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September 12, 2022

Commercial Energy Consumers Association of British Columbia
c/o Owen Bird Law Corporation
P.O. Box 49130, Three Bentall Centre
2900 – 595 Burrard Street
Vancouver, BC V7X 1J5

Attention: Mr. Christopher P. Weafer

Dear Mr. Weafer:

Re: FortisBC Energy Inc. (FEI)

Revised Renewable Gas Program Application – Stage 2 (Application)

Response to the Commercial Energy Consumers Association of British Columbia (CEC) 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 (BCUC) Order G-165-22A, FEI respectfully submits the attached response to CEC IR No. 2.

FEI has not provided a response to CEC IR2 63.1 as the BCUC deemed this IR to be outside the scope of this proceeding in Order G-214-22.

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

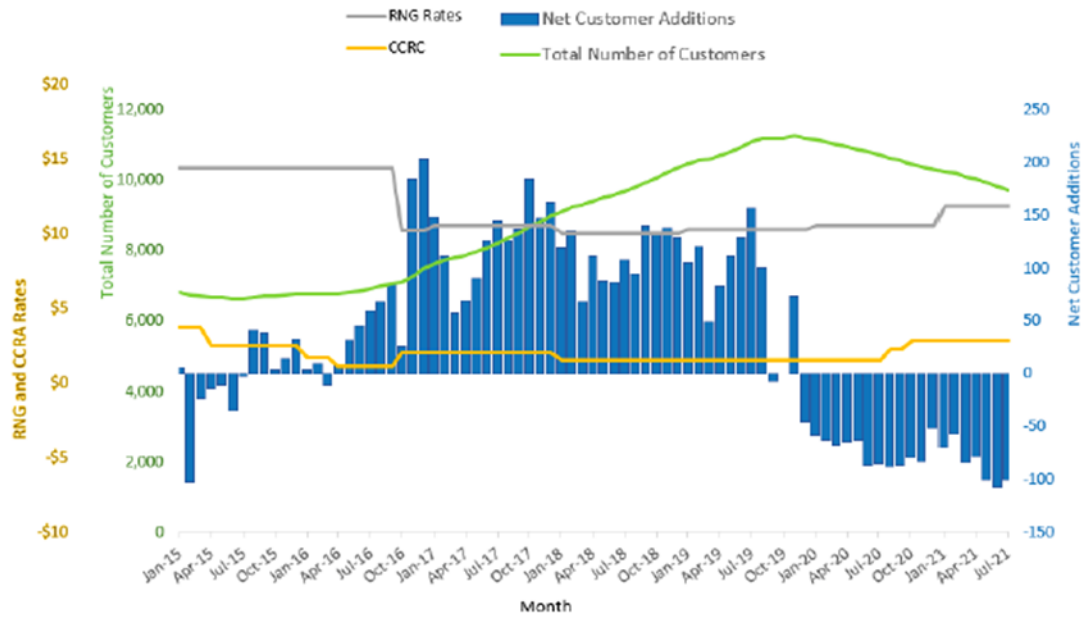
55. Reference: Exhibit B-22, CEC 1.6.1 and 1.6.2

6.1 Please overlay the price of RNG and the price of natural gas on the above graph.

Response:

Please refer to the graph below for the price of RNG with the price of natural gas (CCRC) added.

Revised Figure 2-2: Renewable Gas Program Monthly Net Customer Additions and Total Customers



6.2 Please describe the influences FEI assesses as causing the net attrition from 2020 on.

Response:

The reduction in customer additions towards the end of 2019 to mid-2021, as shown in Figure 2-2 above, was due to a temporary closure of the existing RNG Program to new participants because RNG supply did not materialize as anticipated and fell short of demand.

The temporary closure of the RNG Program led to the steady erosion of the total number of customers enrolled, due to the natural exiting of customers from the Program over time which were not replaced by new participants.

55.1 Were all the customers who wished to stay with the Program able to achieve the supply needed to fulfill their contracts during the supply shortage, or was FEI required to cut back supply to existing customers? Please explain.

Response:

In addition to temporarily closing the program to new participants towards the end of 2019, FEI was unable to fulfill its RNG supply commitments to existing program subscribers until 2021 when significant new volumes of RNG supply became available to FEI. In response, FEI purchased carbon offsets to make up for the shortfall on volumes provided to customers enrolled under firm rate schedules and implemented service curtailment for customers enrolled under interruptible rate schedules.

55.1.1 If FEI was able to supply all the customers who wished to stay with the Program, and experienced customers who exited, did FEI have surplus supply when it temporarily closed the Program to new customers? Please explain and if yes, please quantify and value the surplus supply that was not sold.

Response:

Please refer to the response to CEC IR2 55.1. FEI was not able to provide RNG supply to all the customers who wished to continue their enrollment in the RNG Program during the period in question.

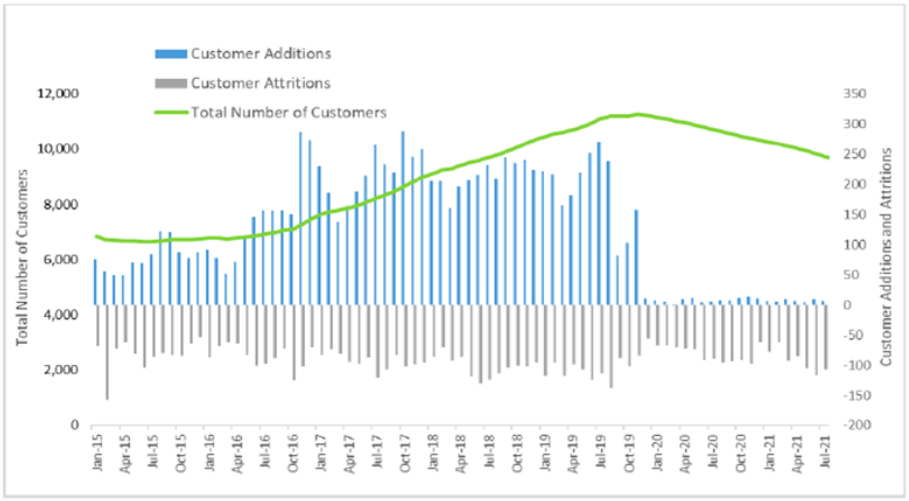
55.1.2 Please confirm the metric for RNG rates as $/GJ or otherwise provide the metric used.

Response:

Confirmed. The RNG rates depicted in the revised Figure 2-2 are provided in $/GJ.

56. Reference: Exhibit B-22, CEC 1.6.3

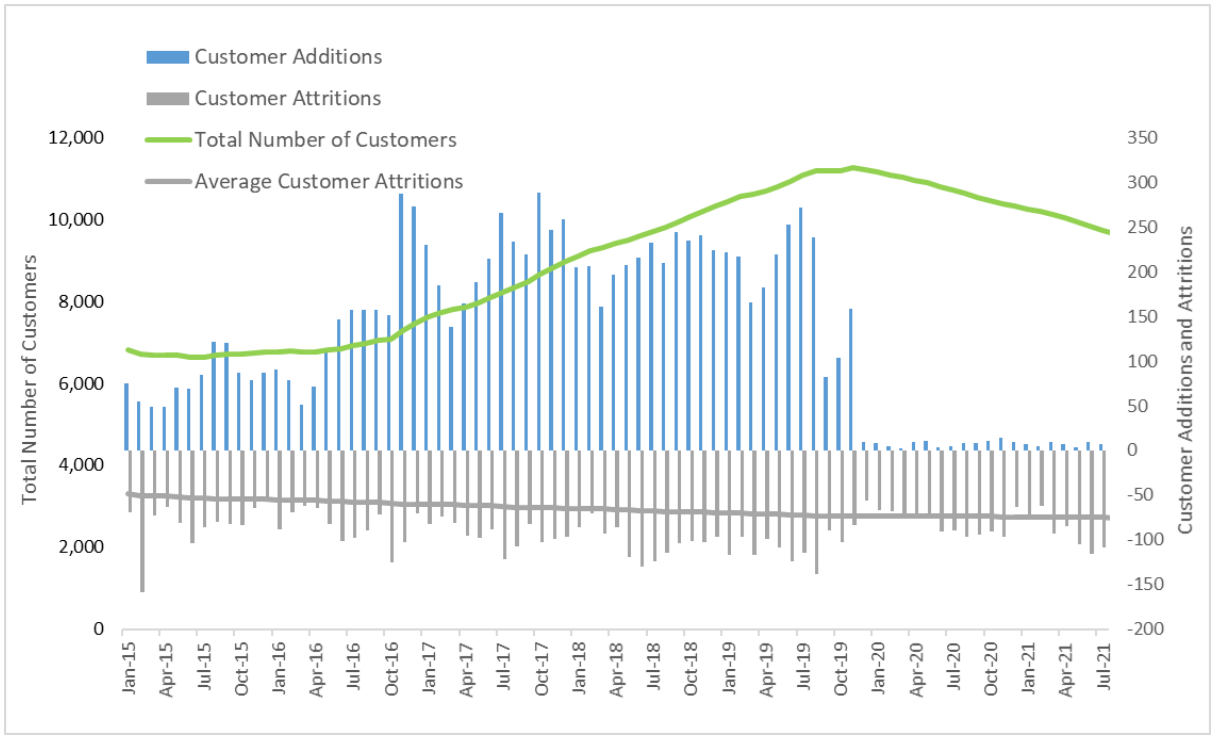
Figure 1: Customer Additions, Attrition and Total



56.1 Please chart the average of customer attritions on Figure 1 and plot this on the Figure 1 graph above.

Response:

Please see the graph below for the requested information.

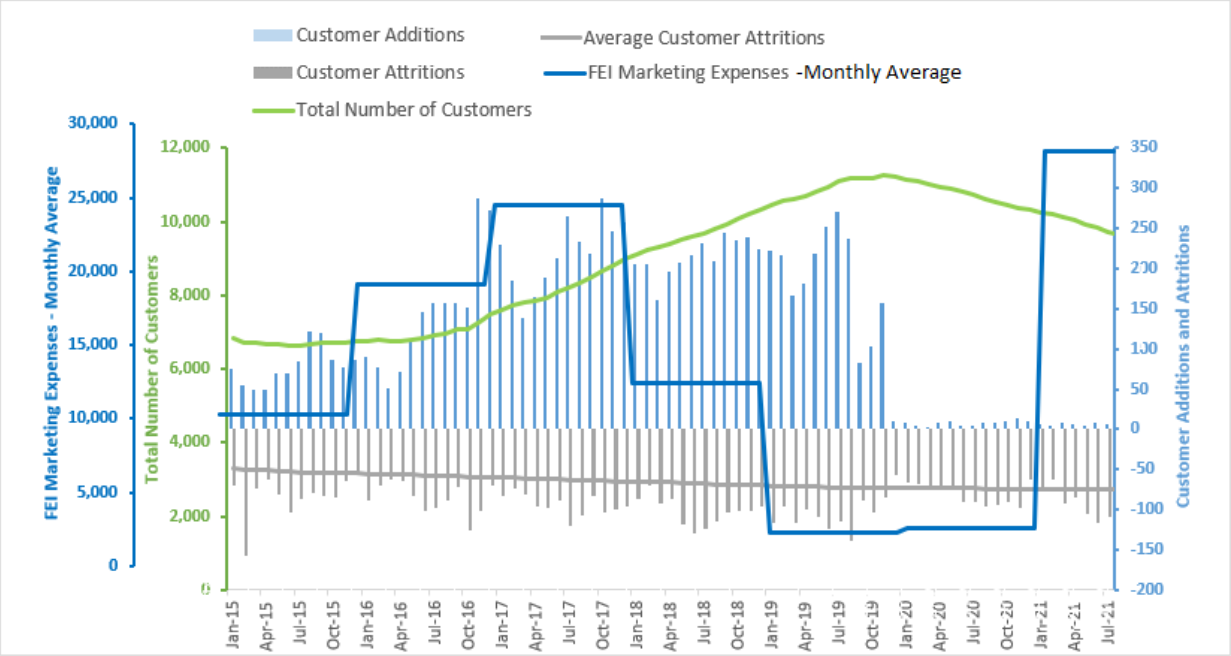


56.2 Please provide FEI's marketing expenses, inclusive of all marketing activities (internal & external expenditures) for each of the above periods as a line graph over Figure 1 above.

Response:

An updated version of Figure 1 is provided below. Marketing expenses are provided in dollars on the scale to the left of the figure.

Figure 1: Customer Numbers and Marketing Expenses



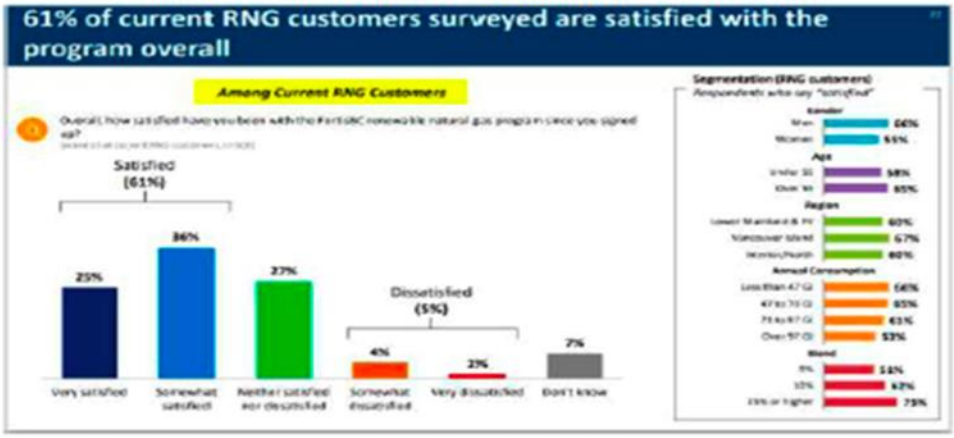
As noted in Section 9.4 of the Application, FEI halted the customer education and awareness spending in 2019 at the time it temporarily stopped accepting enrollments in the existing RNG Program, when demand exceeded the available supply. This is seen in the drop in the marketing expenses line in the figure above.

57. Reference: Exhibit B-22, CEC 1.7.1

7. Reference: Exhibit B-11, page 22

further 27 percent indicated they were neither satisfied nor dissatisfied. Only 5 percent of respondents indicated they were dissatisfied.

Figure 2-5: Current Renewable Gas Program Participant Satisfaction



Moreover, customers who opted for RNG proportions of 25 percent or higher reported even greater satisfaction than other participants. For this group, the customers that reported being satisfied was 75 percent.

7.1 Please provide a summary of any information FEI has as to why 5% of customers are dissatisfied with the program.

Response:

Of the five percent of customers who indicated that they were dissatisfied with the existing RNG Program, the substantial majority said it was because the cost of RNG was more expensive than conventional natural gas.

57.1 Please provide FEI's view as to the renewable natural gas premium that would be a low enough price to enable FEI to keep 75%, 50% and 25% of all of its customer attritions with the RNG program.

Response:

While pricing plays a large role in customers' decision-making, FEI does not believe that all customer attritions from the current RNG program occur for reasons purely related to price as the question appears to presuppose. On this basis, FEI does not believe that pricing could be used to retain all of customer attritions. For example, customers may exit the program because they move out of FEI's service territory, tear their home down or decide that they prefer an alternative form of energy.

Further, FEI is not able to elaborate on what price might allow FEI to keep some lesser portion of customer attritions resulting from price concerns. As described in Section 5.8 of the Application, FEI does not have price elasticity data on which to reasonably base an opinion.

57.2 Please explain and quantify the connection between dissatisfaction on a survey and customer attritions.

Response:

There is no direct quantifiable connection between the dissatisfaction described in the survey and customer attrition. Customer attrition occurs for a number of reasons that affect customers' lives and their need for, attitudes towards, or willingness to spend money on energy. This could include moving homes, changes in income or household expenditures, impaired asset values, change in life circumstances, etc.

While dissatisfaction with the price of RNG may be a factor resulting in customer attrition, so too is the availability of energy alternatives. The customers who expressed dissatisfaction in the survey responses were subscribers to the existing RNG Program at the time of the survey. The survey results therefore do not necessarily represent thoughts regarding the program who are no longer subscribers.

58. Reference: Exhibit B-22, CEC 1.9.1

Response:

Creative Energy discusses Renewable Gas, and whether it would be expected to qualify under the City of Vancouver's bylaws, as part of the Decarbonization Project. In particular, Creative Energy explains that, within their 2021 Long Term Resource Plan, one potential option to reduce the carbon intensity of the steam energy it produces is to purchase Renewable Gas from FEI, thus displacing the conventional natural gas it uses in its steam plant. Within their filing Creative Energy also indicates that they had recently engaged with City of Vancouver staff to seek clarity on the City's view of Renewable Gas under the LCES framework. City of Vancouver staff confirmed that Renewable Gas would not meet the definition of an LCES as it is not a "permanent solution" as written in their policy:

> Type 4: Existing Utility-Owned District Energy System", refers to an existing utility-owned district energy system that is not yet a permanent LCES. As a temporary bridging measure before such a utility builds or connects to a permanent low carbon energy plant and becomes a permanent LCES, the utility must be able to obtain a reliable source of low-carbon energy. Such utility must also have a plan and commitment to build or connect to a permanent low-carbon energy plant in order to provide permanent low-carbon energy to the developments served by it…during the interim period before the utility becomes a permanent LCES, the utility must be able to obtain a reliable source of low carbon energy (which could include, without limitation, **renewable natural gas**,… [emphasis added]

Despite the above, FEI considers that Renewable Gas is a permanent reliable source of low carbon energy given its low carbon attributes. The transition in gas utilities towards cleaner sources of energy is no different than the transition that electric grids are undertaking, including in BC and across Canada, towards cleaner sources of electricity. Moreover, Renewable Gas does not change the efficiency of the plant or its operating costs. FEI is hopeful that with further discussions with the City of Vancouver, which remain ongoing, Renewable Gas will ultimately be recognized as a potential permanent solution.

58.1 Please describe the objections that FEI is hearing from the City of Vancouver with respect to why RNG is not considered to be a 'permanent solution' and provide FEI's views as to how this perception might be overcome.

Response:

FEI has heard concerns from the City of Vancouver (CoV) regarding the permanency of RNG. As described in Section 3.5.1 of the Application, as a voluntary opt-in only service, FEI's existing RNG Program currently lacks permanency, and therefore, does not provide local governments with long-term certainty regarding the GHG emissions associated with new construction projects. FEI is proposing to address this concern by offering RNG over the lifetime of new buildings, enabling permanency and long-term emission reductions.

Furthermore, regarding Creative Energy specifically, and the CoV policy cited above, RNG is a reliable source of low-carbon energy. RNG supply facilities, such as the Vancouver Landfill Project, are permanent facilities that will deliver low-carbon energy into the future.

FEI has been working with the CoV staff over the past few years to provide them with education and evidence on RNG as a low-carbon solution, as well as how FEI will be compelled to reduce its emissions by the provincial government, which will enable the CoV to meet their emission reduction targets. Please also refer to the response to CEC IR2 58.2. Please refer to the response to BCUC IR2 56.2.3 for strategies that will complement the approval of the proposals in this Application.

58.2 Has FEI explained to the City of Vancouver that synthetic methane and hydrogen are natural long-term sustaining options for RNG, where Bio-RNG may have more variability? If so, what has been the response and, if not, why not.

Response:

FEI staff have had many conversations with City of Vancouver staff regarding Renewable Gas, including its attributes, supply potential from various sources, emissions profile, etc.

For details on the CoV's latest climate policy proposal as per the May 22, 2022 Council meeting, please refer to BCUC IR2 48.3.

58.3 Please elaborate on the transitions that the electric grids are undertaking towards cleaner sources of energy.

Response:

From a generation standpoint, electric grids in North America are transitioning from coal-fired thermal generation to cleaner sources of energy such as natural gas-fired generation, in addition to new solar and wind generation. While coal, natural gas, nuclear and hydro generation are firm resources, solar and wind are intermittent sources of energy and will require additional firm resources (primarily natural-gas fired generation, but also batteries, pumped storage hydro, etc.) to provide power (capacity) when it is required.

In more limited cases, dams are constructed (as demonstrated by Site C in British Columbia and Muskrat Falls in Newfoundland); however, these are costly and take a comparatively long time to construct. Further, there are limited options left in North America for new hydro dams and the siting, regulatory process and construction of a new hydro generation facility can ultimately take

a decade or more. Lastly, nuclear generating facilities provide firm clean power, but many jurisdictions, including British Columbia, do not see nuclear as a low carbon path forward.

In BC, clean electricity generation solutions (beyond Site C) are expected to be achieved through renewal of expiring independent power producer agreements. Beyond 2030, as part of BC Hydro's 2021 IRP, new generation resources are expected to be selected from additional expiring purchase agreements, new wind (primarily in the Peace River region), solar, and battery resources, and refurbishments or upgrades to existing BC Hydro facilities. However, FEI is not able to confirm if these strategies will allow sufficient generation and energy storage to meet CleanBC Roadmap emissions targets.

From a transmission and distribution grid perspective, as more electrical energy is required for electric vehicle charging, home and business needs, grids will require additional system infrastructure upgrades to deliver the quantity of power at the time it is required. Depending upon the location and utility, these costs may be borne by the end use customer, in addition to any retrofit costs required on the customer side of the meter.

58.4 Please provide FEI's understanding of the total resource cost (excluding costs paid for through government programs and therefore paid by taxpayers) for use of electric boilers versus the use of RNG in boilers as a means of reducing GHGs and Carbon Taxes using, if possible, the Creative Energy example with estimates where precise information is not available.

Response:

FEI has not conducted any specific analysis on the use of electric boilers versus the use of RNG in boilers as a means of reducing GHG emissions and carbon taxes. At a high level, the benefit of using RNG as a means of reducing GHG emissions and carbon taxes is that a customer with existing gas boilers can substitute RNG into their current equipment without the need for capital upgrades to their equipment or upgrades to the utility distribution system because load is unchanged and RNG is a drop-in fuel. Further, large electric boilers and electrical upgrades are more costly than comparable gas equipment (as demonstrated in the Creative Energy example noted in the preamble). Additionally, the carbon intensity of RNG is lower than that of the current BC electrical grid and, therefore, customers are able to achieve greater GHG reductions.

While FEI is not familiar with all of the details or models of Creative Energy's Decarbonization Project, the associated CPCN filing provided: (1) the Incremental Total Cost of Service of the Decarbonization Project in Table 15; and (2) an example of the Emissions Reduced Calculation in Table 7 (both included below).

From Table 15, assuming an average incremental annual total cost of service of the Decarbonization Project of approximately $10.5 million and, from Table 7, the annual reduction in the natural gas usage from Baseline to Decarbonization Project of roughly 350,000 GJ, the rough cost of the Decarbonization Project is $30 per GJ ($10.5 million / 350,000 GJ). Please note that these costs also include the government subsidies and grants which reduce the cost of the project. As such, if incentives were excluded, the project costs would be higher than $30/GJ. Further, the Decarbonization Project has been assessed using a discounted BC Hydro Clean Energy Electrification Transmission Rate which has the effect of lowering the cost of electricity compared to a solution that did not include the preferential Clean Energy Electrification Rate. Using the otherwise appropriate BC Hydro rate schedule would increase rates, further increasing the cost per GJ. Combined, these two factors would increase the cost to well above $30/GJ in the initial period, but declining over time as the capital assets depreciate.

Conversely, decarbonizing with RNG requires only the purchase of RNG, (assuming the natural gas equipment is not at end of life and is still useful. The incremental cost of RNG is equal to the acquisition cost of RNG less the savings in conventional natural gas and carbon tax (all on a per GJ basis), which is approximately $17 per GJ.[1] Further, RNG currently has a lower carbon intensity than electricity, meaning that the emissions reductions achieved using RNG are greater than the emission reductions using electricity.

Using the RNG to decarbonize in lieu of electrification would be better for both Creative Energy's customers, saving them approximately 50 percent, and BC taxpayers by way of fewer incentives distributed to Creative Energy as incentive costs are ultimately borne by BC taxpayers.

Table 15 –Indicative Incremental Cost of Service of the Decarbonization Project

$000	2024 (year 1)	2028 (year 5)	2033 (year 10)
Depreciation	1,083	1,083	1,083
Cost of Debt	361	635	510
Cost of Equity	634	1,115	896
Income Taxes	69	153	266
Maintenance	109	118	257
Operators	106	115	127
Insurance	80	86	95
Billing, Support & Admin	225	244	269
Steam Cost of Service	2,666	3,548	3,503
Cost of Electricity	4,837	6,944	9,974
Fuel Cost of Service	4,837	6,944	9,974
Total Cost of Service	7,503	10,492	13,477

94

[1] Assuming an average cost of RNG of $24 per GJ an average cost of conventional natural gas of $4 per GJ and carbon tax of $3 per GJ.

Table 7 - Example Emissions Reduced Calculation - 2026

	Baseline	Project
Steam Sold [M#]	1,087,724	1,087,724
Steam through Plant Gate [M#]	1,156,108	1,222,338
Natural Gas [GJ]	1,855,849	1,504,072
Natural Gas Emissions [TCO_{2e}]	93,308	75,621
Electricity [MWh]	2,078	87,937
Electricity Emissions [TCO_{2e}]	62	2,629
Fuel Oil [GJ]	375	375
Fuel Oil Emissions [TCO_{2e}]	98	98
Total Emissions [TCO_{2e}]	93,468	78,349
Emissions Reductions [TCO_{2e}]	0	15,119

58.5 Please confirm that hydroelectric energy such as that which will be derived from the Site C Dam create substantial GHGs in the construction of the dam, as well as having substantial environmental impacts in the reservoir and other aspects.

Response:

FEI confirms that, generally, the construction of hydroelectric energy facilities creates GHG emissions and can have environmental impacts.

58.6 Please explain for how long a DES would be permitted to have an interim RNG solution.

Response:

As with conventional natural gas, the duration of RNG service for a district energy system would be entirely up to the associated provider. FEI considers RNG to be a permanent and reliable low carbon energy source and is optimistic that the district energy system providers will also see these benefits.

59. Reference: Exhibit B-22, CEC 1.9.2

> Nonetheless, the City is seeking feedback on a proposal where **existing** residential customers wishing to replace gas equipment must sign up for 100 percent Renewable Gas through FEI's Voluntary Renewable Gas service, pay the $7 premium, and then through data sharing between FEI and the City, annually confirm that the customer consumed 100 percent Renewable Gas. This would be additive Renewable Gas and the associated emissions to that resulting from the Renewable Gas Blend proposed in this Application.

59.1 From which parties is the City seeking feedback on its proposal?

Response:

FEI is unable to respond to this question as it does not have this information.

59.2 Please explain how the proposal affects commercial customers, if at all.

Response:

The proposal discussed in the preamble to the question entails that residential **and commercial** customers would be required to sign up for 100 percent Renewable Gas at the time of equipment replacement. Customers would pay the S&T LC rider for the percentage of Renewable Gas delivered to all existing sales customers. In addition, they would need to sign up for incremental Renewable Gas volumes to take them to the 100 percent level.

Please note that since the submission of the first round of IR responses and the writing of the response CEC IR1 9.2, the City of Vancouver's proposal with regards to GHG emissions reduction in new and existing buildings has been brought forward to City Council with subsequent motions at the May 17, 2022 Council meeting. These latest proposals are described in the response BCUC IR2 48.3.

59.3 Please elaborate on what Fortis means by 'additive RNG and the associated emissions'. In what ways can it be determined to be 'additive'?

Response:

The additional volumes from Voluntary Renewable Gas service that the City of Vancouver is suggesting existing residential customers sign up for to achieve 100 percent Renewable Gas are "additive" to (i.e., in addition to) the base gas blend volumes that would be allocated to all sales customers.

59.4 Would a City proposal setting a price for an FEI service be an invasion of the Commission's regulatory price-setting jurisdiction for RNG service?

Response:

Yes. Under the *Utilities Commission Act*, the BCUC has jurisdiction over the rates FEI charges for its public utility services.

With respect to the proposal referenced in the preamble to this question, the effect of such a proposal would be to impose terms and conditions on FEI's public utility service, which FEI considers inappropriate. FEI has also advised the City of Vancouver that FEI would not legally be able to share its customers' personal information in the manner contemplated in the proposal unless each customer individually consents to the disclosure of their information from FEI and the collection of that information by the local government.

60. Reference: Exhibit B-22, CEC 1.9.1

> FEI sees three ways to align the provincial government and the City of Vancouver.
>
> - First, FEI views the City's participation in the regulatory process as an intervener in this proceeding as a positive development towards reaching alignment, as the City will have access to more information regarding the proposed Renewable Gas Program and its merits.
> - Second, as discussed in the response to CEC IR1 53.1, FEI has recommended to the provincial government that it needs to conduct broad and early consultation around the GHGRS, including with local governments like the City. FEI has proposed to the City that it pause changes to its building decarbonization code until after the completion of this proceeding and the completion of the GHGRS; however, the City is moving forward with its decarbonization code slated to go before council on May 17, 2022.
> - Finally, FEI continues to be actively engaged with City staff and elected officials in policy development, especially as it relates to the building sector. This includes, for example, execution of a Memorandum of Understanding between FEI and the City,[5] workshops with City staff, and written submissions by FEI in the City's building-related consultation processes.

60.1 What is the status of the decarbonization code slated to go before council on May 17, 2022?

Response:

Please refer to the response to BCUC IR2 48.3.

60.2 Did FEI provide evidence at the council meeting?

60.2.1 If yes, please provide the evidence that FEI provided to the council.

60.2.2 If no, please explain why not.

Response:

FEI did not present evidence at the May 17, 2022 council meeting. However, FEI engaged with City of Vancouver staff in advance of the meeting, as well as some members of Council individually.

FEI also provided a letter to the City of Vancouver on April 29, 2022 outlining FEI's comments regarding the proposed policies. The letter provided by FEI introduced the GHGRS and recommended a temporary pause in the introduction of new policies. During the temporary pause, FEI recommended a joint and concerted effort to develop compliance mechanisms for existing buildings and new construction that align with the GHGRS.

Since the May 17, 2022 council meeting, FEI has continued to engage members of Council individually in advance of relevant bylaws being introduced.

61. Reference: Exhibit B-22, CEC 1.10.3 and 1.11.1

> 10.3 Could District Energy systems using RNG be made cost effective relative to the use of electricity and still retain an equivalently low carbon footprint? Please explain why or why not.
>
> **Response:**
>
> Yes. While individual business models within District Energy Systems (DES) vary, they could use Renewable Gas for a cost-effective system that would have an equally low or lower carbon footprint than a system using electricity. A DES owner would have to compare the cost of gas infrastructure and the associated costs of Renewable Gas to alternatives such as electrical infrastructure (heat pumps) and the associated variable costs of electricity. As a drop-in fuel, existing gas-based DES can easily transition to Renewable Gas supply.
>
> Depending upon the DES design and rate recovery mechanisms, a DES can be more expensive and have higher energy costs due to the added costs of hot water piping infrastructure between the energy plant and the customer's building. Therefore, it may ultimately be more cost-effective for a customer to use Renewable Gas directly through discrete in-building systems.

> 11.1 Is it fair to expect that reduced energy choices will likely result in higher end user costs? Please explain why or why not.
>
> **Response:**
>
> Yes, it is fair to expect that reduced energy choice will likely result in higher end user costs. When energy choices are limited in sectors such as new buildings, the ability of market participants including energy providers, homebuilders, appliance manufacturers and renewable and low carbon gas suppliers to innovate and offer the most competitive and cost-effective options are restricted.
>
> Furthermore, as discussed in Guidehouse's report titled *Pathways for British Columbia to Achieve its GHG Reduction Goals* (Pathways Report),[6] limiting choice creates significant costs in the aggregate as it would drive peak demand across the electricity system which would lead to high costs for new electric generating, transmission and distribution resources. In contrast, a diversified approach that maintains choice for customers will moderate the growth in electric peak demand and associated infrastructure costs. Even though more higher-cost renewable and low-carbon gases would be needed, the costs of these are significantly less than new electric infrastructure.

61.1 Please explain how a DES could have an equally low or lower carbon footprint than one using electricity, and please provide a quantitative analysis demonstrating same.

Response:

A District Energy System using RNG will have a lower carbon footprint than one using electricity because the emissions factor of RNG is much lower than electricity, and the efficiency of electric heating systems are not high enough compared to the efficiency of gas-based systems to outweigh the lower emissions factor of RNG.

As demonstrated through the analysis set out below, in order for the emissions to be equal between an RNG-based system and an electricity-based system, the efficiency of the electricity-based system must meet or exceed the simple ratios of the emissions factors of electricity and RNG-based systems, which is 10.2 as calculated below. Put another way, the efficiency of the electricity-based system divided by the efficiency of the RNG-based system must be equal to 10.2 or higher on average throughout the entire winter where RNG is used. The highest consumption is at the coldest time of the winter, when air source heat pumps are at their lowest efficiency. FEI is not aware of any electric heating system that is more than 10 times more efficient on a HDD-weighted-average-during-winter basis than a properly functioning modern gas heating system using 100 percent RNG.

Associated Analysis:

In any heating system:

Eq. 1 *Energy Output = Energy Input * Efficiency*

Eq 1. can be rearranged to solve for Energy Input as follows:

Eq. 2 *Energy Input = Energy Output/Efficiency*

The energy needed for a particular building or group of buildings does not change based on fuel or heating systems type; that is, the output needed from one heating system option versus any other is equal. Heat load is determined by the building's envelope, ventilation rates, etc., not the heating system.

Eq. 3 *Energy Output 1 = Energy Output 2*

Given the following emissions factors:

1) Renewable Natural Gas: 0.2932 kgCO2e/GJ (PDF pg 12)
2) BC Hydro Electricity: 3.0 kgCO2e/GJ (PDF pg 16)

Based on PDF pages 12 and 16 of the following:
https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2020-pso-methodology.pdf

Given GHG emissions from energy use can be calculated by taking the Energy Consumed ("energy input" into a heating system) times the Emissions factors above, we get:

Eq. 4 *GHG = Energy Input * GHG Emissions Factor (EF)*

In order for the GHG from each energy system option to be equal, the following would need to be true:

*EnergyInput1 * GHG_EF1 = GHG = EnergyInput2 * GHG_EF2*

EnergyInput1 / EnergyInput2 = GHG_EF2 / GHG_EF1

Substituting EnergyInput terms w/ Eq. 2 into the equation above, results in:

(EnergyOutput1/Efficiency1) / (EnergyOutput2/Efficiency2) = GHG_EF2 / GHG_EF1

Given Eq. 3 above, we can cross off the output terms in the equation above, leaving:

~~EnergyOutput1~~/Efficiency1) / (~~EnergyOutput2~~/Efficiency2) = GHG_EF2 / GHG_EF1

Efficiency2 / Efficiency1 = GHG_EF2 / GHG_EF1

The GHG Energy Factors on the right hand side of the equation are

GHG_EF1 is the Emissions Factor from RNG (0.2932 kgCO2e/GJ)

GHG_EF2 is the Emissions Factor from BC Hydro Electricity (3.0 kgCO2e/GJ)

GHGEF2 / GHGEF1 = (3.0 kgCO2e/GJ) / (0.2932 kgCO2e/GJ) = 10.2

Therefore, in order for the GHG from each energy system option to be equal:

Efficiency2 / Efficiency1 = 10.2

61.2 Is it a correct understanding that, in certain municipalities, new buildings using low carbon energy options may be permitted to be constructed to lower energy efficiency standards, so that customers require the expenditure of more energy than they would if RNG was used? Please explain.

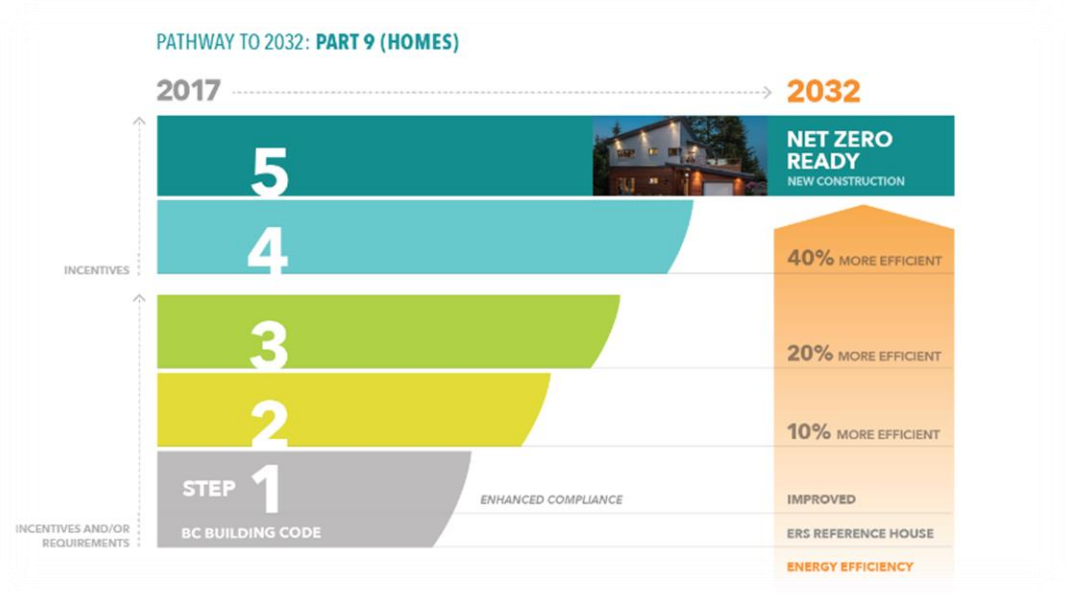
Response:

Yes, it is correct that in some municipalities, new buildings using low carbon energy options may be permitted to be constructed to lower energy efficiency standards, resulting in the expenditure of more energy by the occupants. For example, some local governments offer two compliance pathways, either: (1) building to a lower level of the BC Energy Step Code, but using a low-carbon energy source or meeting a greenhouse gas intensity limit; or (2) building to a higher level of the BC Energy Step Code without such a requirement.

The steps of the BC Energy Step Code set out a compliance path that increases in energy efficiency and hence decreases in energy use as they progress up the steps from Step 1 to Step 5. To demonstrate this, Figure 1 shows how a home built to Step Code level 2 is 10 percent more

efficient than if built to the base BC Building Code. In comparison, a home built to Step Code level 3 is 20 percent more efficient relative to the base BC Building Code.

Figure 1: BC Step Code Levels for Part 9 Buildings (Homes)



Source: http://www.energystepcode.ca/how-it-works/

In the City of Richmond (as shown in Table 1 in the response to BCUC IR1 20.3), a home can be built to Step Code level 3 or, alternatively, to Step Code level 2 with a Low Carbon Energy System (6 kgCO2e/m2 or ≤ 1.2 tCO2e / year). Builders typically favour the lower level of the Step Code due to the lower upfront construction cost. However, a Step Code level 2 home consumes more energy than a Step 3 home due to its lower efficiency.

61.3 If higher energy efficiency construction is combined with RNG can this be expected to result in lower GHG emissions overall, or comparable emissions to the low carbon option? Please explain.

Response:

Yes, the combination of higher energy efficiency measures with RNG can result in greater GHG emissions reductions. To demonstrate this, FEI describes below an energy study performed for a building in its Custom Efficiency Program below.

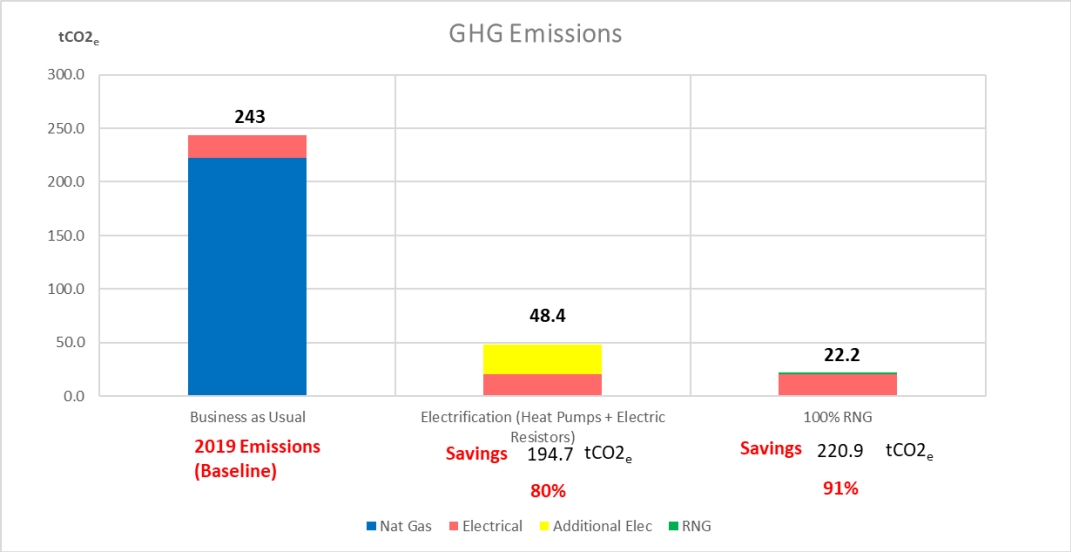
The energy study explores several opportunities to reduce electricity and gas consumption, as well as options for electrification. The bar chart below (Figure 1) shows the projected GHG savings

of the building, compared to the baseline, considering two possible scenarios: (1) 100 percent electrification; or (2) switching to 100 percent RNG. The chart shows that greater emissions reduction can be achieved by switching to 100 percent RNG (a 91 percent reduction) versus switching to electricity (an 80 percent reduction).

This estimate assumed the following:

- The baseline energy use for the energy study was established as 2019
- GHG emission factor for electricity of 3.69 $kgCO_2e/GJ$[2]
- GHG emission factor for RNG of 0.2932 $kgCO_2e/GJ$ (burner tip emissions)[3]

Figure 1: GHG Emissions Reduction using Burner Tip Emissions for RNG



After performing an energy use analysis, the consultant recommended four energy retrofit measures to reduce electricity and gas consumption in the building:

- Controls upgrades
- A condensing boiler upgrade
- Washroom exhaust fan heat recovery
- Air handling unit upgrades

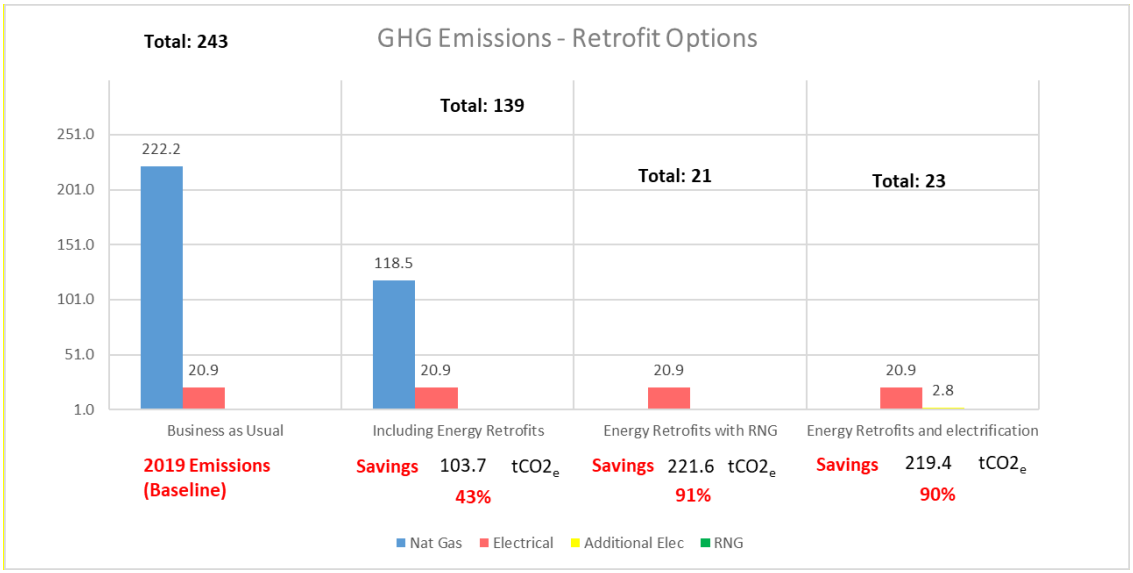
As shown in Figure 2 below, the total annual savings of the recommended Energy Retrofits bundle alone was projected to be 2,080 GJ for natural gas and 40,800 kWh for electricity, which equates to a 43 percent emissions reduction. Implementing the energy retrofit measures, along with

[2] Source: B.C.'s Grid Electricity GHG Emission Intensity Factors for 2021 for the integrated grid https://www2.gov.bc.ca/gov/content/environment/climate-change/industry/reporting/quantify/electricity.

[3] Source: 2020 BC Best Practices Methodology for Quantifying Greenhouse Gas Emissions, Table 1, p.12. Emission Factors used in Reporting the B.C. Government's GHG Emissions from Business Travel - 2010.

electrification of the existing gas equipment, was projected to achieve a total emissions reduction of 90 percent. This compared to a projected emissions reduction of 91 percent after implementing the energy retrofit measures in conjunction with switching the remaining natural gas use to RNG.

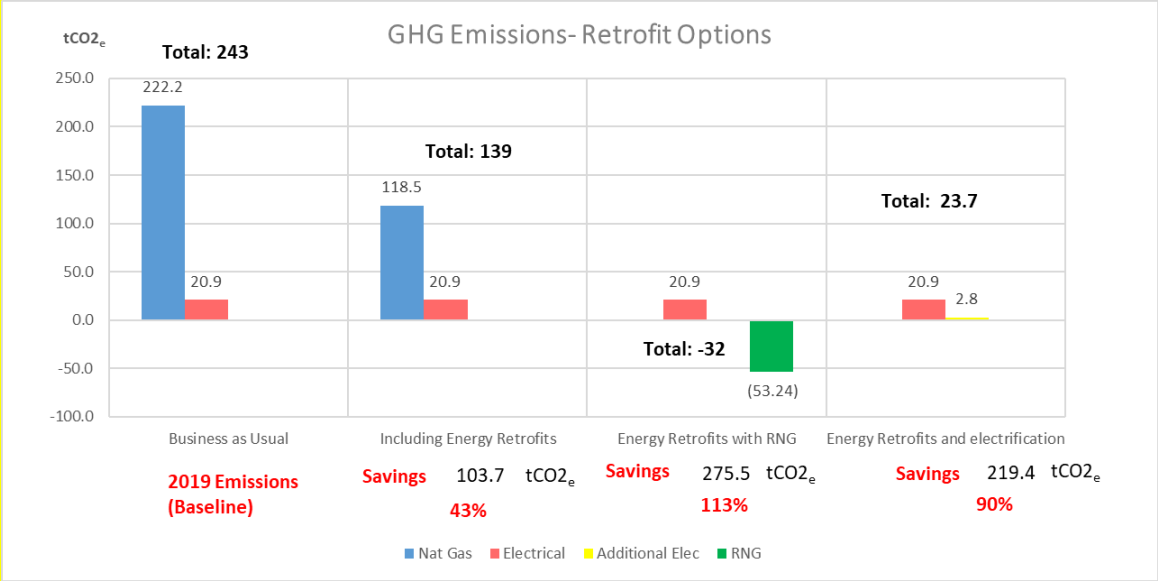
Figure 2: GHG Emissions Reduction Implementing Energy Retrofits and Switching to RNG



Further, as is shown in Figure 3 below, if the calculation above instead uses FEI's 2021 RNG supply portfolio's lifecycle emissions factor of negative 22.4 kgCO2e/GJ[4], the GHG emissions reduction amounts to 113 percent when compared with the baseline.

[4] Refer to response to BCUC IR1 4.1.

Figure 3: GHG Emissions Reduction Implementing Energy Retrofits and Switching to RNG (and using RNG lifecycle emissions factor)



This example demonstrates that higher energy efficient measures, when combined with RNG, can result in lower or comparable overall GHG emission reductions when compared to the low carbon (i.e., electrification) option.

Please note that FEI was only able to prepare the above analysis for this one customer as FEI has the details of their current circumstances. However, FEI was unable to respond to BCUC IR1 13.8 and 13.9 as energy use and capital costs can vary substantially from one building archetype to another. To collate a heterogeneous pool of customers, with unique building archetypes, mechanical equipment and energy uses will not provide for a representative average to prepare the calculations requested in those IRs.

62. Reference: Exhibit B-22, CEC 1.15.1 and 1.15.2 and 1.15.3

Commercial customers showed a similar preference for these capabilities. Commercial customers that serve particularly vulnerable sectors of the population (e.g., hospitals and care facilities) value the reliability of gas service throughout the year, but in particular during times of peak use.

As mentioned in the response to CEC IR1 26.2, FEI's industrial customer group represents a wide range of industries and end uses including pulp and paper, forest products, mining, refineries, chemical, cement, various manufacturing industries, greenhouses, agriculture, and food and beverage processors. These customers use natural gas equipment that differs from residential and some commercial customers, since they use natural gas as the primary means of generating heat for manufacturing processes, including product drying, process heating, and industrial processes, in addition to space heating. For many of these processes there is a requirement for thermal heat produced from combustion that electrical equipment is not able to meet. Natural gas is often the best alternative for this customer group as it has the lowest emissions of the fossil fuels, is reliable and is low cost.

The industrial sector is generally focused on managing their costs and the competiveness of their business, potentially both locally and internationally. Decisions related to energy are based on a variety of factors such as safety, reliability, resiliency, profitability, diversity, and their corporate sustainability and ESG plans as a tool to help them meet their corporate sustainability goals.

Managing operating costs will be a key driver of this customer segment. Alignment of policy to enable cost effective Renewable Gas would benefit this customer group.

Lastly, NGV customers benefit from natural gas as a lower cost and as a lower carbon alternative fuel where their only viable alternative is moving back to diesel.

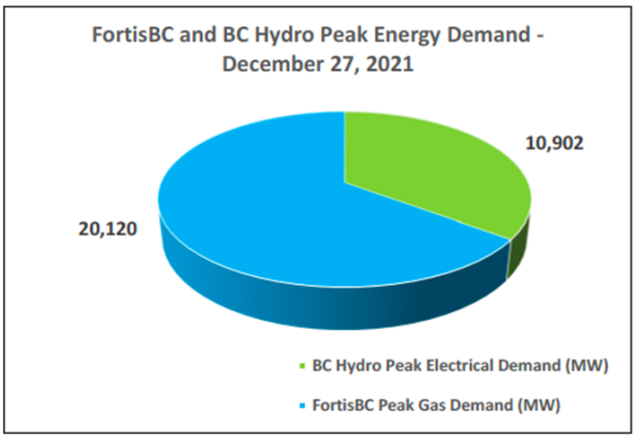
15.2 Please identify the customer groups and/or end-uses which benefit from natural gas versus other energy sources.

Response:

FEI believes that all customers benefit from natural gas versus other energy sources. Natural gas provides a safe, reliable, and low cost energy solution for all customers.

Please also refer to the response to CEC IR1 15.1.

Figure 1: FEI and BC Hydro Peak Energy Demand December 27, 2021



> Increasing heating load on the electric system, all things equal, will result in a greater peak, and will require additional generation and capacity. It is difficult to increase peak supply of electricity without investing in associated electric infrastructure. Further, as discussed in the response to CEC IR1 15.1, the gas system provides more flexibility when responding to peak load periods, as FEI can increase the pressure in the system, add LNG downstream or take other measures to increase capacity.

62.1 Recognizing that all customer groups benefit from the natural gas characteristics, is it fair to say that businesses could bear the most significant cost harm arising from the obligations to use of other energy sources? Please explain.

Response:

All customer groups benefit from the characteristics of the gas system, particularly the ability of the gas system to deliver greater quantities of energy during periods of peak demand. It is for this reason that gases (including RNG) delivered via the gas system is the suitable fuel for heating as the gas system is designed to deliver this energy efficiently and effectively during cold periods and at lower cost than the electric system.

All energy consumers could bear significant cost and implications arising from an obligation to use only one energy source (electricity).

Businesses are unique in that these costs can have a negative impact on the business as they seek to pass these costs through to customers. If a business is not able to recover these costs from their customers, then the business may end up in financial difficulty, further impacting their ongoing operations and potentially their existence.

Non-business consumers are also unique in that they pay the increased costs of their own energy, but they must also then pay the increased costs of energy to businesses in the form of higher prices for goods and services.

62.2 Does FEI consider that regulations restricting the ability for customers to use RNG as a GHG effective alternative will contribute to ongoing increases in electricity costs and inflation? Please explain why or why not.

Response:

FEI agrees that a decarbonization approach that focuses exclusively on electrification strategies in the building sector will lead to higher energy rates and bills for consumers as compared to strategies that employ a diversified approach, which includes the use of RNG (amongst other solutions).

FEI conducted scenario modeling in its Pathways to 2050 report that evaluated the impact to consumers of an electrification approach that restricted RNG adoption versus an approach that maintained connections with an increasing proportion of renewable and low-carbon gases to 2050. The analysis found that total costs were $100 billion lower in the diversified approach, with overall lower energy rates and bills for consumers.

This was corroborated by additional analysis conducted by the University of Victoria and FortisBC which evaluated the system costs of displacing 100 percent of the natural gas in Metro Vancouver with either electricity or RNG and hydrogen.[5] The analysis drew three key findings:

1. that the ability to replace natural gas heating in buildings with electricity was limited by existing generation resources;

2. that pathways that use renewable gases are generally lower in cost – 7 of the 9 scenarios evaluated showed lower costs when using renewable gases; and

3. significant electricity storage would be needed to maintain resiliency of building electrification.

These higher costs will impact businesses who will have to recover those costs from consumers in order to maintain the viability of their business. As such, it is logical to assume that increased energy costs will translate into additional increases in the costs of goods and services and, therefore, result in inflationary pressures.

[5] Palmer-Wilson, K., Bryant, T., Wild, P.M., & Rowe, A. (2022). Cost and capacity requirements of electrification or renewable gas transition options that decarbonize building heating in Metro Vancouver, B.C. Energy Strategy Reviews. https://www.sciencedirect.com/science/article/pii/S2211467X22000803?via%3Dihub.

63. Reference: Exhibit B-22, CEC 1.15.4

> FEI's proposed AMI project will collect hourly consumption data from all customer groups. This improved granularity will be helpful in both cost of service analysis (COSA) and rate design. AMI's hourly interval data can provide a near-real time communications link between customers and FEI. This will eliminate the current sampling error associated with basing COSA inputs on information estimated without full population data, and provide better insight into customer usage patterns. AMI will also allow FEI to explore more advanced rate designs based on actual utilization information (including consumption during peak demand periods) and better customer segmentation. The effectiveness of such rate designs would depend on FEI's ability to model future anticipated consumption characteristics for various groups of customers, and the ability to send timely price signals to customers.

63.1 Will the use of the AMI system add enough reliable information to the COSA inputs that FEI will not need to build in +/- variance when identifying Revenue/Cost ratios? Please explain.

Response:

FEI has not provided a response to this question as the COSA inputs and Revenue/Cost ratios related to AMI are not within the scope of this proceeding as set by BCUC Order G-214-22.

64. Reference: Exhibit B-22, CEC 1.27.2 and 1.27.3

27.2 Figure 6-2 indicates an increase of 3300 TJ in supply occurring in 2022. Please discuss the likelihood of FEI being able to achieve this result.

Response:

FEI now anticipates that the total volume of Renewable Gas received from suppliers in 2022 will be approximately 2,000 TJ, down from the forecast of 4,000 produced toward the end of 2021. FEI notes that once all of 2022's suppliers begin providing Renewable Gas, the anticipated supply from this cohort of supply projects remains approximately 4,000 TJs over a 12-month period. Supply forecasts remain variable and can be materially affected by over or under performance by the larger supply projects, given the still relatively low volumes of supply in question, or by successfully signing new contracts with existing Renewable Gas producers.

27.3 On Figure 6-2, please depict the volume of RNG sales to customers.

Response:

The chart below represents the historical volume of Renewable Gas supply and Renewable Gas sales to customers as well as the current short-term forecast for 2022. Note that, at this time, not all of the anticipated growth in Renewable Gas supply for 2022 is operational. FEI is expecting several new supply projects to begin providing Renewable Gas later in the year. FEI is managing the growth of demand to maintain the balance between Renewable Gas supply and demand in the meantime. The actual volume of Renewable Gas sold to customers in 2022 may be higher than shown in Figure 1 below if the new supply volumes exceed FEI's current supply expectations described in the response to CEC IR1 27.2 above. Note also that the sale of Renewable Gas to customers will lag somewhat behind the increase in supply volumes as FEI manages demand in order to avoid a shortfall situation. Therefore the Renewable Gas sales volume is anticipated to be somewhat lower that the Renewable Gas supply volume at year end.

Figure 1: Total RNG Supply versus RNG Sales to Customers

64.1 What circumstances caused the forecast to decline to 2000 TJ, which it was originally forecasting as 4,000 TJ? Is this a temporary issue? Please explain.

Response:

The decline in the RNG volume forecast for 2022 is temporary and primarily due to projects being delayed for various reasons. More specifically, five projects within BC were delayed and two operated below expected volumes resulting in a variance of about 600 TJ. Seven out-of-province projects were also delayed resulting in a variance of close to 1,000 TJ. The original forecast also included more optimistic estimates for potential projects that ultimately did not materialize as signed supply contracts, which makes up the remainder of the difference.

Despite the delays, FEI forecasts that this supply will be available over the next one to two years and the annual volume of approximately 4,000 TJ will be realized within that timeframe.

64.2 When will all of 2022's suppliers be providing RNG, and is it on track to get to 4000 TJ eventually?

Response:

Please refer to the responses to CEC IR1 34.2 and CEC IR2 64.1.

64.3 Please provide an updated status of FEI's supply and demand status.

Response:

An updated description of FEI's supply and demand status is provided below. FEI notes that projecting the program enrollment and demand in 2022 is challenging due to the pause on enrollments and promotion activities that occurred from August of 2019 through into October of 2021. In particular, many mass market customers are not aware of RNG or the existing RNG Program, while larger volume customers typically take some time to consider and evaluate all of their options prior to selecting their preferred energy type.

Supply

The total RNG supply will build upon momentum achieved in 2021 and is expected to slightly exceed 2,000 TJ for 2022. During the year, FEI began receiving supply from three additional projects and had one project return to service in the spring after encountering damage due to flooding in the fall of 2021.

Demand

Since reopening the existing RNG Program to new participants in October of 2021, FEI has seen a steady increase in enrollment in the program from mass market customers. In addition, several customers have requested large volumes of RNG. FEI expects that investments in customer education and raising awareness of RNG would increase the interest in and uptake in the program. As noted in Section 9.4 of the Application, stakeholders and customers commonly expressed that they lacked awareness about RNG.

FEI currently anticipates that approximately 11,000 customers will be enrolled in the program, and customer demand could reach approximately 1.5 PJs by the end of 2022.

65. Reference: Exhibit B-22, CEC 1.30.1 and 1.30.2

30.1 Please confirm that the organic waste fuel source is always already in existence prior to being captured for RNG.

Response:

Confirmed. The sources of organic waste that FEI's suppliers are utilizing to create RNG are already in existence prior to being captured for RNG.

30.2 Please discuss whether or not the opportunity to use organic waste as a source for RNG, and for purveyors to potentially profit from it, could result in less drive to minimize organic waste in the first place.

Response:

FEI does not consider that using organic waste could result in less drive to minimize organic waste.

Organic waste, as distinct from inorganic waste (e.g., plastic), will always exist because of human consumption. Facilities that capture and utilize the organic waste create a way for the waste to be utilized as a resource rather than being landfilled. It is unlikely that waste would be deliberately created in order to be turned into biomethane. It is conceivable that organic material could be grown to be turned into renewable energy. FEI is aware this is the case for biofuels such as ethanol but is not aware of any projects of that nature for biomethane.

65.1 To the extent that there is an ongoing effort to reduce organic waste, and potential competition for the waste, does FEI expect that there could be a risk that supply will eventually become unavailable to FEI in sufficient quantities to permanently meet its Renewable Gas targets.

Response:

Order G-165-22A limited the scope of this proceeding in relation to Renewable Gas supply to the following: "The short term (5 years) forecast supply of RNG and FEI's plan for the RNG supply acquisition, security of the RNG supply, price of the RNG supply, and supply substitutes such as carbon offsets."

Over the next five years, FEI does not see this as a material risk.

FEI does not expect reductions in food waste, for example, to have a substantial effect on the total amount of waste organics available. Organic wastes are a diverse byproduct of human activity and include: animal manures, sewage sludge, used greases/oils, non-edible parts of crops and inedible material removed in food preparation. These other sources of organic waste make up the vast majority of organic waste available in BC and are not expected to materially decline as a result of reductions in consumer food wastage.

Moreover, using organic waste for anaerobic digestion is not necessarily in competition with composting, and indeed, the two used for organic waste may be complementary. In particular, digestate made from source separated organics can also be composted. The low price of compost makes anaerobic digestion attractive as a replacement or complement to composting operations.

65.2 Please confirm that with Synthetic Natural Gas and Hydrogen Gas in the FEI system, that these forms of renewable natural gas can provide resilience in managing any changes in Bio-Renewable Natural Gas.

Response:

Confirmed.

66. Reference: Exhibit B-22, CEC 1.35.1

35.1 Please elaborate on the locations outside of BC from which FEI expects to acquire RNG.

Response:

FEI is currently considering projects from across Canada and the US. FEI has not considered RNG from other jurisdictions at this point in time.

66.1 What other jurisdictions, if any, has FEI considered for the future supply of RNG? Please explain why those jurisdictions have been considered.

Response:

FEI is only considering jurisdictions that connect directly to the existing natural gas system across Canada and the United States. RNG supplied onto the existing natural gas system can directly displace conventional natural gas and thus be delivered to FEI. FEI is impartial to the location where the RNG is injected into the system.

66.2 When might FEI consider acquiring RNG from jurisdictions outside of Canada and the United States?

Response:

FEI is currently acquiring RNG from BC, Alberta, Ontario and the United States. It has no plans to acquire RNG from jurisdictions outside of Canada or the United States.

67. Reference: Exhibit B-22, CEC 1.35.2

Response:

FEI does not expect to see significant increases in the cost of acquiring RNG for two primary reasons. First, FEI has managed to procure supply from outside of BC at lower average prices and higher average volumes. Second, FEI already has enough supply contracted to reach close to 20 PJ of supply, thereby locking in pricing until beyond 2030.

Over the past few years, FEI has established itself as a known off-taker in the North American market and has developed a reputation in the market as an off-taker with a known process and consistent timelines. This has enabled FEI to command interest from a variety of suppliers and therefore be competitive when negotiating prices with its counterparties. FEI uses an established process to evaluate new projects which also ensures good pricing. FEI ranks new opportunities against each other and pursues the highest value projects first. FEI actively negotiates each of its Renewable Gas supply projects to ensure the best value for customers, taking into account factors such as project volumes, price per GJ, speed to market, annual GHG reduction, and carbon intensity play. This disciplined approach ensures FEI acquires RNG cost effectively.

67.1 Which other parties would be considered as 'off-takers'?

Response:

FEI typically considers any end-users of RNG to be 'off-takers'. However, in this context, FEI is broadly defining off-takers as any other party that would potentially purchase RNG. FEI considers itself to fit into the category of long-term off-takers; that is, FEI enters long-term contracts at a fixed price. The most common alternate off-taker in this category would be another natural gas utility, such as Northwest Natural in Oregon.

67.2 Are there any other key attributes that suppliers value in selecting their RNG customers? Please explain, and elaborate on how FEI would reasonably be evaluated on those dimensions.

Response:

FEI interprets the questions reference to "customers" to refer to any purchaser of RNG from an RNG supplier.

The primary attribute suppliers look for is the highest price possible for their product while ensuring certainty of sales. If an RNG supplier developing a new project can enter into a long-term agreement, with a purchaser with high credit quality, such as FEI, this can help secure lender financing. The supplier will also be seeking a fair price to achieve a reasonable financial return on

its capital invested. A related part of the evaluation is ensuring a fair contract to address the risk of default for non-performance.

FEI believes that is has been successful in acquiring RNG because it offers both long-term offtakes and a fair price. FEI has managed to acquire RNG on a portfolio basis on the lower end of North American market pricing because of its existing RNG program and long-term agreements.

68. Reference: Exhibit B-22, CEC 1.38.1 and 1.49.2

> 38.1 Please discuss whether or not the availability of RNG can serve to deter customers from implementing DSM measures.
>
> 38.1.1 If yes, how does FEI intend to ensure that customers also maximize use of the DSM options available?
>
> 38.1.2 If no, please explain why not.
>
> **Response:**
>
> FEI has not conducted any formal research on how the availability of RNG would impact customer interest in DSM offers. However, FEI has no reason to believe that the availability of RNG would deter customers from implementing DSM measures. In fact, FEI expects that increased availability of RNG could heighten customer interest in DSM offers, as customers will likely be interested in DSM as a means to keep their energy bills low while pairing with RNG to help meet climate action objectives. FEI intends to continue to develop and expand DSM offers in order to support the needs of its customers.

> 49.2 Please provide the specific value of the Voluntary customer's increase as a result of the proposal.
>
> **Response:**
>
> Assuming an RS 1 Voluntary Renewable Gas customer elects 15 percent[27] Renewable Gas, their annual bill will increase from an estimated $1,490 in 2024 to approximately $1,930 in 2032 as a result of the proposals in this Application.

68.1 Would it be beneficial for FEI to offer enhanced/preferential or otherwise differentiated DSM options for RNG customers as compared to regular natural gas customers, so that customers interested in taking advantage of DSM programs also consider the benefits of RNG at the time of decision, and those customers considering RNG can reduce their costs? Please explain why or why not.

Response:

While FEI does not currently provide enhanced/preferential options to RNG customers, FEI intends to evaluate such options in the future. As explained in the response to CEC IR1 38.1, FEI expects that increased availability of RNG may result in an increase in DSM program participation.

The combination of RNG and DSM programs could potentially increase awareness of each program by leveraging previously distinct market offerings, thus accelerating participation in the Voluntary Renewable Gas service. By enabling customers to remain on the gas system, they are able contribute to the fixed costs of the gas system while simultaneously mitigating against initial affordability concerns of certain customers when switching to RNG service.

Please note that any potential pairing of RNG and DSM offers would need to comply with the BC Demand-Side Measures Regulations.

69. Reference: Exhibit B-22, CEC 1.43.3.1

43.1 Please explain further what FEI means to do by 'mimicking' regular gas service rates.

43.1.1 Why does FEI deem this to be necessary?

Response:

For a discussion of how the rates for New Residential Connections will parallel existing gas services rates, please see Sections 7.4.2 and 7.4.2.1 in the Application. These sections outline that to provide equity between residential dwellings who are mandated to reduce emissions and those who are not, customers served under the Renewable Gas Connections tariff will pay the same effective rate for their gas service as existing customers in similar rate schedules.

An existing residential customer pays the CCRC plus the carbon tax for their natural gas commodity, and the S&T LC rider for the Renewable Gas Blend. A customer served under the Renewable Gas Connections tariff served 100 percent Renewable Gas will pay a rate equal to the CCRC plus the carbon tax, as well as the S&T LC rider for the Renewable Gas Blend portion of the 100 percent Renewable Gas.

In this way, customers requesting a new service for a residential dwelling are charged the same as any other customer in a residential dwelling already connected to the gas system.

FEI deems equity to be necessary so that one subset of the same customer type is not compelled to pay a higher price for gas which must be low carbon to comply with new municipal regulations.

69.1 Please confirm that there are many instances in which codes, standards, regulations, technologies, quality of materials and options change over time such that new customers are required to pay/do more to complete their plans than those customers who purchased a service under different circumstances.

Response:

Confirmed. Changes in these factors over time can either increase or lower costs and effort for customers.

70. Reference: Exhibit B-22, CEC 1.48.1

48.1 Does FEI believe that the $1/GJ discount was instrumental in securing long-term customers in the past? Please explain and provide examples of how it made a difference.

Response:

The $1/GJ discount has been an "important" factor in securing long-term customers, but may not have been "instrumental". These long-term customers also valued RNG for its ready availability,

and the ease with which it could be used to reduce their GHG emissions without requiring significant capital upgrades. Cost competitiveness, and the enhancement to competitiveness offered by the discount, was certainly another important factor. FEI has, however, no means of truly weighting the relative importance of each consideration among those customers who entered into long-term services agreements.

70.1 Please confirm the CEC's interpretation of the above response that the $1/GJ discount served as one of many considerations, but was not necessarily the deciding factor when a customer was determining whether or not to use RNG.

Response:

Confirmed.

71. Reference: Exhibit B-22, CEC 1.52.1 and Exhibit B, BCUC 1.44.3

52.1 Would FEI be open to providing annual updates commencing in 2024, with a comprehensive review in 5 years' time? Please explain why or why not.

Response:

Please refer to the response to BCUC IR1 44.3.

"In order to supplement the five-year comprehensive review process and ensure the BCUC continues to receive incremental updates regarding the Renewable Gas Program, FEI has also proposed to provide information in its fourth quarter gas cost report about the Renewable Gas Program on an annual basis. This reporting would include a calculation of the S&T LC rider for the following year on a forecast basis and to determine the volume of Renewable Gas deemed to be delivered via the Renewable Gas Blend service for sales customers, as well as any other information directed by the BCUC."

71.1 Would interveners have access to the information provided in the fourth quarter gas cost report? Please explain.

71.1.1 If no, would FEI object to having the information available to interveners? Please explain why or why not.

Response:

Yes. FEI's quarterly gas cost reports are publicly filed applications. Generally, only those pages of the quarterly gas cost reports that include individual contract / project-level supply details are filed confidentially.

72. Reference: Exhibit B-22, CEC 1.53.1

> ***2. The Use of Renewable Gas in Residential New Construction and Existing Buildings***
>
> The City believes residential new construction is a relatively easy sector to decarbonize and because the City believes that Renewable Gas is in short supply, renewable gas should not be used in new construction. In contrast, FEI believes that new residential construction and existing buildings are both difficult to decarbonize sectors, there is adequate Renewable Gas supply to address both segments of the building sector, and the use of Renewable Gas in new construction benefits the long-term viability of the gas system, FEI's existing customers and British Columbians at large.
>
> The City believes existing buildings are a relatively hard segment of the building sector to decarbonize and what it perceives as a limited amount of Renewable Gas should be prioritized accordingly. Therefore, the City is considering policies that would restrict the use of gas fueled appliances in existing and new buildings. As explained above, FEI believes both new construction and existing buildings are difficult to decarbonize, there will be adequate supply to serve both sectors, and any potential appliance-based barriers should be removed to the facilitate the use of renewable gas.

72.1 Please confirm that the availability of some form of natural gas can be an important fuel source permitting heating and food preparation during periods of electrical failure, and reducing the dependence of residents on a single fuel source.

Response:

Confirmed. The peaking capability of the gas system (the ability of the gas system to store and deliver large volumes of energy when needed), and the ability to deliver energy reliably, are key features of the gas system that are of great value to residential, commercial, and industrial customers alike. Customer access to the gas infrastructure fosters resiliency for businesses and residential customers in case of electrical failures such as power outages.

While these capabilities of the gas system have been commonly used for cooking and heating using gas stoves and fireplaces in times of electricity outages, the benefits of the gas system can go well beyond these end-uses. In particular, access to the gas system also enables gas equipment innovations used by customers. For example, gas generators and combined heat and power units significantly enhance the resiliency of homes and the operations of businesses.

At a micro level, the value of two energy grids complementing each other is demonstrated when an electrical Uninterrupted Power Supply (UPS) battery is connected to the controls of a gas appliance such as a water heater. The small electrical UPS battery is charged by the electrical grid during normal operations and at times of electrical failure would power the electrical components of the gas appliance. This combination is an affordable and unobtrusive mechanical set up that allows for commercial customers to experience lesser degrees of interrupted service at times of electrical failure.

Consequently, relying on one energy source not only removes the resiliency embodied in today's technology, but eliminates future improvements in resiliency arising from new innovation in technology which further leverage the complementary nature of gas and electric energy systems.

72.2 How would FEI evaluate the value of diversity of energy supply to end customers independently of the cost increase issues for replacing gas heating with electric heating broadly throughout the whole BC economy?

Response:

As described in Section 4.3 of the Application, gas infrastructure in British Columbia is a multi-billion dollar asset, resulting from over 70 years of sustained development. The value of diversity of energy supply includes, in particular: (1) the reliable, resilient and continuous delivery of energy service to British Columbians; (2) avoiding unnecessary investment in an energy grid that is duplicative of existing systems; and (3) the innovation stemming from ancillary economies downstream of the utility that develop a diversity of products and services to customers and businesses.

Reliable, resilient and continuous delivery of energy

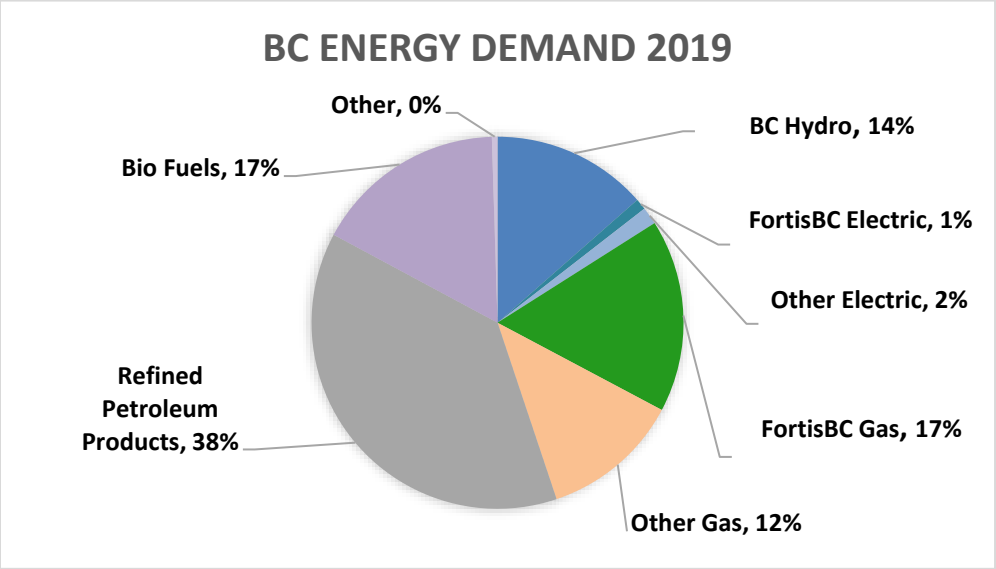
FEI highlighted the value of reliability via a diversity of energy supply in the response to CEC IR1 15.3 which discusses the peak energy demand experienced by FEI and BC Hydro on December 27, 2021. Despite the demand for energy significantly increasing as a result of very cold temperatures in the province, service to customers was uninterrupted. Had a diversity of energy supply not been available, FEI as a sole supplier would have needed to increase its output by 54 percent and BC Hydro as a sole supplier would have had to increase its output by 185 percent to ensure enough energy is available to continue to meet peak demand requirements.

In the event of an interruption to energy supply, customers would be forced to either reduce or halt their operations, diminishing productivity and adversely affecting economic activity, or procure alternative energies (to extent fuel switching is possible) at much higher prices with no guarantee that energy supply would be available.

Avoiding unnecessary investment in an energy grid

Energy diversity helps British Columbians avoid unnecessary investment in duplicative energy infrastructure. As shown in the chart below, British Columbians also benefit from a diversified energy portfolio on an annual demand basis. Attempting to replace one form of energy with another reduces or eliminates the usefulness of established infrastructure, thus constricting energy diversity while exposing British Columbians to challenges in the form of affordability and continuity of energy service. In contrast, blending RNG into an existing system using infrastructure

that already reaches millions of customers eliminates a number of barriers and is ultimately easier and less costly for customers.



Further, in regards to avoidance of costs, diversity of energy supply also avoids utility costs related to peak energy generation, transmission and distribution infrastructure, and provides certainty in terms of uninterrupted productivity for commercial customers.

Innovation stemming from ancillary economies

British Columbia's economy and marketplace benefits from a diverse energy supply. Calculating the cost of diversity would require not only including the utility infrastructure costs, but also the lost benefits of the ancillary economies connected to the gas delivery system. These ancillary economies include manufacturing companies, distributors of equipment, contractors, and consultants. British Columbians benefit from these organizations because they add competition to the marketplace, bring multiple distribution networks, diversify supply chains, and provide innovation in design and manufacturing. These ancillary economies also represent thousands of jobs. Lack of diversity reduces or eliminates these market players from BC's economy and job market.

The loss of efficiencies from the removal of these businesses equates to a loss of speed, affordability, and innovation to British Columbian homes and businesses. Businesses operating in a marketplace with out-of-province or international players would have the additional burden of diminished cost competitiveness.

The widespread nature of energy means costs related to lack of diversity are not solely seen at the utility infrastructure level, but at every level of British Columbia's economy and job market.

73. Reference: Exhibit B-22, CEC 1.53.1

> ***3. Appropriate Comparators of Renewable Gas***
>
> The City uses conventional natural gas as the benchmark for comparing the cost of Renewable Gas, whereas FEI uses both the cost of conventional natural gas and electricity.[33] The City's more restricted comparison framework does not recognize that Renewable Gas is more comparative to electricity than it is to natural gas and is therefore the appropriate clean energy benchmark.
>
> In its comparisons, the City also indicates that, "BC Hydro has a surplus of clean electricity that is expected to last until at least 2029."[34] In contrast, FEI's modelling extends beyond 2029 to 2050 when it expects material deficits in the availability of clean electricity unless significant investments in generation capacity are made.
>
> FEI expects that the approval of the Renewable Gas Connections service and further engagement associated with the provincial government's development of the GHGRS are required to bring alignment between FEI and the City.

73.1 Please elaborate on FEI's statement that 'Renewable Gas is more comparative to electricity than it is to natural gas and is therefore the appropriate clean energy benchmark'.

Response:

As explained below, RNG and electricity can serve as substitutes for each other both functionally (in several applications) and for the purpose of reducing GHG emissions associated with energy consumption.

Functionally, both RNG and electricity can be used as substitutes for each other in several applications. These include space heating, water heating, cooking, drying and various industrial processes.

The use of RNG, like electricity, produces a much reduced quantity of GHG emissions and is considered a clean energy by the provincial government. This is recognized by the provincial government in several ways. First, the acquisition of RNG (biomethane) is a prescribed undertaking per the *Greenhouse Gas Reductions Regulation* and section 18 of the *Clean Energy Act*. Second, the CleanBC Roadmap explicitly describes RNG as one of the energy types that will be used to limit GHG emissions from homes, buildings, and industries in BC. Third, RNG has long been included in the provincial government's "Best Practices Methodology for Quantifying Greenhouse Gas Emissions" document as a fuel with a very low CO2e emissions factor.[6] Fourth, the provincial government grants carbon tax credits for the use of biomethane.

Finally, as set out in the response to City of Richmond IR1 12.8, RNG has lower overall lifecycle and burner tip GHG emissions than electricity. As noted in the response to CEC IR2 72.2, the gas system can deliver a greater amount of energy to serve heating applications during peak times, such as during cold winter periods, than the electric system. The gas system is also

[6] https://www2.gov.bc.ca/assets/gov/environment/climate-change/cng/methodology/2020-pso-methodology.pdf, pg. 8.

inherently more reliable and, in particular, is significantly less susceptible to outages or service interruptions due to inclement weather. FEI is therefore of the view that for heating end uses, RNG is a better alternative than electricity, even though the two energy types can, in a comparison like that above, be viewed as substitutes for each other.