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September 12, 2022

BC Hydro
c/o Regulatory Group
16th Floor, 333 Dunsmuir Street
Vancouver, BC
V6B 5R3

Attention: Mr. Chris Sandve, Chief Regulatory Officer

Dear Mr. Sandve:

Re: FortisBC Energy Inc. (FEI)

Revised Renewable Gas Program Application – Stage 2 (Application)

Response to the British Columbia Hydro and Power Authority (BCH) Information Request (IR) No. 2

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

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

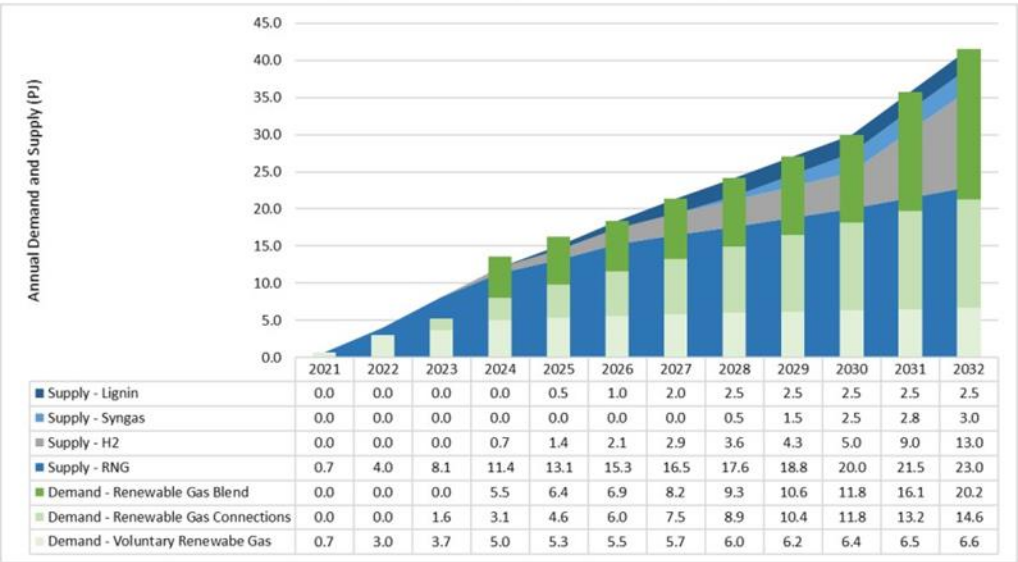
cc (email only): Commission Secretary
Registered Parties

1.0 Topic: Supply of Renewable Gas

Reference: Exhibit B-17, page 13; and FEI's 2022 Long Term Gas Resource Plan ("LTGRP"), section 9.2.1.3, page 9-2

In response to BCUC IR 1 3.1 in Exhibit B-17, FEI provided the following figure:

Restated Figure 8-3: Breaking out Renewables by Type



	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Supply - Lignin	0.0	0.0	0.0	0.0	0.5	1.0	2.0	2.5	2.5	2.5	2.5	2.5
Supply - Syngas	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	1.5	2.5	2.8	3.0
Supply - H2	0.0	0.0	0.0	0.7	1.4	2.1	2.9	3.6	4.3	5.0	9.0	13.0
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

(lines 1-2, page 13)

In section 9.2.1.3 of FEI's 2022 Long Term Gas Resource Plan (LTGRP)[1], FEI states:

> "FEI's transition to renewable and low-carbon gas supplies has the largest impact on GHG emission reductions for residential, commercial and industrial customers. Acquiring and allocating 60.2 PJ of renewable and low-carbon gas supply by 2030 to these customer groups results in emission reductions of 3.0 Mt CO_2e." (lines 24-27, page 9-2).

BC Hydro seeks to clarify the total volume of Renewable Gas that FEI plans to acquire by 2030.

1.1 Please reconcile the difference between FEI's 2030 supply projections for renewable and low-carbon gas in its Application for a Revised Renewable Gas Program (30 PJ) and its 2022 LTGRP (60.2 PJ), including any differences with respect to the definition of "renewable and low-carbon gas".

[1] FEI's 2022 Long Term Gas Resource Plan, filed with the Commission on May 9, 2022.

Response:

The difference in the total volume of Renewable Gas that FEI plans to acquire by 2030, as described in the Application and in FEI's 2022 Long Term Gas Resource Plan (LTGRP), is attributable to: (1) the timing of the two filings in relation to the release of the CleanBC Roadmap; and (2) the differing definitions of "Renewable Gas" in the Application and the 2022 LTGRP.

First, the supply projection included in the Application was developed in the second half of 2021, while the CleanBC Roadmap was released on October 25, 2021, after the supply projection included in the Application had been finalized and shortly before submitting the Application. In contrast, the supply forecast included in the 2022 LTGRP was developed after the CleanBC Roadmap was released. As a result, the 2022 LTGRP Renewable Gas supply forecast accounted for the limits on GHG emissions from natural gas use described in the CleanBC Roadmap, while the Application did not. More specifically, in response to the CleanBC Roadmap, FEI increased the volume of Renewable Gas it plans to acquire by 2030 and included this updated volume in the 2022 LTGRP.

Second, the term "Renewable Gas" as defined in the Application collectively refers to Renewable Natural Gas, hydrogen, synthesis gas and lignin (as allowed under the GGRR), while the term "renewable and low carbon gas" used in the 2022 LTGRP refers to renewable natural gas (RNG), hydrogen (green and blue), synthesis gas, lignin, and a small amount (approximately 1.3 PJ) of conventional natural gas with associated carbon capture. The inclusion of blue hydrogen and conventional natural gas with carbon capture in the 2022 LTGRP represents the difference in the types of the low carbon gases versus those included in this Application.

1.2 Please confirm whether the estimated emission reductions of 3.0 Mt CO_2e from "acquiring and allocating 60.2 PJ of renewable and low-carbon gas supply by 2030" assumes the approval of the Renewable Gas Connections service.

Response:

Not confirmed. The analysis of emission reductions from the acquisition of renewable and low carbon gases included in FEI's 2022 LTGRP was not predicated on a specific rate design or resource allocation among customer sub-groups within the residential, commercial, and industrial rate classes. It simply calculates the emission reductions that result from displacing conventional natural gas supplied to customers with renewable and low-carbon gas.

2.0 Topic: Emissions Intensity

Reference: Exhibit B-15, page 4; Exhibit B-17, page 3; FEI's 2022 LTGRP, Executive Summary, page ES-2; and Exhibit B-11 (the "Application"), Section 3.5.1, page 33

In BC Hydro IR 1 1.6, BC Hydro requested a comparison of the expected reduction in GHG emissions per GJ used in Renewable Gas for new construction if it displaces electricity. In response to BC Hydro IR 1 1.6 in Exhibit B-15, FEI provided the following table:

Table 1: Renewable Gas for New Construction if it Displaces Electricity

Renewable Gas vs. Electricity	2020 kgCO2e/GJ (or gCO2e/MJ)	2021 kgCO2e/GJ (or gCO2e/MJ)
Renewable Gas - Lifecycle Intensity of FEI Supplied RNG[2]	-10.3	-22.4
Electricity - 2021 GGIRCA website (integrated grid) [3] [4]	11.14	2.69
Difference in emissions per GJ	-20.3	-25.09

(lines 9-10, page 4)

In response to BCUC IR 1 1.1 in Exhibit B-17, FEI states:

> "FEI assumed that the carbon intensity of FEI's Renewable Gas supply portfolio as of 2021 would be approximately 10 kg CO_2e per GJ until 2030" (lines 20-22, page 3)

In the Executive Summary of FEI's 2022 LTGRP, FEI provided the following table:

Table ES-2 Fuel Types and Decarbonization Technologies Used in the 2022 LTGRP

Fuel Type	Description[3]	Life cycle Emission Factor (tCO_2e/GJ)	End use cycle Emission Factor (tCO_2e/GJ)
Natural gas	Natural gas is a naturally occurring hydrocarbon. Hydrocarbons are a class of organic compounds consisting of carbon and hydrogen. Raw natural gas (before processing) is composed primarily of methane.[4]	0.0598	0.04987[5]
Renewable natural gas (RNG)	Upgraded biogas produced from farm or municipal organic biomass. Upgraded synthesis gas (syngas) produced from wood biomass at pulp mills and some municipal organic biomass.	0.0100	0.0003
Syngas	Produced from wood to displace natural gas used in lime kilns at pulp mills. Can also be upgraded to green hydrogen.	0.0100	0.0000
Lignin	Produced from black liquor to displace natural gas used in lime kilns at pulp mills.	0.0100	0.0000
Green Hydrogen	Produced via water electrolysis using renewable electricity feedstock.	0.0000	0.0000
Blue Hydrogen	Reformed from hydrocarbon feedstock with up to 90 percent carbon sequestered.	0.0200	0.0000[6]
Natural Gas with Associated Carbon Capture, Utilization and Storage (CCUS)	Applying the carbon reduction benefits of CCUS to the delivery of natural gas on FEI's gas network.[7]	0.0148	0.0148

(line 4, page ES-2)

In section 3.5.1 of the Application, FEI states:

"A building using natural gas for space and water heating cannot meet some of the more stringent GHGi targets; however, the carbon intensity of Renewable Gas is low enough to meet the Step Code and municipal GHGi targets." (lines 1-3, page 33)

BC Hydro seeks to clarify information FEI has provided with respect to the emissions intensity of Renewable Natural Gas (RNG or biomethane) and Renewable Gas (inclusive of hydrogen and other low carbon gases).

2.1 Please confirm, or explain otherwise, that the GHG emissions intensity reported in response to BC Hydro IR 1 1.6 represents that of RNG only (biomethane), and not Renewable Gas inclusive of hydrogen, synthesis gas and lignin.

Response:

Confirmed. The GHG emissions intensity reported in the response to BC Hydro IR1 1.6 represents that of RNG only.

2.2 Please confirm, or explain otherwise, that the GHG emissions intensity of RNG (biomethane) is expected to vary amongst supply sources.

Response:

Confirmed. Similar to how the GHG intensity for electricity can vary from year-to-year, so too can that of RNG. Please refer to the response to BC Hydro IR1 2.4 where FEI describes how it ensures that the carbon intensity of the RNG it sources does not exceed certain thresholds through contractual assurances.

2.3 Please explain the differences between the Renewable Gas carbon intensity reported by FEI in response to BCUC IR 1 1.1 (10 kg CO_2e per GJ), the life cycle emission factor of RNG reported in FEI's 2022 LTGRP (10 kg CO_2e per GJ) and the lifecycle intensity of FEI supplied RNG stated in response to BC Hydro IR 1 1.6 (-22.4 kg CO_2e per GJ).

Response:

Please refer to the response to BCUC IR2 47.2.

2.4 Please provide the assumed carbon intensity of Renewable Gas that was used to make the determination on page 33 in section 3.5.1 of the Application that "the carbon intensity of Renewable Gas is low enough to meet the Step Code and municipal GHGi targets".

Response:

The assumed carbon intensity of RNG used by FEI to determine that the carbon intensity of RNG is low enough to meet the Step Code and the GHGi targets set by local governments is 0.2932 kgCO2e/GJ. This is derived from the 2020 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions, Table 1, p. 8.

Please also refer to Table A-8 in Appendix A of the Application where FEI examined the complexity of determining the blend of RNG required to achieve GHGi measures. FEI took a sample of 201 participants in FEI's New Homes Program and assumed those homes were also required to meet a GHGi target in addition to the Step Code level they achieved. FEI assumed these homes had both gas space and water heating. The last four columns in Table A-8 show how the percent of RNG required to meet the GHGi target of either a target of $3kgCO_2e/m^2$/year or $1kgCO_2e/m^2$/year would vary. For example, in this sample of homes, the RNG blend can range from between 86 percent to 100 percent in order to achieve a $1kgCO_2e/m^2$/year level. This variability makes it extremely difficult to establish the precise percentage of RNG required to meet a given local government regulation at the design stage. Therefore, providing a service with 100 percent RNG ensures that FEI meets local regulations and provides assurance to builders at the project planning stage.

Please note that, in FEI's modelling analysis, it has identified that there could potentially be some unique cases where meeting very low GHGi targets, such as 1 $kgCO_2e/m^2$ in small floor area building types (e.g., in some laneways homes), cannot be met with 100 percent RNG or 100 percent electricity. This is due to the relatively large baseload heat and electricity needs (i.e., electronics, appliances, lighting and hot water usage). Baseload energy usage is generally not sensitive to load and becomes disproportionately large as floor areas shrink. These unique challenges of setting GHGi targets for the various building archetypes will likely be explored over time as they become better understood.

As a further illustration of the above-noted complexity, if upstream emissions from electricity in BC were included in the emissions factor calculation, the factor would be higher and make it more difficult to achieve the GHGi target of either $3kgCO_2e/m^2$/year or $1kgCO_2e/m^2$/year. Conversely, if FEI were to include upstream emissions for RNG, it would meet all of these GHGi targets because the current lifecycle emissions (including upstream emissions) for RNG are negative.

2.5 Please state the GHG emissions intensity that Renewable Gas acquired by FEI must meet in order for a building that uses natural gas for space and water heating to be compliant with some of the more stringent municipal GHGi targets (e.g., 1 kg CO_2e/m^2 to 6 kg CO_2e/m^2).

Response:

Please refer to the response to BC Hydro IR2 2.4 and Table A-8 in Appendix A of the Application.

2.6 Please provide FEI's estimate of total GHG emissions from the use of natural gas by residential, commercial and industrial customers in 2030, with and without the Renewable Gas Connections service. Please include the emissions associated with the use of conventional natural gas and Renewable Gas and provide all assumptions used in the calculation.

Response:

FEI's estimated total GHG emissions cap in 2030 for residential, commercial and industrial customers under the GHGRS is 5.8 mega tonnes. Please refer to the responses to BCUC IR1 1.1 through 1.3 that describe FEI's key GHG mitigation strategies that it expects to utilize to meet this cap, and the emissions associated with (the carbon intensity of) RNG and conventional natural gas that were used in calculating how the cap could be reached.

With or without the Renewable Gas Connections service, FEI expects to take the steps necessary so that its total GHG emissions from the use of natural gas by residential, commercial and industrial customers will meet the 2030 GHG emissions cap expected to be implemented by the Province. While Renewable Gas Connections will help FEI continue to add customers and, all else equal, increase throughput, FEI expects that this will ultimately not change its total GHG emissions in 2030. Rather, the availability of Renewable Gas Connections will instead inform the strategies FEI must employ to meet the GHG emissions cap. Moreover, it is FEI's view that approval of the Renewable Gas Connections service that will allow the gas utility to continue to add new customers is necessary to maintain a viable gas system, and that taking a diversified approach to emissions reductions, which includes both gas and electric systems, is ultimately the most cost-effective approach to emissions reductions and will provide important benefits in terms of the reliability and resiliency of energy delivery in British Columbia.

3.0 Topic: Displacement Fuel

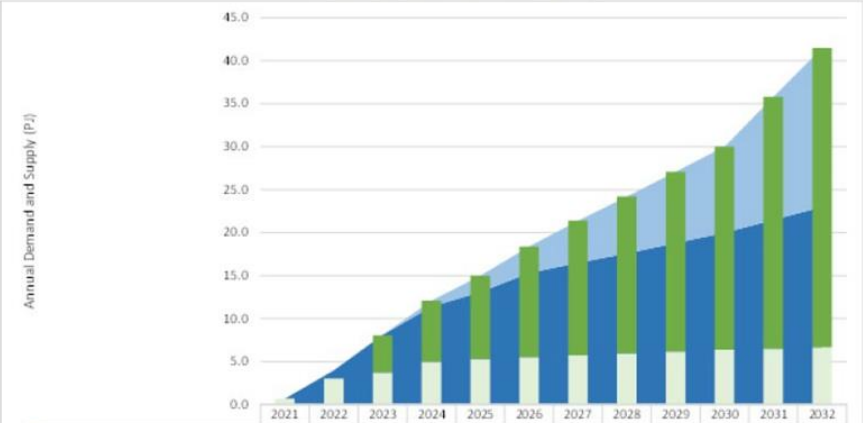
Reference: Exhibit B-17, pages 59-60 and 88; and the Application, Section 8.6, pages 121-122

In response to BCUC IR 1 12.2.1 in Exhibit B-17, FEI states:

> "If the Renewable Gas Connections service is not approved and tailored to the new residential construction sector as proposed, FEI expects that some of this load would be served by conventional natural gas for the municipalities that do not adopt GHGi metrics.
>
> However, there would be a loss of customer attachments and associated potential load without a Renewable Gas Connections program that would increase out to 2030. Those not served by gas would likely be served by electricity; however, such an expectation is dependent on the provincial and municipal regulations in place within each community at the time.
>
> 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 PJ14 or 18 percent lower than it would be if the Renewable Gas Connections service was approved.
>
> With respect to Renewable Gas load only, FEI does not expect the total volume of Renewable Gas sold to customers would diminish if there were not a Renewable Gas Connections service. If Renewable Gas supply did not flow to the Renewable Gas Connections customers, it would flow instead to Renewable Gas Blend customers. There may also be an additional opportunity to sell Renewable Gas to voluntary customers." (emphasis added) (lines 22-35, page 59; lines 1-3, page 60).

In response to BCUC IR 1 14.1.1 in Exhibit B-17, FEI provided the following figure which assumes the LCG Charge is set equal to the Renewable Gas weighted average cost of supply per GJ:

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	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	4.3	7.1	9.7	12.9	15.7	18.2	20.9	23.6	29.3	34.9
Demand - Renewable Gas Connections	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
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

(lines 7-9, page 88)

In section 8.6 of the Application, FEI states:

"FEI made the following assumptions to arrive at the demand forecast shown in Figure 8-3:

- Renewable Gas Connections are in the range of 14 thousand to 16 thousand per year" (lines 35-36, page 121; line 1, page 122).

BC Hydro seeks to confirm our understanding of the volumes of RNG and conventional natural gas that would be sold with and without the Renewable Gas Connections service.

3.1 As a follow up to FEI's response to BCUC IR 1 12.2.1, please confirm, or explain otherwise, that approval of the Renewable Gas Connections service would enable an increase in the total volume of gas sold in British Columbia (inclusive of conventional natural gas and RNG), relative to a scenario without the Renewable Gas Connections service.

Response:

Confirmed. The approval of the Renewable Gas Connections service would provide residential homeowners and home builders with the option to connect to the gas system should they so choose, thus enabling an increase in the total gas throughput in FEI's system relative to a scenario without the Renewable Gas Connections service.

3.2 Please confirm, or explain otherwise, that in the absence of a Renewable Gas Connections service the chart shown in FEI's response to BCUC IR 1 14.1.1 applies, which assumes no Renewable Gas Connections service.

3.2.1 If not confirmed, please provide a revised Figure 8-3 that assumes no Renewable Gas Connections service is offered.

Response:

Confirmed.

4.0 Topic: Bill Impacts of Renewable Gas Connections Service

Reference: Exhibit B-15, page 18; Exhibit B-17, pages 67, 69-70, 88 and 110; and Exhibit B-30, pages 42-43

In response to BC Hydro IR 1 4.2 in Exhibit B-15, FEI states:

> "Please refer to the responses to BCUC IR1 14.1 and 14.2 where FEI describes that increasing the rate above that proposed in the Application will result in zero new connections. Please refer to the response to BCUC IR1 12.3.2 for the bill impacts if there are no new connections." (lines 2-4, page 18)

In response to BCUC IR 1 14.1.1 in Exhibit B-17, FEI states:

> "The inability to add new residential customers to the gas system would be detrimental to the utility's long-term viability, and, ultimately, the affordability of rates for all customers. … Without the ability to connect new customers and with existing customers exiting the system, throughput will dwindle, leaving a shrinking customer base to absorb a growing amount of costs. Rate increases would largely be caused by the turnover of residential building stock, causing a progressive erosion of FEI's customer base." (lines 10-11; 16-20, page 88)

In response to BCUC IR 1 12.3.2 in Exhibit B-17, FEI states:

> "This comparison results in the following conclusion: if the proposals in the Application are approved, in 2030, when accounting for Carbon Tax in real 2022 dollars the Annual Bill for an RS 1 customer would equal $1,760 or a 43 percent increase from 2022 bills. With the loss of the new construction sector without the Renewable Gas Connections service, the annual bill for an RS 1 customer in 2030 will equal $1,920 in real 2022 dollars or a 56 percent increase from 2022 bills.
>
> …
>
> There are longer term and permanent implications to closing FEI out of the new construction sector, which will result in greater customer bill impacts into the future as more building stock turns over. FEI estimates that by 2050, in 2022 dollars, RS 1, 2, and 3 annual bills would approximately double because of the impacts on throughput of FEI's inability to add new residential customers alone, and not accounting for other compounding and expected effects, such as existing customers leaving the system due to the resulting higher rates." (line 6-11, page 67; lines 12-15, page 69; lines 1-2, page 70)

In response to BCUC IR 1 19.2 in Exhibit B-17, FEI states:

> "FEI's estimate of the residential teardown rate in its 2021 Conservation Potential Review (CPR) suggests that housing turnover in BC occurs at a rate of

approximately 2 percent per year. This amounts to an expected life of approximately 50 years for residential buildings." (lines 2-4, page 110)

In response to RCIA IR 1 21.1 in Exhibit B-30, FEI states:

"As illustrated in the table above, natural gas residential customers are largely inelastic to price variations, and elasticity estimates ordinarily range from -0.07 to -0.36 depending on the study's timeframe….

The review of published elasticity studies indicates that although price elasticity estimates may change slightly by jurisdiction and over time, these variances do not change the overall conclusion that the majority of natural gas customers are price inelastic." (lines 19-20, page 42; lines 1 and 4-6, page 43)

In response to RCIA IR 1 21.3 in Exhibit B-30, FEI states:

"FEI has not undertaken an analysis comparing the price elasticity of demand for conventional natural gas and Renewable Gas." (lines 26-27, page 43)

BC Hydro seeks clarification on FEI's calculations related to bill reduction impacts.

4.1 Please provide the price elasticity that was assumed in order to conclude that higher pricing of the Renewable Gas Connections service would lead to no new residential connections. Please explain if it differs from the finding that most residential customers are price inelastic and if so, please explain why.

Response:

FEI did not use price elasticity to conclude that higher pricing of the Renewable Gas Connections service would lead to no new residential connections; the finding that most residential customers are price inelastic applies to **existing** customers. As discussed below, FEI's conclusion regarding the pricing of Renewable Gas Connections service is based on the relative importance of cost to consumers when **selecting** energy services. Put simply, the pricing of energy services influences the rate of adoption, as FEI has experienced with the existing Renewable Natural Gas Program.[2]

Unlike a connection to the electric system, a connection to the gas system is optional. As a result, residential customers (property developers or homeowners) must choose to rely on the gas system to provide a portion of their energy needs and do so based on the perceived value provided by the gas system that cannot (or cannot as readily) be provided by the electric system. While the comparative robustness and reliability of the gas system informs perceived value, and the various lifestyle amenities available to gas customers are appealing to many customers, affordability remains a primary consideration when selecting an energy service.

[2] Application, p. 18.

As explained in the response to BCUC IR1 13.6, after significant financial incentives favouring heat pumps and a tax regime discouraging gas fired appliances have been accounted for, the capital costs of installing gas appliances or electric heat pumps for space and water heating of single family homes are generally comparable. Further, as explained in the response to BCUC IR1 13.7, even at the price proposed for Renewable Gas Connections in the Application, electric heat pumps may provide customers with a lower energy cost than a comparable gas option in certain situations. At a rate of $33.13/GJ for the gas service, similar to the $30/GJ renewable gas price cap posited by BC Hydro in IR1 4.2, electric heat pumps offer a clear cost advantage in all scenarios. Higher pricing of the Renewable Gas Connections service would widen the cost advantage of electric heat pumps, adversely impacting the value proposition of the service.

While residential consumers may be price inelastic once they've selected the energy mix to serve their home (i.e., consumers do not change their energy use drastically in response to changes in the cost of energy), this is not the case when developers and/or homeowners are deciding what energy type to include in new construction projects. In these situations, relative cost is a primary consideration, and lower overall cost is a persuasive factor in selecting one energy type over another.

4.2 In the responses to BCUC IR 1 12.2.1 (see preamble to IR 3 series above) and BCUC IR 1 12.3.2, please explain the basis of the assumption that there will be a 2% reduction in residential gas customers each year due to building stock turnover in absence of the Renewable Gas Connections service. Does FEI consider this a worst-case scenario given that not all the municipalities have adopted GHGi metrics?

Response:

FEI's assumption that there will be a 2 percent reduction in residential gas customers in absence of the Renewable Gas Connections service is a plausible scenario that correlates to the 2021 Conservation Potential Review (CPR), which suggests that housing turnover in BC occurs at a rate of approximately 2 percent per year. FEI has no indication that the turnover rate would be any greater or lesser within its service territory. Further, it is plausible that local governments throughout its service territory will implement strict GHGi targets, reflecting the continued rise in declarations of a climate change emergency, public messaging around reducing GHG emissions and the forthcoming inclusion of GHGi targets in the BC Building Code.

4.3 Please identify the specific tab and cells in BCUC Attachment 12.3.2 that provide the calculation of the annual bill for an RS 1 customer in 2030 without the Renewable Gas Connections service being equal to $1,920 in real 2022 dollars.

Response:

The specific tab and cells in BCUC Attachment 12.3.2 that provide the referenced calculation are as follows:

- Tab = Graphs
- Sum of cells M64 through M67

Please refer to the response to BCUC IR2 65.2 for updated figures 8-4 through 8-6 with carbon tax discounted to real 2022$.

4.4 Please provide the average annual real bill increase for RS 1 customers from 2022 to 2030 and from 2030 to 2050 for the two scenarios with and without the Renewable Gas Connections service to 2050.

Response:

FEI provides the requested information in Table 1 below based on the assumptions set out in the response to BCUC IR1 12.3.2. FEI notes that bills decrease in 2050 relative to 2030 because the carbon tax rate of $170 per tonne is held constant from 2030 to 2050 and, when discounted to real 2022$, this results in a bill decrease, all else equal.

Table 1: Bill Changes from 2022 to 2030 and from 2030 to 2050 in Real 2022$

	Real 2022$ Bill Increases	
	Without RG Connections	**With RG Connections**
2022 to 2030		
RS 1	687	543
RS 2	2,556	2,105
RS 3	27,502	23,214
2030 to 2050		
RS 1	428	(119)
RS 2	1,302	(463)
RS 3	12,069	(5,102)

4.5 Does FEI expect there to be incremental capital or other costs to add new connections from the new construction sector, relative to a scenario without the new construction sector? Please explain the nature of these costs and whether they have been factored into the bill impact calculations referenced in FEI's response to BCUC IR 1 12.3.2.

Response:

Adding new connections, whether from the new construction or conversion sector, will result in utility costs as are typically required to provide service to new customers such as for new mains, meters and service lines, as well as expenditures on labour, permits, landscaping, etc. These costs are incremental to a scenario without the new construction sector and have not been directly factored into the bill impact calculations in the response to BCUC IR1 12.3.2. This is because FEI was asked to calculate rate and bill impacts. In doing so, FEI has assumed that existing rates are sufficient to recover these costs; that is, that the capital costs of these new customers are similar to the costs of existing customers. For example, if capital costs are added they will increase the revenue requirement; but the additional volumes being added will recover the costs and there will be no impact to rates.

Also note that in the 2015 System Extension Application and the 2020 Main Extension Report, FEI provided analysis demonstrating that the actual revenue from adding new customers was

greater than actual costs (associated capital and operating costs), resulting in downward pressure on existing customer rates over time.

4.6 As a follow-up to BCUC IR 1 12.3.2, what is the estimated total ratepayer bill saving benefit (in percentage and dollars) as a result of having the Renewable Gas Connections service in 2030 and in 2050?

Response:

In Table 1 below, FEI sets out the estimated bill savings from retaining customers due to the approval of the Renewable Gas Connections service by the BCUC (as proposed in this Application) compared to losing customers if the Renewable Gas Connections service is not approved.

Table 1: 2030 and 2050 Annual Bill in 2022$ and Difference in Dollars and Percent

	Annual Bill Real 2022$			
	Without RG Connections	**With RG Connections**	**Difference $**	**Difference %**
2030				
RS 1	1,920	1,764	(156)	-8%
RS 2	6,733	6,248	(485)	-7%
RS 3	68,865	64,281	(4,584)	-7%
2050				
RS 1	2,348	1,644	(703)	-30%
RS 2	8,035	5,786	(2,249)	-28%
RS 3	80,934	59,179	(21,755)	-27%

4.6.1 Please confirm, or explain otherwise, that the estimated bill reduction benefit is the result of an increase in the total volume of gas sold in British Columbia (inclusive of conventional natural gas and RNG).

Response:

Confirmed.

5.0 Topic: Targeted Solution

Reference: Exhibit B-15, page 6; Exhibit B-17, pages 59-60; and FEI's LTGRP, Section 3.3.4, page 3-17

In response to BC Hydro IR 1 1.9 in Exhibit B-15, FEI states:

> "The proposed Renewable Gas Connections service is designed to ensure [the new construction] segment of the market continues to have access to the gas system and is not a "targeted" solution intended to drive Renewable Gas supply to these customers over others." (lines 24-26, page 6)

In response to BCUC IR 1 12.2.1 in Exhibit B-17, FEI states:

> "With respect to Renewable Gas load only, FEI does not expect the total volume of Renewable Gas sold to customers would diminish if there were not a Renewable Gas Connections service. … If Renewable Gas supply did not flow to the Renewable Gas Connections customers, it would flow instead to Renewable Gas Blend customers. There may also be an additional opportunity to sell Renewable Gas to voluntary customers." (lines 34-35; page 59; lines 1-3, page 60)

In section 3.3.4 of FEI's 2022 LTGRP, FEI states:

> "FEI is working with industry and government to identify opportunities to begin the industrial transition to low-carbon hydrogen. In these difficult-to-decarbonize sectors, FEI believes innovation in hydrogen technology will best serve the needs of British Columbians by preserving clean electricity for other uses and regions where electrification may present greater opportunities for GHG reductions." (lines 3-7, page 3-17)

BC Hydro seeks to better understand FEI's position that the Renewable Gas Connections service is not a targeted solution.

5.1 Please confirm, or explain otherwise, that the Renewable Gas Connections service would result in a segment of customers having greater access to Renewable Gas supply without additional cost.

Response:

The following response addresses BC Hydro IR2 5.1, 5.2, and 5.3.

In this series of questions, it appears that BC Hydro uses the word "access" to probe the availability of low carbon energy, which FEI would equate to "supply". However, FEI's Renewable Gas Program is not about the "supply" of RNG; rather, FEI has designed the revised program to ensure the fair allocation of the costs of the supply and that FEI is able to meet both policy/regulatory requirements and the needs of its customers.

From a cost perspective, the use of rolled-in or average cost pricing for the proposed Renewable Gas Connections service ensures that "new" and "old" customers are being treated equitably. This approach recognizes the fact that new customers, who will be served under the Renewable Gas Connections service, did not "cause" the need for utilization of higher-cost Renewable Gas supplies.

Although it is true that, if there were a limited supply of RNG, then allocating 100 percent RNG to new residential connections would reduce the amount available to other customers, FEI believes that there is ample RNG supply for Renewable Gas Connections customers, and for customers seeking voluntary amounts of RNG. Any remaining supply will be incorporated into FEI's Renewable Gas Blend service.

Regarding industrial customers specifically, these customers are situated in a variety of rate classes and schedules. Most industrial customers are served under transportation service that could access RNG via Rate Schedule 11B. These transportation customers also have the ability to procure or acquire their RNG via their gas marketer. For the remaining industrial customers, under the sales rate classes, they will receive a blend and pay for the blend via the S&T LC rider. Should these customers desire higher volumes of RNG, they can also opt into the Voluntary Renewable Gas service.

5.2 Please confirm, or explain otherwise, that the Renewable Gas Connections service would result in all other customers having access to less Renewable Gas supply (through the RNG Blend) or at a higher cost (through the voluntary program).

Response:

Please refer to the response to BC Hydro IR2 5.1.

5.3 Please confirm, or explain otherwise, that the Renewable Gas Connections service will result in a lower blend of Renewable Gas to the industrial sector, relative to a scenario without the Renewable Gas Connections service.

Response:

Please refer to the response to BC Hydro IR2 5.1.

6.0 Topic: Proposed Tariff Revisions

Reference: Exhibit B-21, page 30; Exhibit B-17, page 114; the Application, Appendix D-2, pages 318, 320 and 324 of the PDF; and Exhibit B-20, page 16

In response to BCOAPO IR 1 10.1 in Exhibit B-21, FEI states:

> "FEI supplies various blends of Renewable Gas to different customers, including 100 percent for the Renewable Gas Connections service, based on the principle of receipt by displacement. Receipt by displacement refers to the common practice of deeming energy injected into a transmission and/or distribution system in one location to have been received by another party at a different location on the system. The actual molecules or electrons that are injected into the system do not necessarily arrive at the receiving party's location; however, they cause a displacement of electrons or molecules in the system, on behalf of the receiving party." (lines 19-25, page 30)

In response to BC Hydro IR 1 2.1 (BCUC IR 1 20.1 in Exhibit B-17), FEI provided the following proposed wording for Rate Schedule 1PLC:

> "This Rate Schedule is only available to and is mandatory for Permanent Connection Low Carbon Gas Service Customers for firm Gas consisting of 100 percent Renewable Gas on a permanent basis for the life of the premises served" (Exhibit B-17, page 114)

In Appendix D-2 of the Application, FEI provides the following proposed revisions to FEI's General Terms and Conditions:

> "Customers receiving Low Carbon Gas Service may not receive actual Low Carbon Gas at their Premises, but may instead be contributing to the cost for FortisBC Energy to deliver an amount of Low Carbon Gas proportionate to the Customer's Gas usage into the FortisBC Energy System." (page 324 of 559 of the PDF)

In Appendix D-2 of the Application, Low Carbon Gas Service is defined as follows:

> "Means the Gas Service provided to Customers, but not Natural Gas Vehicle Customers, under Rate Schedules:
>
> (a) 1LC for Residential Low Carbon Gas Service;
>
> (b) 2LC for Small Commercial Low Carbon Gas Service;
>
> (c) 3LC for Large Commercial Low Carbon Gas Service;
>
> (d) 5LC for General Firm Low Carbon Gas Service; or
>
> (e) 7LC for General Interruptible Low Carbon Gas Service; or a

(f) Long Term Low Carbon Gas Contract for such Service."

(page 320 of 559 of the PDF)

In Appendix D-2 of the Application, the FortisBC Energy System is defined as follows:

"Means the Gas transmission and distribution system owned and operated by FortisBC Energy, as such system is expanded, reduced or modified from time to time." (page 318 of 559 of the PDF)

In response to City of Richmond IR 1 3.7 in Exhibit B-20, FEI states:

"For clarity, purchased offsets will not be allowed in the supply of Renewable Gas to Renewable Gas Connections customers. As indicated in Appendix D-2, Tariff Revisions, page 28-3 of the Application, purchased carbon offsets are only admissible for use under the Low Carbon Gas Service and Vehicle Low Carbon Gas Service rate schedules, as well as Long Term Biomethane Contracts. In contrast, Renewable Gas Connections customers will be serviced under one of the three Permanent Low Carbon Gas rate schedules." (lines 11-16, page 16)

BC Hydro seeks to confirm our understanding of the terms and conditions associated with the Renewable Gas Connections service.

6.1 Please confirm, or explain otherwise, that Renewable Gas is currently not defined in the proposed tariff revisions within Appendix D-2 of the Application.

6.1.1 Please state the intended definition of Renewable Gas, as it relates to the Permanent Connection Low Carbon Gas Service (referred to in the body of the Application as Renewable Gas Connections service) and explain whether the definition is different from that used for the Low Carbon Gas Service.

6.1.2 Please confirm whether customers receiving Low Carbon Gas (referred to in the body of the Application as Renewable Gas) through the Permanent Connection Low Carbon Connections Service (referred to in the body of the Application as Renewable Gas Connections service) would be subject to the terms outlined in Section 28 ("Low Carbon Gas Service") of FEI's General Terms and Conditions. This includes terms that outline notional gas delivery and the use of carbon offsets and curtailment.

Response:

The term "Renewable Gas" is not a defined term in the proposed tariff revisions within Appendix D-2 of the Application. As stated on page 1 of the Application, FEI uses the term Renewable Gas in the Application to refer collectively to the low carbon gases or fuels that the utility can acquire under the *Greenhouse Gas Reduction Regulation*, including renewable natural gas (RNG or

biomethane), hydrogen, synthesis gas and lignin. However, in the tariff amendments filed with the Application, FEI used the term "Low Carbon Gas" to refer to these same fuel types, with each fuel type being further defined. Pursuant to BCUC Order G-165-22 the scope of this proceeding is now limited to RNG, rather than Renewable Gas more broadly. As indicated in the response to BCUC IR2 45.2, FEI intends to file amended tariff revisions to reflect this revised scope and any directives in the decision as a compliance filing after the BCUC issues its final decision on the Application.

Customers receiving Low Carbon Gas through the Permanent Connection Low Carbon Connections Service will be subject to the terms outlined in Section 28 of the General Terms and Conditions, where the tariff language specifies which terms apply to Permanent Connection Low Carbon Gas Service. For example, in Section 28.1 the term 'Notional Delivery' refers to Low Carbon Gas, as opposed to a particular class of service, and is applicable to all customers receiving Low Carbon Gas including those enrolled under Permanent Connection Low Carbon Gas Service as defined in the definitions section of the General Terms and Conditions. In contrast, Section 28.3 (a) 'Carbon Offsets' applies only to Low Carbon Gas Service, Vehicle Low Carbon Gas Service, and Long Term Biomethane Contracts. It does not apply to Permanent Connection Low Carbon Gas Service. Likewise, Section 28.3 (b) 'Curtailment' does not apply to Permanent Connection Low Carbon Gas Service.

6.2 With respect to the proposed amendments to FEI's General Terms and Conditions outlined in Appendix D-2, please explain how notional delivery of Renewable Gas that is acquired outside of the Province of B.C., or delivery by displacement, allows FEI to: "deliver an amount of Low Carbon Gas proportionate to the Customer's Gas usage into the FortisBC Energy System." (emphasis added).

Response:

In its compliance filing in this proceeding, FEI will clarify in its General Terms and Conditions that the delivery of Low Carbon Gas into the FortisBC Energy System may be delivery by displacement.