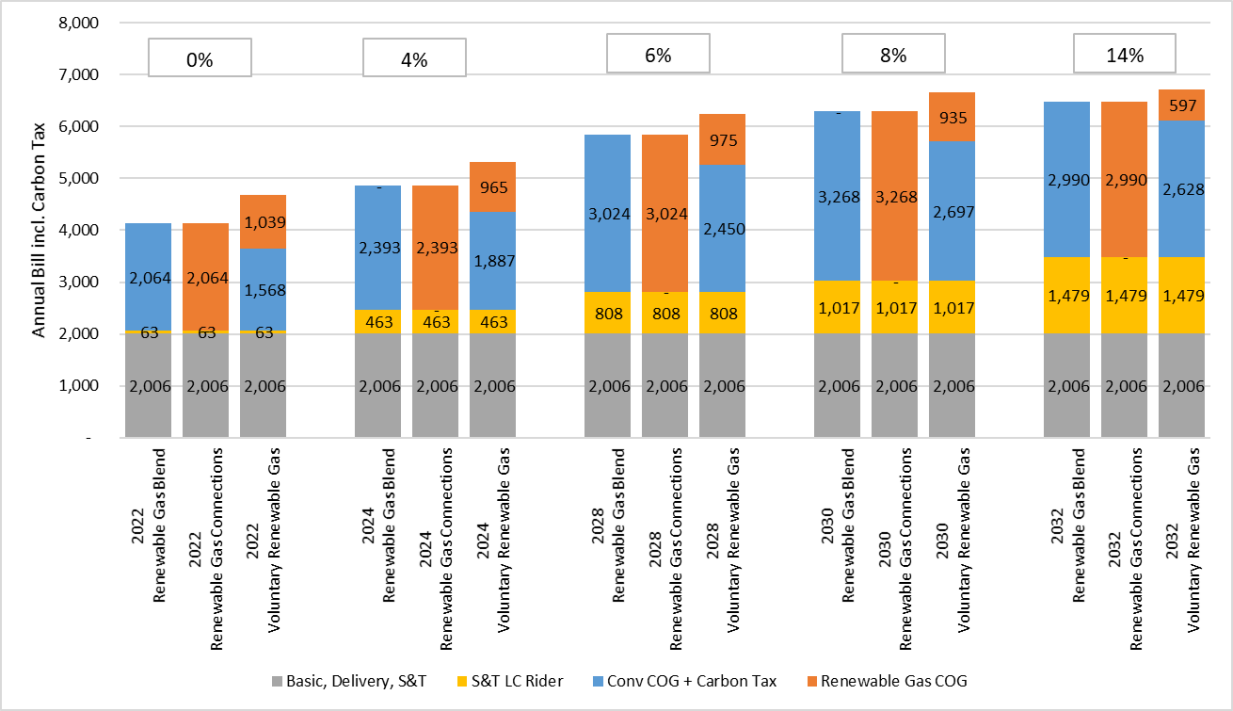
Response:

FEI has provided re-stated Figures 8-4 to 8-6 with carbon tax in real 2022$. FEI has discounted to real 2022$ the carbon tax on the annual bill, the carbon tax credit on the bill from receiving Renewable Gas and the carbon tax embedded in the Low Carbon Gas (LCG) Charge, where applicable, when the LCG Charge is set to equal cost of gas plus carbon tax plus $7 premium as discussed in Section 7.4.3 of the Application, with Voluntary Renewable Gas customers electing 15 percent for Rate Schedule 1, 25 percent for Rate Schedule 2 and 100 percent for Rate Schedule 3.

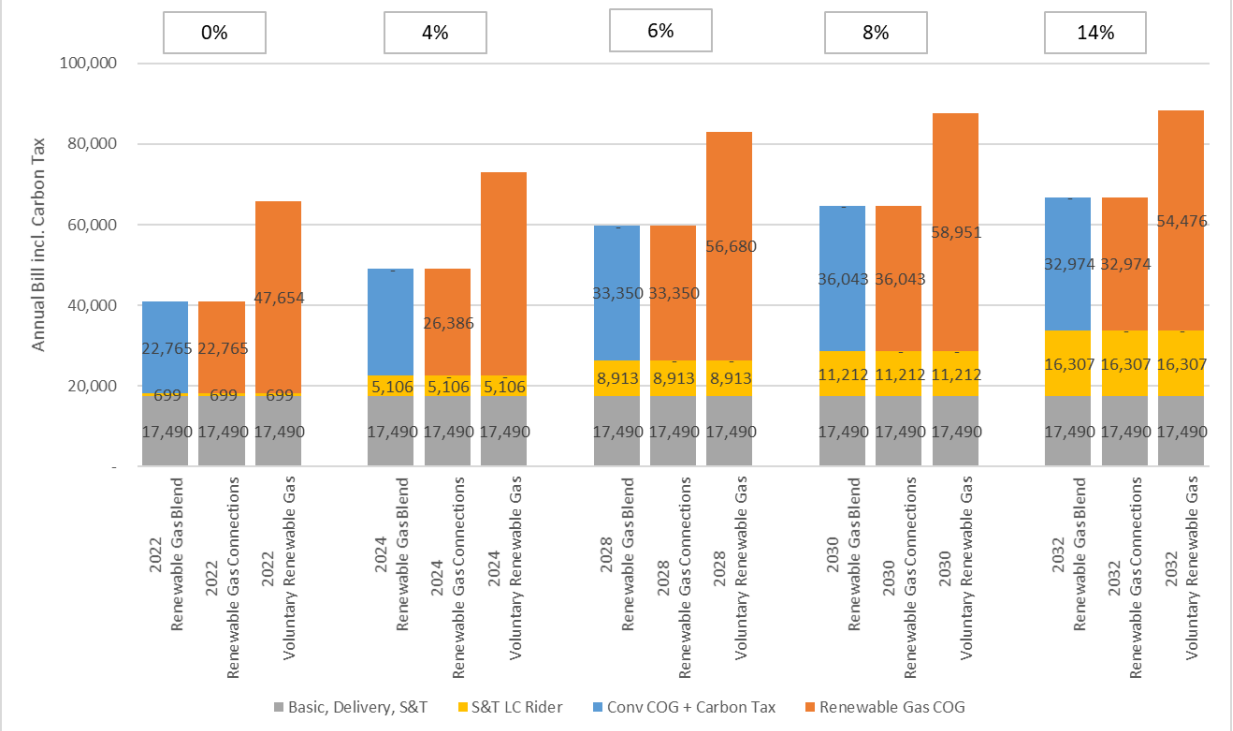
Re-stated Figure 8-4 with Carbon Tax in Real 2022$ With Years 2022 and 2030 Added



Re-stated Figure 8-5 with Carbon Tax in Real 2022$ with years 2022 and 2030 added and RG Connections added



Re-stated Figure 8-6 with Carbon Tax in Real 2022$ with years 2022 and 2030 added and RG Connections added



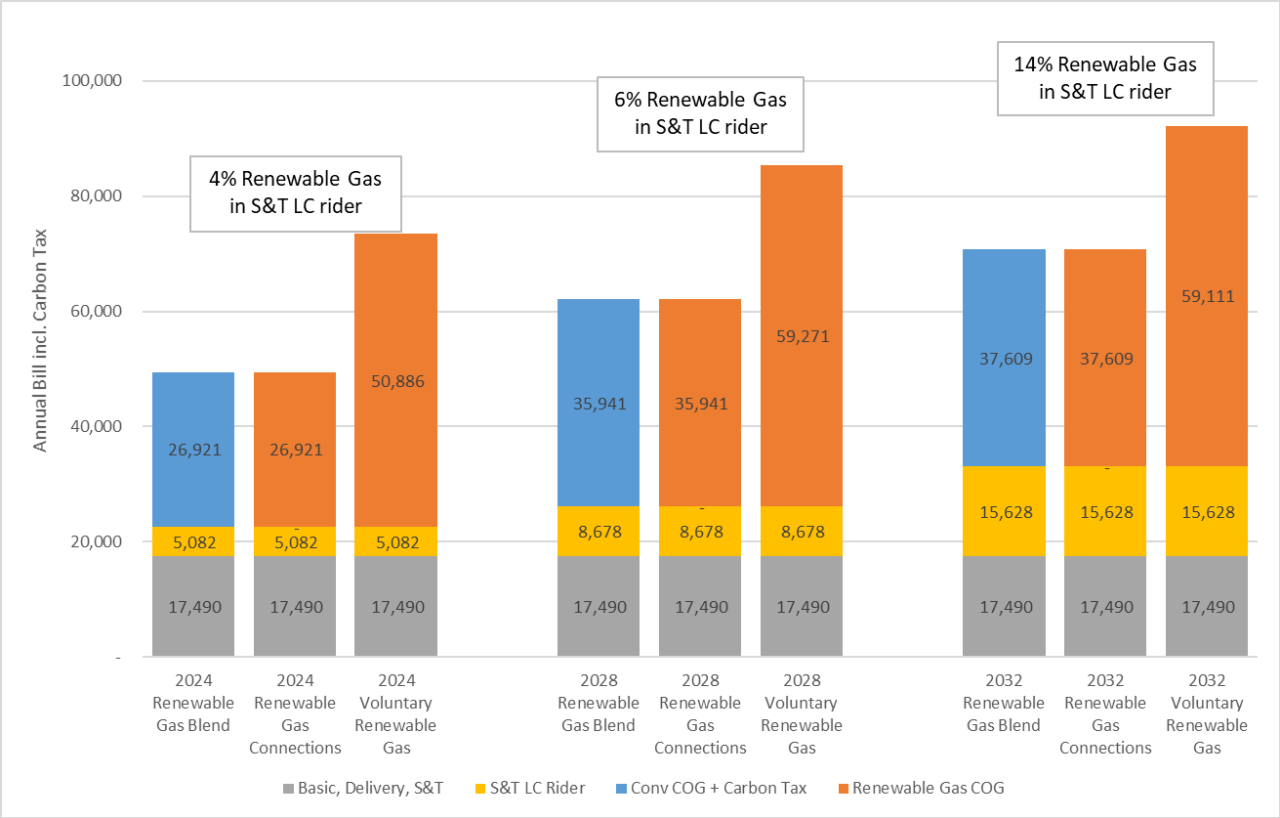
In response to BCUC IR 41.3, FEI provided the requested Figures 8-5 and 8-6, with a new column for the RG Connections offering.

65.3 Please clarify why the requested Figures 8-5 and 8-6 for RS 2 and RS 3 are identical. Please provide any corrections as appropriate.

Response:

FEI notes that it inadvertently copied the incorrect figure into its response to BCUC IR1 41.3. FEI provides the correct figure for BCUC IR1 41.3 below.

Requested Figure 8-6: Annual Bill for Rate Schedule 3 (with RG Connections Column added)



In response to BCUC IR 41.4, FEI provided the following table with annual bill in dollars and yearly percent change:

Table 1: Annual Bill in Dollars and Yearly Percent Change

	2022	2023	2024	2025	2026	2027	2028	2029	2030
Percent of Renewable Gas Delivered via the S&T LC Rider	0%	0%	3.7%	4.3%	4.6%	5.5%	6.3%	7.1%	8.0%
Rate Schedule 1									
RG Blend Annual Bill	1,202	1,263	1,418	1,501	1,577	1,660	1,713	1,785	1,858
RG Blend Annual Bill Change		*5%*	*12%*	*6%*	*5%*	*5%*	*3%*	*4%*	*4%*
RG Connections Annual Bill	1,202	1,263	1,418	1,501	1,577	1,660	1,713	1,785	1,858
RG Connections Annual Bill Change		*5%*	*12%*	*6%*	*5%*	*5%*	*3%*	*4%*	*4%*
RG Voluntary Annual Bill	1,297	1,357	1,491	1,570	1,645	1,723	1,771	1,838	1,906
RG Voluntary Annual Change		*5%*	*10%*	*5%*	*5%*	*5%*	*3%*	*4%*	*4%*
Rate Schedule 2									
RG Blend Annual Bill	4,070	4,305	4,907	5,229	5,526	5,847	6,051	6,332	6,614
RG Blend Annual Bill Change		*6%*	*14%*	*7%*	*6%*	*6%*	*3%*	*5%*	*4%*
RG Connections Annual Bill	4,070	4,305	4,907	5,229	5,526	5,847	6,051	6,332	6,614
RG Connections Annual Bill Change		*6%*	*14%*	*7%*	*6%*	*6%*	*3%*	*5%*	*4%*
RG Voluntary Annual Bill	4,613	4,848	5,367	5,674	5,964	6,266	6,453	6,715	6,977
RG Voluntary Annual Bill Change		*5%*	*11%*	*6%*	*5%*	*5%*	*3%*	*4%*	*4%*
Rate Schedule 3									
RG Blend Annual Bill	40,255	42,851	49,492	53,037	56,310	59,856	62,109	65,205	68,309
RG Blend Annual Bill Change		*6%*	*15%*	*7%*	*6%*	*6%*	*4%*	*5%*	*5%*
RG Connections Annual Bill	40,255	42,851	49,492	53,037	56,310	59,856	62,109	65,205	68,309
RG Connections Annual Bill Change		*6%*	*15%*	*7%*	*6%*	*6%*	*4%*	*5%*	*5%*
RG Voluntary Annual Bill	65,143	67,739	73,458	76,848	80,050	83,375	85,439	88,326	91,217
RG Voluntary Annual Bill Change		*4%*	*8%*	*5%*	*4%*	*4%*	*2%*	*3%*	*3%*

65.4 Please clarify whether the annual bill calculations in the table are based on a mix of figures in nominal dollars (e.g., the carbon tax) and in real dollars (e.g., Basic, Delivery, etc.). If they are a mix, please revise Table 1 with all figures in real (2022) dollars.

Response:

In FEI's response to BCUC IR1 41.4 carbon tax was in nominal dollars with other charges in real dollars. FEI provides the following table with carbon tax on the bill and embedded in applicable LCG Charges in real 2022 dollars.

Re-stated Table 1: Annual Bill in Dollars and Yearly Percent Changes

	2022	2023	2024	2025	2026	2027	2028	2029	2030
Percent of Renewable Gas Delivered via the S&T LC Rider	0%	0%	3.7%	4.3%	4.6%	5.5%	6.3%	7.1%	8.0%
Rate Schedule 1									
RG Blend Annual Bill	1,202	1,257	1,406	1,480	1,546	1,618	1,658	1,716	1,774
RG Blend Annual Bill Change		*5%*	*12%*	*5%*	*4%*	*5%*	*2%*	*4%*	*3%*
RG Connections Annual Bill	1,202	1,257	1,406	1,480	1,546	1,618	1,658	1,716	1,774
RG Connections Annual Bill Change		*5%*	*12%*	*5%*	*4%*	*5%*	*2%*	*4%*	*3%*
RG Voluntary Annual Bill	1,297	1,352	1,479	1,550	1,614	1,680	1,716	1,770	1,823
RG Voluntary Annual Change		*4%*	*9%*	*5%*	*4%*	*4%*	*2%*	*3%*	*3%*
Rate Schedule 2									
RG Blend Annual Bill	4,070	4,284	4,861	5,149	5,406	5,683	5,838	6,065	6,290
RG Blend Annual Bill Change		*5%*	*13%*	*6%*	*5%*	*5%*	*3%*	*4%*	*4%*
RG Connections Annual Bill	4,070	4,284	4,861	5,149	5,406	5,683	5,838	6,065	6,290
RG Connections Annual Bill Change		*5%*	*13%*	*6%*	*5%*	*5%*	*3%*	*4%*	*4%*
RG Voluntary Annual Bill	4,613	4,827	5,320	5,594	5,845	6,101	6,239	6,448	6,654
RG Voluntary Annual Bill Change		*5%*	*10%*	*5%*	*4%*	*4%*	*2%*	*3%*	*3%*
Rate Schedule 3									
RG Blend Annual Bill	40,255	42,621	48,982	52,158	54,989	58,044	59,752	62,263	64,744
RG Blend Annual Bill Change		*6%*	*15%*	*6%*	*5%*	*6%*	*3%*	*4%*	*4%*
RG Connections Annual Bill	40,255	42,621	48,982	52,158	54,989	58,044	59,752	62,263	64,744
RG Connections Annual Bill Change		*6%*	*15%*	*6%*	*5%*	*6%*	*3%*	*4%*	*4%*
RG Voluntary Annual Bill	65,143	67,510	72,947	75,969	78,730	81,563	83,083	85,384	87,652
RG Voluntary Annual Bill Change		*4%*	*8%*	*4%*	*4%*	*4%*	*2%*	*3%*	*3%*

65.5 Considering that these bill increases only relate to the anticipated increase in RG supply to 15 percent in FEI's system and to the increase in the carbon tax (and not meeting the more stringent CleanBC Roadmap emissions cap), and that in 2024, the rate increases for all rate schedules and types of customers are expected to be higher than 10 percent, please explain how FEI is proposing to address the potential for rate shock.

Response:

FEI believes that strategies to mitigate rate pressures and maintain rate stability should be considered in the broader context of Revenue Requirement or other rate setting applications

where the impacts of all changes, including both cost and revenue increases, are known and can be considered in a more comprehensive manner.

Please also refer to the responses to the BCOAPO IR2 20 series of questions for further discussion.

66.0 Reference: CUSTOMER BILL IMPACTS

Exhibit B-17, Section G, BCUC IR 42.2

Customer Bill Impacts Under the CleanBC Roadmap's GHG Emissions Cap

In BCUC IR 42.2, FEI stated:

> Adjusting the carbon tax to real dollars is why Figure 8-4 depicts a difference in the annual bill between the three Renewable Gas Connection types; otherwise, the bills would all be the same.

66.1 Please clarify the statement above and provide an example to illustrate this statement.

Response:

As a simplifying assumption in the response to BCUC IR1 42.2, FEI did not discount the carbon tax embedded in the Low Carbon Gas (LCG) Charge for Renewable Gas Connections customers. The difference was caused because Renewable Gas Blend and Voluntary Renewable Gas customers do not have a carbon tax amount embedded in their LCG Charges (the carbon tax is calculated separately and discounted). Discounting the carbon tax rate embedded in the LCG Charge results in equal annual bills for Renewable Gas Connections, Renewable Gas Blend, and Voluntary Renewable Gas customers when the Renewable Gas Blend percent exceeds a specific percent depending on the rate schedule.[23] Discounting the carbon tax embedded in the LCG Charges also increases the S&T LC rider because it reduces the real dollar revenue from Renewable Gas Connections and Voluntary Renewable Gas customers. The reduced real dollar revenues are recovered instead by way of an increase in the S&T LC rider.

As an example, FEI has set out the calculation of a Rate Schedule 1 Renewable Gas Connections, Renewable Gas Blend and Voluntary Renewable Gas customer's bill in 2028, with the carbon tax embedded in the LCG Charge left as nominal as was done in the response to BCUC IR1 42.2,[24] and discounted to real 2022 dollars[25] below. When discounted, the total bill for the Renewable Gas Connection customer shown in the table below is now equal to the total bill for both the Renewable Gas Blend and Voluntary Renewable Gas customer. All three bills are the same when the blend of Renewable Gas in FEI's system for core customers exceeds 16 percent, as is expected by 2028 in this scenario.

[23] Rate Schedule 1 Voluntary Renewable Gas customers elect, on average, 16 percent Renewable Gas so when the blend of Renewable Gas in FEI's system for core customers exceeds 16 percent then Rate Schedule 1 customers receive all of their Voluntary RG election through the Renewable Gas Blend service. For Rate Schedule 2, the percent is 24. However, for Rate Schedule 3 Voluntary customers, since they typically elect 100 percent Renewable Gas, their bills will always be higher than other Rate Schedule 3 customers (at the same UPC) receiving service through Renewable Gas Connection or Renewable Gas Blend.

[24] Columns 1 to 3.

[25] Columns 4 to 6.

Table 1: RG Connections, RG Blend and Voluntary RG Customer's 2028 Annual Bill Calculation in Real 2022$ with Carbon Tax Embedded in LCG Charge Nominal and Real

			(1)	(2)	(3)	(4)	(5)	(6)	
			As responded BCUC IR1 42.2			*With Carbon Tax in LCG Charge discounted*			
Line No.	**Particulars**		**RG Blend**	**RG Connections**	**Voluntary RG**	**RG Blend**	**RG Connections**	**Voluntary RG**	**Reference**
1	Basic Charge	$/Day	0.4085	0.4085	0.4085	0.4085	0.4085	0.4085	
2	Delivery Charge	$/GJ	4.915	4.915	4.915	4.915	4.915	4.915	
3	Storage & Transport Charge	$/GJ	1.350	1.350	1.350	1.350	1.350	1.350	
4	S&T LC Rider	$/GJ	5.653	5.653	5.653	5.719	5.719	5.719	Increase due to lower real$ recoveries through the LCG Charges
5	Cost of Conventional Natural Gas	$/GJ	3.844	3.844	3.844	3.844	3.844	3.844	
6	LCG Charge	$/GJ		10.784	17.784		10.006	16.222	Carbon tax embedded in calculated LCG Charge is in 2022$
7	Carbon Tax	$/GJ	6.162	6.162	6.162	6.162	6.162	6.162	
8									
9	RG Delivered with RG Blend	GJ	16.5	16.5	16.5	16.5	16.5	16.5	
10	RG Delivered with RG Connection	GJ		66.6			66.6		
11	Conventional Gas Delivered	GJ	66.6		66.6	66.6		66.6	
12	Total Delivered	GJ	83.1	83.1	83.1	83.1	83.1	83.1	Sum of Lines 10 through 11
13									
14	Basic Charge	$	149	149	149	149	149	149	Line 1 x 365.25
15	Delivery Charge	$	408	408	408	408	408	408	Line 2 x Line 12
16	Storage & Transport Charge	$	112	112	112	112	112	112	Line 3 x Line 12
17	S&T LC Rider	$	470	470	470	475	475	475	Line 4 x Line 12
18	Cost of Conventional Natural Gas	$	256	-	256	256	-	256	Line 5 x Line 11
19	LCG Charge	$	-	718	-	-	667	-	Line 6 x Line 10
20	Total Bill before Carbon Tax	$	1,396	1,858	1,396	1,401	1,812	1,401	Sum of Lines 14 through 19
21									
22	Carbon Tax	$	512	512	512	512	512	512	Line 7 x Line 12
23	Carbon Tax Credit from RG	$	(102)	(512)	(102)	(102)	(512)	(102)	- Line 7 x (Line 9 + line 10)
24	**Total Bill after Carbon Tax**	**$**	**1,806**	**1,858**	**1,806**	**1,812**	**1,812**	**1,812**	Sum of Lines 20 through 23

As can be seen in the table above, when the carbon tax embedded in the LCG Charges for Renewable Gas Connections and Voluntary Renewable Gas customers is discounted to 2022$ (Line 6), the annual bills equal (Line 24).

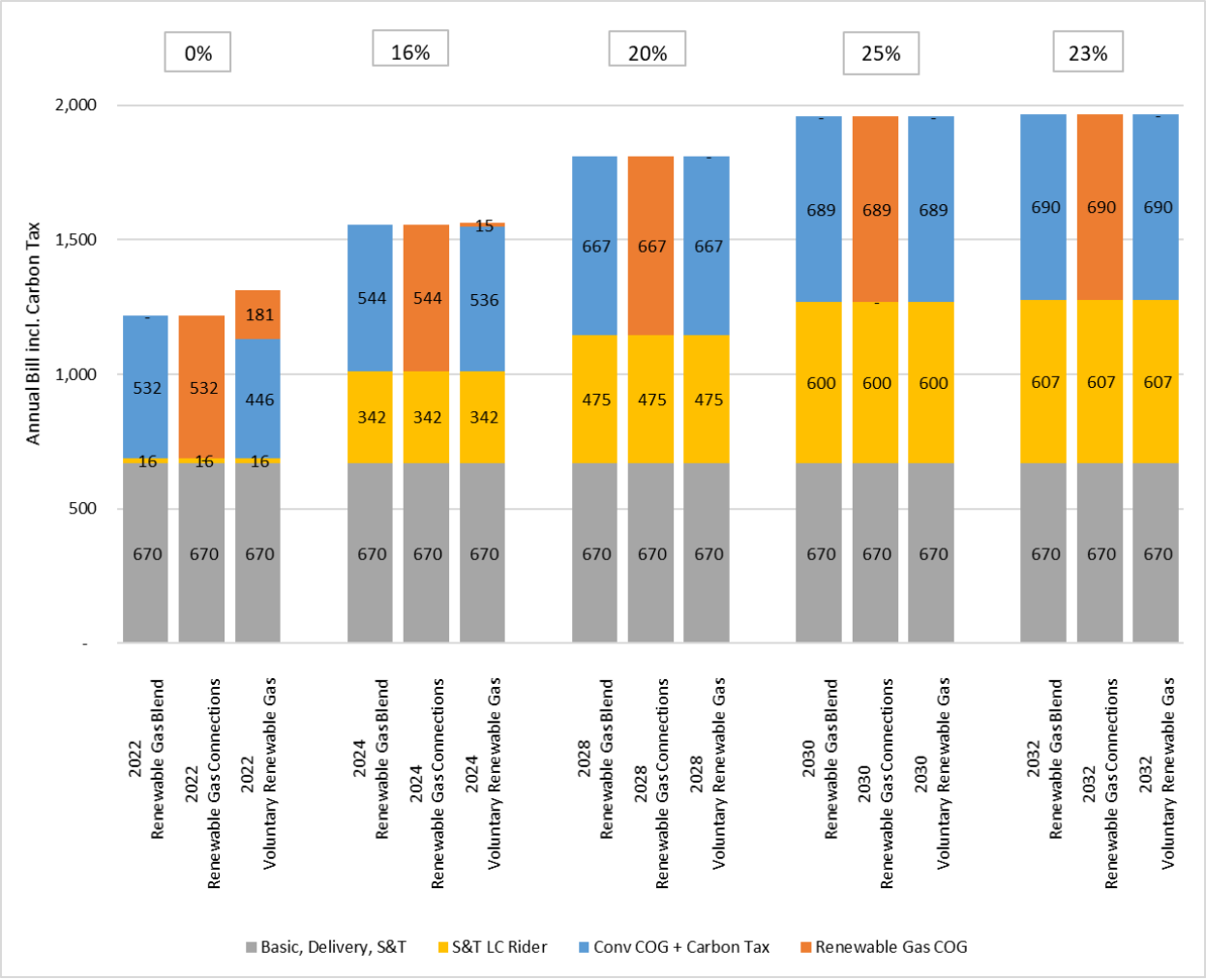
In BCUC IR 42.2, FEI provided the requested Figures 8-4 to 8-6, showing annual bills for RS 1, RS 2 and RS 3 for the three RG customer types.

66.2 Please provide a narrative describing each of the requested figures in BCUC IR 42.2, similar to the narrative provided with each of the Figures 8-4 to 8-6 in the Application.

Response:

With consideration for FEI's response to BCUC IR2 66.1, FEI has provided revised[26] Figures 8-4 to 8-6 below and included narratives as requested.

Revised Requested Figure 8-4: Annual Bill for Rate Schedule 1 (1 Renewable Gas Supply to 55 PJ by 2030)

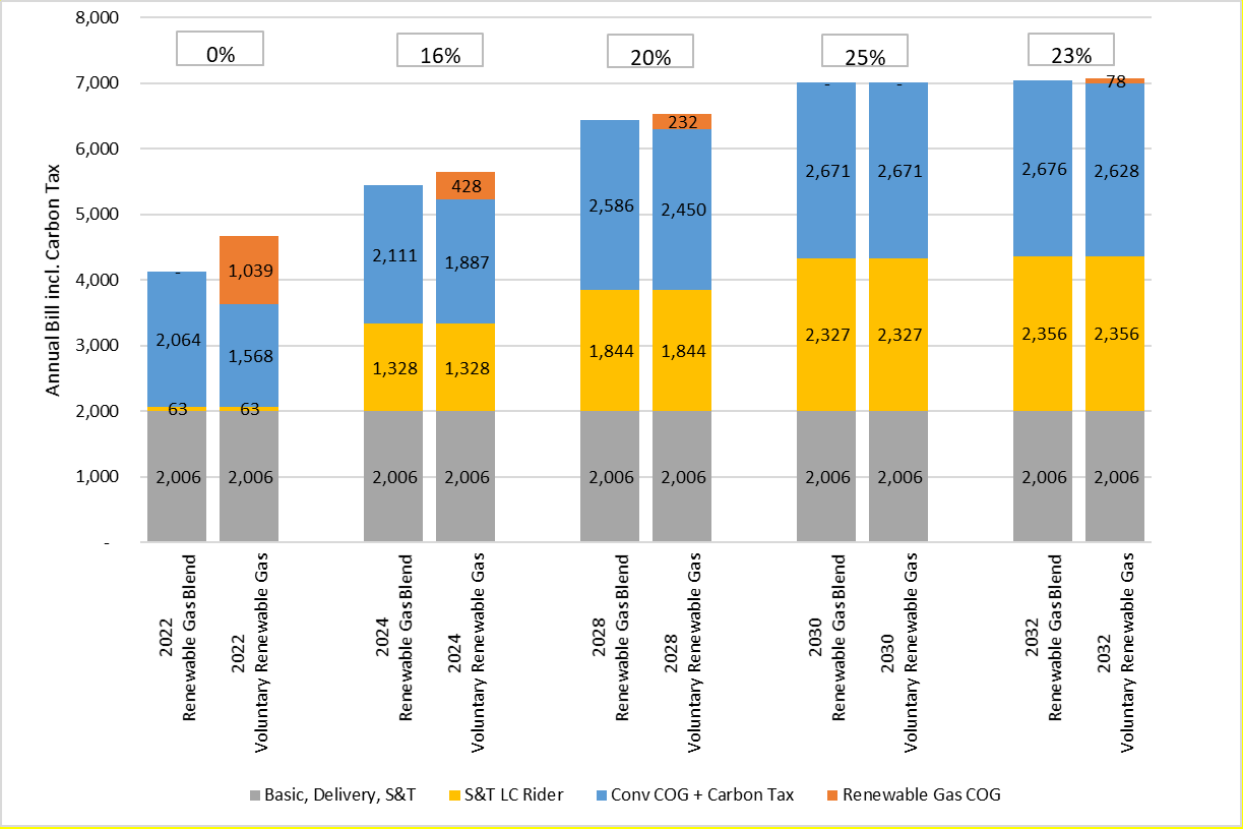


For RS 1, FEI used a Use Per Customer (UPC) of 83.1 GJs per year based on the 2021 approved forecast. As can be seen in Revised Figure 8-4 above, all customers receive some portion of their gas through the S&T LC rider and all pay the same cost for that portion of their Renewable Gas. For years 2022 and 2024, where the blend of Renewable Gas in FEI's system for core customers is less than the Voluntary Renewable Gas customer's average elected percent (i.e., 16 percent) of Renewable Gas, the voluntary customer's bill is higher than new residential[27] and existing residential[28] because of the elected percentage of Renewable Gas which carries a $7 per GJ

[26] Revised from BCUC IR1 42.2.
[27] Renewable Gas Connections customers.
[28] Renewable Gas Blend customers.

premium (as discussed in Section 8.4.1 of the Application). For years 2028 through 2032 all bills would equal because Voluntary Renewable Gas customers will receive all of their Renewable Gas through the Renewable Gas Blend service. All else equal,[29] a non-voluntary RS 1 residential customer's bill would increase from approximately $1,218[30] in 2022 to $1,967[31,32] in 2032 from acquisition of supply up to 55 PJ by 2032, increases in carbon tax, and the proposals in this Application.

Revised Requested Figure 8-5: Annual Bill for Rate Schedule 2 (1 Renewable Gas Supply to 55 PJ by 2030)

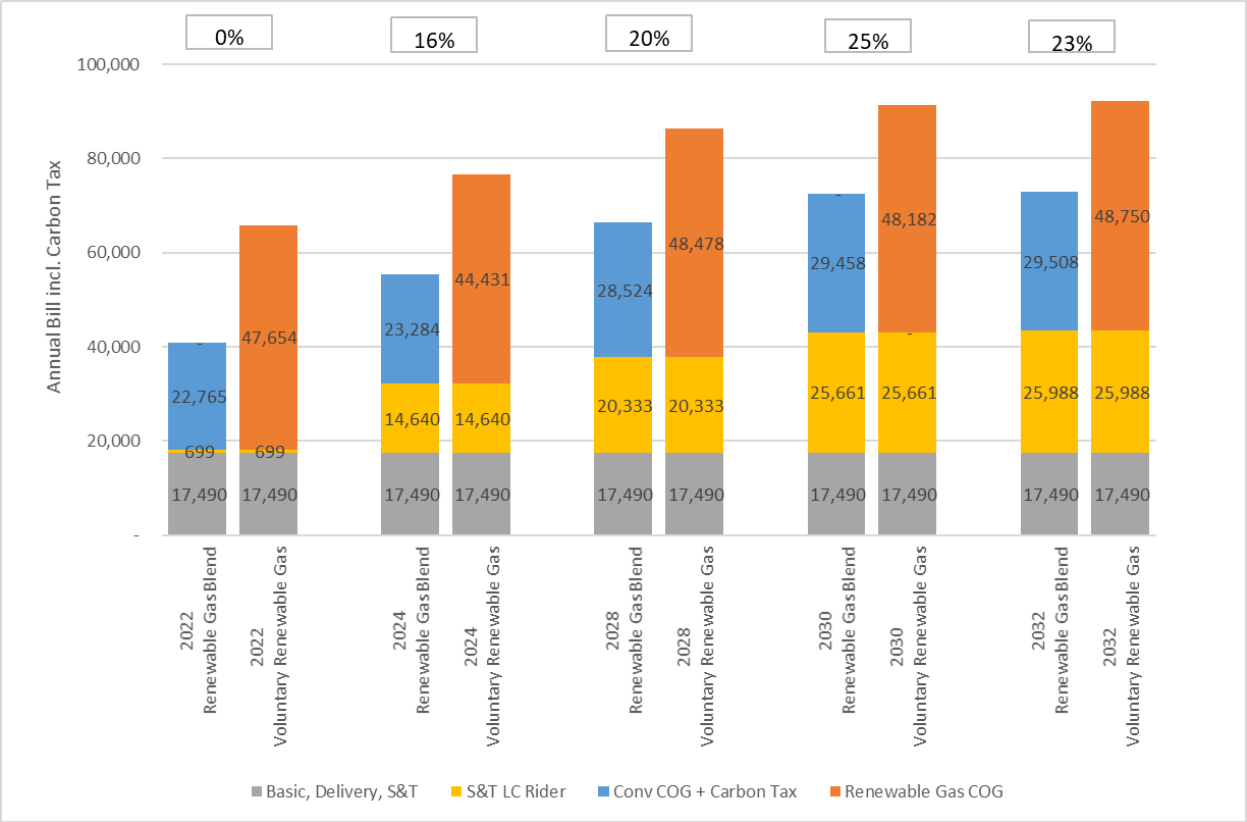


For RS 2, FEI used a UPC of 332.4 GJs per year based on the 2021 approved forecast. As can be seen in Revised Figure 8-5 above, all customers receive some portion of their gas through the S&T LC rider and all pay the same cost for that portion of their Renewable Gas. For years 2022, 2024, 2028 and 2032 where the blend of Renewable Gas in FEI's system for core customers is less than the Voluntary Renewable Gas customer's average elected percent (i.e., 24 percent) of Renewable Gas the voluntary customer's bill is higher than new small commercial[33] and existing

[29] FEI currently estimates Renewable Gas supplied through the S&T LC rider to grow from 0 percent in 2022 to 23 percent by 2032 based on supply reaching 55 PJ by 2032.
[30] Real 2022$.
[31] Real 2022$.
[32] The increase equates to 61 percent over 10 years or a 4.9 percent compound annual growth rate.
[33] Renewable Gas Connections customers.

small commercial[34] because of the elected percentage of Renewable Gas which carries a $7 per GJ premium (as discussed in Section 8.4.1 of the Application). For year 2030, all bills would equal because Voluntary Renewable Gas customers will receive all of their Renewable Gas through the Renewable Gas Blend service. All else equal, a non-voluntary RS 2 small commercial customer's bill will increase from approximately $4,133[35] in 2022 to $7,038[36] [37] in 2032 from acquisition of supply up to 55 PJ by 2032, increases in carbon tax, and proposals in this Application.

Revised Requested Figure 8-6: Annual Bill for Rate Schedule 3 (1 Renewable Gas Supply to 55 PJ by 2030)



For RS 3, FEI used a UPC of 3,555.5 GJs per year based on the 2021 approved forecast. As can be seen in Revised Figure 8-6 above, all customers receive some portion of their gas through the S&T LC rider and all pay the same cost for that portion of their Renewable Gas. FEI's experience has shown that voluntary customers in RS 3 elect to take 100 percent of their gas as Renewable Gas; consequently, the voluntary customer's bill is markedly higher than new large commercial[38] and existing large commercial[39] because of the high elected percentage of Renewable Gas which carries a $7 per GJ premium. All else equal, a non-voluntary RS 3 large commercial customer's

[34] Renewable Gas Blend customers.
[35] Real 2022$.
[36] Real 2022$.
[37] The increase equates to 70 percent over 10 years or a 5.5 percent compound annual growth rate.
[38] Renewable Gas Connections customers.
[39] Renewable Gas Blend customers.

bill will increase from approximately $40,953[40] in 2022 to $72,986[41] [42] in 2032 from acquisition of supply up to 55 PJ by 2032, increases in carbon tax, and proposals in this Application.

66.2.1 Please also describe how the annual bills resulting from achieving the CleanBC Roadmap's GHG emissions cap compare to the annual bills resulting from the Application (i.e., 15 percent RG in FEI's system by 2030).

Response:

The following table includes the annual bill in 2030 in real 2022$ assuming that FEI has 15 percent (equivalent to approximately 30 PJ) of Renewable Gas included in its supply by 2030 and the annual bill in 2030 in real 2022$ assuming that FEI has 55 PJ of Renewable Gas included in its supply by 2030.

Table 1: Comparison of 2030 Bills Using Different Renewable Gas Supply Volumes

RG Blend & RG Connections Bills

	30 PJ RG by 2030	55 PJ RG by 2030	Difference $	Difference %
RS 1	$ 1,742	$ 1,947	$ 205	12%
RS 2	$ 6,166	$ 6,962	$ 796	13%
RS 3	$ 63,370	$ 72,146	$ 8,776	14%

Voluntary RG 2030 Bills

	30 PJ RG by 2030	55 PJ RG by 2030	Difference $	Difference %
RS 1	$ 1,801	$ 1,806	$ 5	0%
RS 2	$ 6,607	$ 6,962	$ 354	5%
RS 3	$ 91,217	$ 94,161	$ 2,944	3%

As shown in the table above, the bills for the Renewable Gas Connections and Renewable Gas Blend customers are approximately 13 percent higher when FEI is acquiring 55 PJ of Renewable Gas by 2030 and the bills of Voluntary Renewable Gas customers are approximately 3 percent higher.

The bills of Voluntary Renewable Gas customers are less affected by the incremental volume because they are effectively trading the Renewable Gas that they receive through their voluntary nominations for Renewable Gas received through the Renewable Gas Blend service (S&T LC

[40] Real 2022$.
[41] Real 2022$.
[42] The increase equates to 78 percent over 10 years or a 5.9 percent compound annual growth rate.

rider). As the Renewable Gas supply increases, more is delivered through the S&T LC rider, thus lessening the amount these customers receive through their nominations.