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January 7, 2020

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

Attention: Mr. Patrick Wruck, Commission Secretary and Manager, Regulatory Support

Dear Mr. Wruck:

Re: FortisBC Energy Inc. (FEI)

Project No. 1599033

Revelstoke Propane Portfolio Cost Amalgamation Application (Application)

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

On July 18, 2019, FEI filed the Application referenced above. In advance of the deadline in the Regulatory Timetable established by BCUC Order G-290-19 for the review of the Application, FEI respectfully submits the attached response to BCUC IR No. 2.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Doug Slater

Attachments

cc (email only): Registered Parties



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2	15.0	Reference	e: AMALGAMATION OPTIONS AND OBJECTIVES
3			Exhibit B-2, IRs 2.5, 2.6
4			Consultation and Impacts
5 6		In respon 2.5, Fortis	se to British Columbia Utilities Commission (BCUC) Information Request (IR) BC Energy Inc. (FEI) stated:
7 8 9 10 11		I Re Th col ha	FEI has received comments from the City of Revelstoke, the businesses of velstoke, and the community of Revelstoke around energy price and stability. e conversations mainly occurred during FEI's exploration into the potential of nverting the Revelstoke distribution system from propane to natural gas and ve continued as FEI has prepared this Application
12 13			 In 2014, FEI held a public open house to discuss the potential to convert the system 10 supply from propane to LNG
14 15 16 17			• From 2014 onward, FEI has met numerous times with representatives from staff and council at the City of Revelstoke. The City has continually requested that FEI explore options to reduce energy costs and bring price stability to FEI rates
18 19 20			• From 2015 onward, FEI representatives have met annually with Gorman Brothers Lumber Ltd The mill representatives discussed issues on price and stability
21 22 23 24			• During 2015 and 2016, FEI representatives met with the General Manager of the Sutton Place and Sandman Hotels in Revelstoke During these conversations, the Sutton Group indicated that energy costs in Revelstoke were a barrier to real estate development
25 26 27 28		[C] sw joir Re	oncerns were focussed on the impact that lower rates would have on fuel itching, both in terms of accelerating a switch from residences with heating oil ning the FEI system as well as slowing a transition to renewable energy within velstoke.
29 30 31 32 33	Resp	15.1 Ple Re col	ease confirm whether FEI undertook consultation with the community of velstoke specifically related to the propane portfolio cost amalgamation as ntemplated in the Application.
55	11000		

FEI's consultation with its customers, the City of Revelstoke, and the broader community spans the past five years and has largely been focussed on the issue of energy costs and volatility.



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1 Overall, there is broad based support for a solution that will lower energy costs and reduce 2 volatility.

Through the course of FEI's consultation, including its discussion of various alternatives, the concerns raised by FEI's customers and stakeholders have been consistent and form part of a multi-year dialogue. Accordingly, since FEI has engaged in continuous dialogue, it did not re-start consultations with the broader community on the specific details of the Application. FEI provides additional detail on the consultation process since 2014, which demonstrates the ongoing nature of its consultation.

In 2014, FEI began consultation with the City of Revelstoke on a project to convert the propane
system to natural gas using LNG. After meeting with Mayor Raven and Chief Administrative
Officer Palmer to explain the project, FEI presented to Revelstoke City Council. In 2014, FEI also
gave a presentation to the Revelstoke Chamber of Commerce and received support for the
project.

14 During separate meetings in early 2015, FEI met with its larger customers in Revelstoke including 15 Gorman Brothers Lumber (owners of the Downie mill), the Northlands Property Group (owners of 16 the Sandman Hotel and Sutton Resort), and the Revelstoke Community Energy Corporation 17 (RCEC). At that time, representatives from Gorman Brothers provided information on potential 18 load growth at the Revelstoke mill should their costs to dry lumber be reduced due to lower 19 energy costs. The Northlands Property Group provided input on how energy costs in Revelstoke 20 were a barrier to development and that energy contributed to much higher strata costs in 21 Revelstoke versus properties in other cities. RCEC expressed concern that lower FEI fuel costs 22 would make RCEC uncompetitive in relation to natural gas and would also hinder its potential 23 future growth.

In early 2015, FEI also met with board members from the North Columbia Environmental Society Sustainable Living Committee (NCES). Members of the NCES expressed concern that a shift from propane to natural gas, a more stable and inexpensive commodity, may lead to increased energy use making future investments in renewable energy uncompetitive, thus impacting GHG emissions. Some members of the public have expressed similar concerns to FEI in 2019.

During 2015, FEI also met with Peter Humphreys (owner of Big Eddy Fuel Services). Mr. Humphreys expressed concern that lower propane rates would negatively impact his heating oil business. He also expressed concern that if his business closed, heating oil customers would be forced to buy heating oil from a location outside Revelstoke, which Mr. Humphreys felt would increase their costs. Mr. Humphreys raised these same concerns to FEI in 2019.

In late 2015, FEI reached out to the broader community to consult on its proposal for an LNG conversion. FEI held an open house at the Revelstoke Community Centre which was attended by approximately 50 residents. Attendees were supportive of the project and the public's questions focused on costs of conversion, timelines, and security of supply. The predominant feedback received from the community was that FEI should move the project along more quickly so that



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Revelstoke customers could begin realizing the benefits of lower energy costs and volatility as
 soon as possible.

3 Over 2016 and 2017, FEI worked on developing the LNG conversion project. FEI continued to 4 meet with its larger customers, the City, and also held a further meeting with the NCES to provide 5 updates and to determine if any new concerns had arisen. After determining that the LNG 6 solution was not feasible. FEI communicated the news to its customers, explaining that the LNG 7 project was not feasible, but that FEI was going to investigate the potential to amalgamate 8 commodity costs. FEI received positive feedback and encouragement from all of its larger 9 stakeholders to proceed with the solution, although RCEC again expressed concerns with respect 10 to its competitiveness.

In April 2018, FEI presented to Revelstoke City Council to formally inform the City that the LNG conversion project was not going ahead, but that FEI would investigate the potential to amalgamate commodity costs. A recording of the council meeting can be found at https://www.youtube.com/watch?v=-ZUe-163_Yk (commencing at approximately 41:00).

- 15 FEI highlights the responses provided by Council following FEI's presentation in the video:
- At 46:30, Councilor Brothers provides her support for the project saying she knows that
 FEI is working hard to find solutions for Revelstoke and also expresses her concerns over
 energy price impacts to families during the winter.
- At 47:05, Councilor Nixon asks if FEI's executive team is aware of the commodity rate amalgamation project as she wants to ensure the project moves forward.
- At 49:04, Councilor English states that it is difficult to see rates jump 12% and that he "really really hopes FortisBC is looking for a solution in Revelstoke".
- At 52:45, Councilor Duke states in relation to rate amalgamation "go for it".
 - At 53:00, Mayor McKee states that, at the end of the day, if this works out it will be a benefit to all the customers and businesses of Revelstoke.
- In summary, FEI has received positive support to address energy costs and volatility within
 Revelstoke. Such an approach would increase business opportunities, reduce energy/housing
 costs, and reduce volatility for all FEI customers in Revelstoke.

30 In recent years, FEI has consulted with its customers and stakeholders and believes it has 31 thoroughly canvassed stakeholder concerns for the Application. FEI notes that the concerns 32 raised by stakeholders are the same whether FEI commodity rates are lowered by converting to 33 natural gas or though the amalgamation of commodity costs. The solution proposed by FEI is the 34 best solution for the customers in Revelstoke as other solutions such as LNG, CNG, and piped 35 natural gas are more costly for all consumers. Propane is the best solution at this time for the customers in Revelstoke. Customers in Revelstoke should benefit from amalgamated rates as 36 37 other FEI customers have. FEI believes that the majority of its customers support the Application.

FORTIS BC ^{**}

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Response:	15.1.1	If confirmed, please provide a summary of feedback and comments
		received.
Please refer t	o the resp	ponse to BCUC IR 2.15.1.
Response:	15.1.2	If not confirmed, please explain why FEI chose not to consult.
Please refer t	o the resp	ponse to BCUC IR 2.15.1.
15.2 Response:	Please p	provide examples of the concerns raised in relation to fuel switching.
Please refer t	o the resp	ponse to BCUC IR 2.15.1.
Response:	15.2.1	Were these concerns related to potential increased greenhouse gas emissions? Please discuss.
Please refer GHG emissio	to the res ns.	ponse to BCUC IR 2.15.1 which discusses the NCES concerns related to
	Please refer to the second	Please refer to the resp 15.1.2 Xesponse: Please refer to the resp Xesponse: Please refer to the resp 15.2.1 Xesponse: Please refer to the resp SHG emissions.



1 Please discuss the concerns that were raised in relation to the transition to 15.3 2 renewable energy. 3 4 **Response:** 5 Please refer to the response to BCUC IR 2.15.1. 6 7 8 9 15.3.1 Please explain how these concerns have been mitigated in FEIs 10 amalgamation proposal. 11 12 Response: 13 The proposed amalgamation seeks to address the concerns of FEI's Revelstoke customers by

lowering energy costs and reducing volatility in line with the accepted principle of common rates
across FEI's amalgamated service territory. As discussed in the response to BCUC IR 2.15.1,
FEI believes its Application addresses the concerns of its customers, as well as other
stakeholders such as the local Chamber of Commerce.

As noted in the response to BCUC IR 2.15.1, stakeholders, such as the NCES, have raised
concerns about the impacts of the Application on solar domestic hot water and home solar arrays.
However, FEI does not believe its Application will impact the adoption of these technologies, and
therefore has not mitigated these concerns within its Application, for the following reasons:

- First, solar domestic hot water systems require the use of baseload firm energy such as
 propane since solar thermal energy is primarily used to pre-heat supply water. Thus
 propane is used to finish heating the water when solar preheating occurs and to fully heat
 the water at times when solar heating is not effective.
- Second, domestic solar photovoltaic arrays provide electricity supply that can be used for multiple applications but, by themselves, are not sufficient to service thermal heating loads, especially in colder climate regions. Rather, they are typically used to offset electricity supplied from the grid.
- As discussed in the response to BCUC 2.15.1, RCEC has raised concerns about the competitiveness of its business due to lower propane rates. However, as discussed in the response to BCUC IR 2.16.1, FEI believes the impacts to be limited and RCEC will benefit from lower energy costs as a result of the Application. Therefore, FEI did not believe it was necessary to mitigate these concerns within its Application.
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15.3.2 Please explain how the proposed application may result in the slowing of the transition to renewable energy sources within Revelstoke.

5 **Response:**

6 Please refer to the response to BCUC IR 2.15.3.1.

- 10
 15.4 Please provide an overview of any consultation FEI had with the City of Revelstoke
 or the provincial government regarding the proposed amalgamation.
- 12

13 Response:

As discussed in the response to BCUC IR 2.15.1, FEI has consulted with the City of Revelstoke on a continuous basis since 2014. FEI has met with the mayor and City staff at least once per year to discuss progress and plans related to addressing energy costs and volatility concerns for Revelstoke. Once FEI determined that a conversion to LNG was not feasible, FEI engaged the City in discussion about the possibility of amalgamating commodity rates.

While many of these discussions were directly with staff and the mayor, FEI has also presented to Revelstoke City Council three times. At the two council meetings in 2018 and 2019, council asked FEI about its plans to move forward with the commodity rate amalgamation in order to provide rate stability and rate relief for Revelstoke customers.

At the same time, the City and FEI have engaged in discussions regarding the impact that lower rates would have on RCEC, including the ability of RCEC to attract and retain customers.

25 FEI and the City of Revelstoke continue to discuss the amalgamation project.



1 16.0 Reference: AMALGAMATION OPTIONS AND OBJECTIVES

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Exhibit B-2 BCUC IR 1.1; Exhibit B-4, BCSEA IR 6.3; Exhibit B-6, Clean Energy IR 1 Impacts on Alternate Energy Sources

In response to BC Sustainable Energy Association (BCSEA) IR 6.3, FEI stated: "FEI acknowledges the proposed amalgamation in the Application could impact the competitiveness of the biomass district energy system operated by Revelstoke Community Energy Corporation (RCEC)."

- 8 In response to Clean Energy Fueling Services Corp. (Clean Energy) IR 1, FEI stated:
- 9 FEI does acknowledge that there may be conversions from other heating fuels to 10 the FEI propane system if propane rates are lower than those heating fuel prices 11 and if that price differential is sufficient to offset the other costs of conversion. FEI 12 does not have insight into the ability of other fuel providers to offer competitive 13 rates for their heating fuels or to retain their customers.
- In response to BCUC IR 1.1, FEI stated: "[T]he Revelstoke annual energy bill reductions
 proposed may contribute to encouraging other Revelstoke energy users to switch from
 higher-carbon heating oil to propane, economic development, creation and retention of
 jobs."
- 1816.1Please explain how the proposed amalgamation could impact the competitiveness19of the biomass district energy system (DES). Provide a comparison of current20RCEC prices to FEI propane prices before and after the proposed amalgamation, if21available.

23 **Response:**

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FEI is not able to quantify the impact of the proposed amalgamation on RCEC or compare prices since RCEC's rate information is not publicly available. The proposed amalgamation is expected to lower energy costs and reduce volatility for the benefit of FEI's existing propane customers. FEI acknowledges that the amalgamation may also impact RCEC but believes the impact will be limited for the following reasons:

 First, RCEC has acknowledged that its service is not viable for residential homes due to the high cost of insulated distribution piping¹. Therefore, FEI believes the impact to RCEC due to FEI's proposed amalgamation is limited to the commercial properties located in the downtown core of Revelstoke. As discussed in the response to BCUC IR 1.7.4, FEI is not expecting any conversion of commercial customers due to this proposed amalgamation.

¹ <u>https://www.revelstokereview.com/news/city-of-revelstoke-company-owes-millions/.</u>



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- Second, FEI understands that, based on its experiences with other municipally-owned 1 2 district energy systems throughout the province², the City of Revelstoke may set policy direction regarding new buildings attaching to its district energy system regardless of the 3 4 price of propane. Further, FEI notes that most of RCEC's current customers are 5 institutional facilities including City Hall, a community centre and arena as well as nearby 6 Thus, the City of Revelstoke has the ability to influence new customer schools. 7 attachments and the retention of its existing customers despite the competitiveness of 8 propane prices.
- 9 Third, FEI understands that RCEC's existing customers are typically under contract for 20 10 years and that their expiration dates range from July 2026 to December 2031³. Given the 11 remaining terms, the potential cost of termination, and the capital costs related to 12 converting a commercial building from district energy to a standalone propane heating system, FEI believes it is unlikely that customers will terminate their contracts with RCEC 13 14 due to the proposed amalgamation.
- 15 Finally, as discussed in the response to BCSEA IR 1.6.3, FEI expects that RCEC will 16 benefit from the proposed amalgamation since RCEC is one of FEI's largest commercial 17 customers under Rate Schedule (RS) 3. If approved, an average RS 3 Large Commercial 18 customer consuming 6,650 GJ per year could save \$48,256 per year. Therefore, any 19 impact could be offset to a degree by lower propane costs.
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- 23 16.2 Please discuss whether the anticipated environmental benefits of FEI's amalgamation proposal could be negated in part or in whole by the reduced competitiveness of the DES operated by RCEC.
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27 Response:

28 As discussed in the response to BCUC IR 2.16.1, FEI believes any impact to RCEC will be 29 limited. Accordingly, FEI does not believe the anticipated environmental benefits of its proposed 30 amalgamation will be negated in part or in whole.

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² The Vancouver Neighbourhood Energy Strategy and Energy Centre Guidelines sets policy direction for the mandatory connection of new developments in the Southeast False Creek area to the City-owned South East False Creek Neighborhood Energy System. Please refer to the Connection Policy in Table 3 on Page 9. https://vancouver.ca/files/cov/neighbourhood-energy-strategy-and-energy-centre-guidelines-committee-report.pdf.

³ Page 14, RCEC 2015 Financial Statement, http://www.revelstokecommunityenergy.ca/images/RCEC%20Signed%20FS%20-%202015.pdf.



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- 16.3 Please discuss whether FEIs amalgamation proposal may jeopardize the viability of the DES or potential future alternative energy projects in Revelstoke.
- 5 **Response:**

As discussed in the response to BCUC IR 2.16.1, FEI believes any impact to RCEC will be limited and that RCEC will benefit from lower propane costs as a user of propane. FEI's Application seeks to address the concerns of FEI's existing Revelstoke customers by lowering energy costs and reducing volatility in line with the accepted principle of common rates across FEI's amalgamated service territory.

FEI's response to BCUC IR 1.9.6 explains how the cost causation principle is maintained under the proposed amalgamation, as well as the application of commonly accepted rate design principles. The effect of a utility's rates on other service providers is not a commonly accepted rate design principle. For example, the effect of an electric utility's rates on the competitiveness of other service providers, such as a district energy provider (or for that matter other fuel suppliers like gas stations) has not and would not be a relevant consideration in setting the electric utility's rates.

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- 2116.4Please discuss the availability and use of alternate propane or natural gas22suppliers by Revelstoke residents without a direct connection to the FEI distribution23system.
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25 **Response:**

Properties that are not connected to FEI's propane distribution may choose various energy sources to meet their energy needs including bottled propane, heating oil, electricity, or wood. FEI does not have any market share or pricing data related to the energy supply options noted above; however, FEI understands that each of the fuel types identified above are sold at various price points and customers are free to choose their fuel type, including connecting to FEI's propane system, for various financial and non-financial reasons.

Regarding natural gas, FEI is not aware of any natural gas suppliers in Revelstoke delivering energy via a virtual (CNG or LNG) or physical pipeline. FEI notes that natural gas is generally infeasible to supply in bottled form due to the significantly higher pressure required to achieve a reasonable energy density.



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16.5 Please discuss how FEI's proposal would affect market competitiveness of existing retail propane, natural gas, and fuel oil suppliers in Revelstoke.

6 **Response:**

7 FEI acknowledges that the proposed Application could provide an increased incentive to switch 8 from other fuel types to piped propane for those customers located within close proximity to FEI's 9 However, many other factors exist that could also impact the market propane system. 10 competitiveness among all fuel types either positively or negatively. Some examples of these 11 factors are government and environmental policies (including carbon taxes), capital costs of the 12 conversions, and incentive programs available for conversion between different fuel types. FEI 13 believes customers should be able to select the fuel type that is most appropriate for their needs, 14 and that energy choices are shaped not only by cost but also by other considerations.

Since FEI does not track the rates of retail propane or fuel oil energy service providers in
Revelstoke, it is unable to provide a specific response. However, FEI provides the following
general response:

- FEI notes that as a regulated utility, rates are set based on the cost of service and are apportioned between rate classes based on rate design principles. As discussed in the response to BCUC IR 2.16.3, the potential impacts on the market competitiveness of other energy providers is not a relevant consideration when setting rates for a utility.
- 22 For existing fuel oil customers, FEI acknowledges that approval of the Application would 23 reduce the payback period for converting to propane service from about 10 years to about 24 6 years as shown in BCUC IR 2.18.5.1, which adds to the already-existing incentive for 25 such conversions. However, FEI notes this is just one of the many already-existing 26 economic as well as non-economic factors providing an incentive to convert from heating 27 oil to propane. For example, some of these factors are the upfront costs and complexity of the switch, the challenges of insurance premiums related to homes with oil heating 28 29 systems^{4,5}, the inconvenience of scheduling the delivery and managing the storage of 30 heating oil, and environmental benefits for switching from heating oil to propane.
- FEI believes residential homes that are currently using retail bottled propane most likely do so because it is either not economical or not feasible to connect to FEI's piped propane system due to their relative location to FEI's main. FEI acknowledges that approval of the Application might result in some homes that are currently on bottled propane becoming economic to connect to FEI's piped propane system; however, FEI believes this will be

⁴ <u>https://www.desjardinsgeneralinsurance.com/blog/-/if-you-heat-your-home-with-oil-read-this.</u>

⁵ <u>https://business.financialpost.com/personal-finance/beware-these-14-home-features-will-raise-your-insurance.</u>



1 2 3	limited to homes already located in close proximity to FEI's main. For instance, the Application's demand forecast identified only residential dwellings within 30 metres of an existing main as having customer addition potential.		
4 5 6 7	 As dis supplie 	cussed in the response to BCUC IR 2.16.4, there are no alternative natural gas ers in Revelstoke.	
8 9 10 11	16.6	Please confirm if FEI has consulted with any other fuel and heating providers regarding this application.	
13 14	Confirmed. F BCUC IR 2.15	EI has consulted with RCEC and Big Eddy Fuels. Please refer to the response to 5.1 which discusses FEI's consultation related to this Application.	
15 16			
17 18 19 20		16.6.1 If confirmed, please provide a summary of consultation and feedback received.	
21	<u>Response:</u>		
22	Please refer to	o the response to BCUC IR 2.15.1.	
23 24			
25			
26 27 28	Response [.]	16.6.2 If not confirmed, please explain why not.	
29	Please refer to	o the response to BCUC IR 2.15.1.	
30 31			
32			
33 34 35	16.7	Please discuss whether FEI is aware of any propane retailers or industrial customers in the Revelstoke area that purchase their propane from sources other than FEI.	



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2 **Response:**

3 Although possible, FEI is not aware of any industrial customers in the Revelstoke area that 4 purchase their propane from sources other than FEI.

5 With regard to propane retailers, FEI does not supply gas to propane retailers in Revelstoke as 6 FEI's tariff does not allow for the resale of propane. Therefore, any propane retailer providing 7 propane service in the Revelstoke area purchases their propane from sources other than FEI.

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- 16.8 Please discuss any potential impacts to wholesale propane market pricing, volatility, or wholesale propane suppliers as a result of the proposed amalgamation.
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15 Response:

16 FEI believes there would not be any potential impacts to wholesale market pricing, volatility, or 17 wholesale propane suppliers from the proposed amalgamation.

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- 21 16.9 Please discuss whether the proposed amalgamation may reduce economic activity 22 and employment opportunities in Revelstoke if other fuel providers are unable to 23 remain competitive with FEI's propane supply.
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25 Response:

26 FEI expects its Application will support increased economic activity and employment opportunities 27 overall in Revelstoke. If the Application is approved, all Revelstoke propane customers will 28 experience lower and more stable cost of energy recovery rates. FEI believes these positive 29 impacts will outweigh any potential negative impact on other energy providers. For example, if 30 the Application is approved, FEI's Revelstoke propane customers would experience significant energy cost reductions (as outlined in Table 5-1 of the Application) and may redirect such energy 31 32 cost savings to activities that directly benefit Revelstoke's economy and job creation. Such 33 activities may include consumption of local goods and services (in the case of residential propane 34 customers) and investment into staffing and business operations (in the case of commercial 35 propane customers).



1 17.0 Reference: AMALGAMATION OPTIONS AND OBJECTIVES

2 Exhibit B-2, BCUC IR 2.7.2

Impacts on Alternate Energy Sources

In response to BCUC IR 2.7.2, FEI stated that:

5FEI calculates that if 100 percent of heating oil residential customers switched to 6 propane, CO2e emissions would be reduced by approximately 100 metric tonnes 7 of per year. However, if fewer than 100 percent of the light fuel oil customers 8 switch to propane, CO2e savings will be proportionately less, as follows:

% of Light Fuel Oil Customers that Switch to Propane	Metric Tonnes of CO ₂ e Saved
100%	100
75%	75
50%	50
25%	25

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17.1 Please discuss the likelihood that wood consumption for heating will be reduced as a result of lower propane prices resulting from the proposed amalgamation.

12 13 **Response:**

14 It is possible that a portion of current wood consumers would switch to propane if the switch made 15 economic sense and there was an improvement to the customer's lifestyle and comfort. These 16 decisions are made on an individual basis based upon each customer's own circumstances and 17 needs. Homeowners may also be motivated to switch from wood to propane in an effort to 18 improve local air quality conditions that occur in the winter months due to burning wood.⁶

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- 17.2 Please provide a GHG emission analysis similar to FEI's response to BCUC IR
 2.7.2 assuming that residential wood heating demand will be replaced by propane
 heating at an equivalent ratio to fuel oil, based on the 2012 City of Revelstoke
 Community Energy and Emissions Inventory.
- 26

<u>https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-pollution/smoke-burning</u> "Smoke is a significant source of air pollution. It comes from both outdoor burning like land clearing fires and from indoor appliances like wood stoves and fireplaces. It is a serious health hazard and can cause road and air travel to be dangerously affected."



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121,117

1 Response:

- 2 FEI has prepared the following simple linear forecast (in GJs) of wood customers switching to
- propane out to 2040 assuming that 100 percent of the wood customers are able to switch to
 propane:
 - В С F Н А D Е G **Residential Customers Switching** 2007 2010 2012 2020 2025 2030 2035 1 from Wood to Propane 88,039 Wood, GJ 84,740 94,256 99,949 105,241 110,533 115,825 2
- 5

6 Please note that the blue colored cells in row 2 are from the Community Energy and Emissions

7 Inventory (CEEI) whereas the orange cells represent the referenced linear projection. Graphically

8 the forecast is:



9

10 The Ministry of Environment CO₂e emission factors for wood and propane are:

Fuel	CO2e kg/GJ	
Wood	19.07	
Propane	61.15	

11

12 The CO₂e emissions for the Revelstoke wood customers is then:

	А	В	С	D	E	F	G	Н	l l
1	Residential Customers Switching	2007	2010	2012	2020	2025	2030	2035	2040
	from Wood to Propane								
2	Wood, GJ	88,039	84,740	94,256	99,949	105,241	110,533	115,825	121,117
3	Wood CO2e @ 19.07 kg/GJ	1,678,904	1,615,992	1,797,462	1,906,021	2,006,942	2,107,862	2,208,783	2,309,703
4	Propane CO2e @ 61.15 kg/GJ	5,383,585	5,181,851	5,763,754	6,111,862	6,435,474	6,759,087	7,082,699	7,406,311
5									
6	CO2e Savings, kg	(3,704,681)	(3,565,859)	(3,966,292)	(4,205,841)	(4,428,532)	(4,651,224)	(4,873,916)	(5,096,608)



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- 1 As shown on row 6 of the table above, FEI calculates that if 100 percent of wood residential
- 2 customers switched to propane, CO₂e emissions would increase by approximately 4,206 metric
- 3 tonnes per year in 2020. However, if fewer than 100 percent of the wood customers switch to
- 4 propane, CO2e increases will be proportionately less, as follows:

% of Wood Customers that Switch to Propane	Average Increase of CO₂e in Metric Tonnes
100%	4,206
75%	3,154
50%	2,103
25%	1,051

5 Finally, FEI notes that while the conversion from wood burning appliances to propane increases

6 CO₂e emissions, it has other beneficial impacts on local air quality such as the reduction of 7 particulate matter that is harmful to human health⁷.

8 9 10 11 17.3 Please confirm, or explain otherwise, that the Energy and Emissions Inventory 12 indicates that Revelstoke residents use a greater amount of electricity in proportion 13 to their gas usage than the average residential natural gas customer in British 14 Columbia. 15 16 Response: 17 Confirmed. 18 19 20 21 17.3.1 If confirmed, please comment on whether historically higher gas prices in 22 Revelstoke could contribute to the lower ratio of gas usage. 23

⁷ <u>https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-pollution/smoke-burning/wood-burning-appliances.</u>



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1 **Response:**

2 Since the CEEI referenced in the preamble⁸ does not distinguish the end-use of the energy, it is 3 not possible to draw any conclusions from this data about the relative use of electricity and 4 propane for specific end uses such as space and water heating. This is because electricity 5 consumption can include space heating, water heating, lighting, and other plug-load uses such as 6 cooking, clothes drying, refrigeration, etc. Therefore, FEI cannot confirm from the CEEI whether 7 or not historically higher gas prices in Revelstoke contributed to the lower ratio of gas usage as 8 compared to other areas of BC.

9 Further, as discussed in the response to BCUC IR 1.5.2.1, FEI believes there are many factors 10 such as the number and age of occupants, dwelling size, seasonal occupation of homes, 11 economic activities, building envelope, etc., that could have led to the lower average of gas 12 consumption in Revelstoke as compared to FEI's natural gas customers.

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Please discuss the likelihood that reduced propane prices after the proposed 17.4 amalgamation would encourage Revelstoke customers to switch from electric appliances to propane alternatives.

20 Response:

21 FEI believes the likelihood that reduced propane prices will encourage customers to switch from 22 electric appliances is low for a number of reasons.

23 First, the price of the commodity is only one of the many factors that impact a customer's decision 24 to convert from electric to propane end uses. Beyond the savings from the utility bill, customers 25 will consider the capital cost of the conversion, the renovation work required to install the 26 necessary ductwork for a new forced-air propane heating system⁹, the requirement of a gas 27 connection to the property, the remaining useful life of existing equipment, the environmental 28 impacts of a propane heating system, as well as a number of other factors.

29 Second, from a purely economic perspective, the simple payback to convert from an electric 30 baseboard home to a forced-air propane furnace heating home is approximately 11 years even 31 considering the reduced propane rates under FEI's proposed Application. This payback is calculated using current BC Hydro rates¹⁰ and the rates as shown in Appendix D-1 of the 32 33 Application under the proposed amalgamation. FEI notes the simple payback calculation is 34 extremely conservative (likely too low) as it assumes an average capital cost of \$7,000 to install a

⁸ https://www2.gov.bc.ca/gov/content/environment/climate-change/data/ceei.

⁹ Electric baseboard is not a forced-air heating system therefore do not have ductwork.

https://app.bchydro.com/accounts-billing/rates-energy-use/electricity-rates/residential-rates.html. 10



- 1 propane furnace as shown in BCUC IR 1.7.3.1¹¹ <u>without</u> considering the additional capital costs
- 2 required to install the necessary ductwork for the new forced-air propane furnace. It also,
- 3 assumes there is no contribution required from the customer for FEI's main extension. FEI made
- 4 this conservative assumption as it does not have information on the cost of installing ductwork in
- 5 an existing home in Revelstoke.
- 6 The table below provides a summary of the simple payback calculation.

Line	Particular	Reference	
1	Revelstoke Residential UPC (GJ)		50
2	Propane furnace efficiency		0.8
3	Equivalent Electricity Consumption (kWH)	Line 1 x Line 2 x 277.778 kWh/GJ	11,111
4			
5	BC Hydro Tier 1 (KWh)	22.1918 kWh/day x 365.25 days	8,100
6	BC Hydro Tier 2 (KWh)	Line 3 - Line 5	3,011
7	Assumes 22.1918 kWh per day under Tier 1 per l	BC Hydro website	
8			
9	Electrically heated home		
10	Basic Charge (\$/day)	BC Hydro Rates (April 1, 2019)	0.209
11	Energy Charge		
12	Tier 1 (\$/kWh)	BC Hydro Rates (April 1, 2019)	0.0945
13	Tier 2 (\$/kWh)	BC Hydro Rates (April 1, 2019)	0.1417
14			
15	Total Electricity Bill (Annual)	Line 10 x 365.25 days + Line 12 x Line 5 + Line 13 x Line 6	\$ 1,268
16			
17	Propane furnace heated home		
18	Basic Charge (\$/day)	Proposed Amalgamation - Appendix D-1	0.4085
19	Delivery (\$/GJ)	Proposed Amalgamation - Appendix D-1	4.349
20	Cost of Gas (\$/GJ)	Proposed Amalgamation - Appendix D-1	2.782
21	Carbon Tax	Effective April 2019	2.407
22			
23	Total FEI Revelstoke Bill (Annual)	Line 18 x 365.25 days + (Sum of Line 19 to Line 21) x Line 1	\$ 626
24			
25	Total savings (\$/yr)	Line 15 - Line 23	\$ 642
26			
27	Average Capital Cost of Propane Furnace	BCUC IR 1.7.3.1	\$ 7,000
28	Simple Payback (yrs)	Line 27 / Line 25	11

Given the length of the payback period, FEI believes the number of electrically heated homes in
Revelstoke converting to a propane heating system will be limited, considering that the payback
period is a significant portion of the life of a propane furnace that can range from 15 to 20 years.
FEI adds that the actual payback period will be longer due to the conservative assumptions used,

12 making the probability of switching even more unlikely.

¹¹ As shown in FEI's response to BCUC IR 1.7.3.1, based on applications for FEI's Connect to Gas Program from Revelstoke, and the cost is for installing a propane heating equipment only. Does not include the cost of duct work.

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- 17.5 Please provide a GHG emissions analysis if Revelstoke customers' ratio of propane to electricity usage changed to align with the provincial average ratio of natural gas to electricity use for natural gas customers.
- 6 7

11

8 <u>Response:</u>

- 9 Please refer to the table below for the requested analysis using the consumptions recorded in the
- 10 2012 CEEI¹².

	Residential Energy (GJ)		Residential Er	nergy (%)	
2012 CEEI	Electricity	Gas	Total Electricity		Gas
Revelstoke	172,447	87,008	259,455	66%	34%
вс	61,674,412	73,252,803	134,927,215	46%	54%
If Revelstoke Gas Use in % equals BC Gas Use					
Revelstoke	118,595	140,860	259,455	46%	54%
Increase in Gas (GJ)	53,852				
Propane CO2e Factor (kg/GJ)	61.2				
Increase in CO2e (tonne)	3,296				

12 The analysis shows that if the ratio of propane gas to electricity use is consistent with the 13 provincial average, the increase in GHG emission would be approximately 3,300 metric tonnes of 14 CO_2e .

FEI believes that the analysis above is not relevant to this Application because it does not provide a realistic approximation of the potential for conversion to propane from electricity, including the associated GHG emission impacts for the following reasons:

- The analysis does not consider the economics or feasibility of switching from electricity to propane which is made up of individual circumstances and individual customer preferences and behaviors as discussed in the response to BCUC IRs 2.17.4 and 2.18.4; customer behaviors are not driven purely by economics.
- As discussed in the response to BCUC IRs 1.6.1, 2.18.1, and 2.19.5, the demand for
 propane is largely inelastic; therefore, the use per customer is not expected to change
 materially with changes in price.

¹² <u>https://www2.gov.bc.ca/gov/content/environment/climate-change/data/ceei</u>.



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Finally, FEI notes that the electricity consumption within the CEEI data relates to all end-uses, including those unrelated to space heating and hot water. As such, the data does not provide insight as to why the differences in consumption exist or how they might change as a result of FEI's proposal.



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1 B. CALCULATIONS AND FORECASTS

2	18.0	Reference:	CALCULATIONS AND FORECASTS

Exhibit B-2, BCUC IRs 1.3, 2.7.1, 5.1, 5.2.1, 9.5

Price Signals and Customer Behaviour

5 In response to BCUC IR 5.1, FEI provided the following tables:

Mainland UPC	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10 Yr. avg
Rate Schedule 1	89.7	89.0	87.1	88.5	85.6	85.1	85.2	88.2	86.6	85.9	87.1
Rate Schedule 2	325	316	318	341	332	331	332	339	337	332	330
Rate Schedule 3	3,466	3,463	3,575	3,659	3,593	3,556	3,555	3,695	3,665	3,521	3,575

Revelstoke UPC	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10 Yr. avg
Rate Schedule 1	55.9	51.6	54.2	54.0	52.7	51.7	52.7	54.7	56.1	54.6	53.8
Rate Schedule 2	310	309	308	307	297	295	311	301	323	321	308
Rate Schedule 3	4,268	4,893	5,024	6,796	7,321	6,771	9,928	6,468	7,336	7,576	6,638

Difference, UPC	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	10 Yr. avg
Rate Schedule 1	33.8	37.4	32.9	34.5	32.8	33.4	32.5	33.5	30.5	31.3	33.3
Rate Schedule 2	15.6	7.1	9.9	34.5	34.9	36.0	21.2	38.4	14.1	11.4	22
Rate Schedule 3	(801.3)	(1,429.4)	(1,448.3)	(3,136.6)	(3,728.1)	(3,214.4)	(6,372.8)	(2,773.5)	(3,670.8)	(4,055.5)	(3,063)

6 7

In response to BCUC IR 1.3, FEI provided the following table:

Average (\$/GJ)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Propane Alberta Price	\$ 12.651	\$ 9.358	\$ 10.671	\$ 12.311	\$ 7.623	\$ 10.657	\$ 12.390	\$ 3.292	\$ 4.567	\$ 8.875	\$ 9.315
Natural Gas AECO Price	\$ 7.704	\$ 3.922	\$ 3.913	\$ 3.484	\$ 2.277	\$ 2.996	\$ 4.186	\$ 2.622	\$ 1.984	\$ 2.301	\$ 1.452
Price Differential	\$ 4.947	\$ 5.436	\$ 6.758	\$ 8.828	\$ 5.346	\$ 7.661	\$ 8.204	\$ 0.670	\$ 2.583	\$ 6.575	\$ 7.863
Price Differential Ratio	1.642	2.386	2.727	3.534	3.347	3.557	2.960	1.255	2.302	3.857	6.415
5-Year Rolling Price					2.470	2.051	2 102	2 072	2 720	2 824	2.064
Differential Ratio					2.4/0	3.051	5.165	2.9/3	2.739	2.024	3.004

8

In response to BCUC IR 5.2.1, FEI stated: "FEI cannot definitively explain and does not
have quantitative evidence as to why Revelstoke propane residential customers
historically use, on average, less than FEI's natural gas residential customers."

- 12 In response to BCUC IR 9.5, FEI stated: "[The proposal] may provide a price incentive for 13 current customers consuming propane to increase consumption."
- 14 In response to BCUC IR 2.7.1, FEI stated:

Similar to natural gas main extension customers, Revelstoke main extension
 customers would be responsible for the equipment costs. Based on applications for
 FEI's Connect to Gas program from Revelstoke over the past 12-month period, the
 average capital cost is approximately \$7,000, with a range of approximately \$3,000
 to \$12,300, to convert from home heating oil to propane.

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- Please discuss whether the higher price of propane relative to natural gas 18.1 incentivizes energy conservation and could be a factor that contributes to lower usage in Revelstoke compared to FEI's natural gas customers.
- 3 4

1

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5 **Response:**

6 As discussed in the response to BCUC IR 2.17.4, multiple factors, not just energy prices, drive 7 energy demand and energy conservation decisions. The table included in the response to BCUC 8 IR 1.5.1 also demonstrates that Rate Schedule 1 Inland Use per Customer (UPC) is lower than 9 Mainland UPC even though these regions experience the same natural gas rates. Therefore, 10 although it is possible that the higher price of propane relative to natural gas contributes to lower 11 usage in Revelstoke as compared to FEI's natural gas customers, as noted in the responses to 12 BCUC IRs 1.6.1 and 1.9.5, FEI has found low historic correlation between propane rates and 13 demand in Revelstoke, and in FEI's experience, low volume customers generally are price 14 inelastic.

15 A level of price inelasticity is consistent with utility service where customer needs cannot be easily 16 substituted. For example, FEI expects that Rate Schedule 1 customers, in particular, meet their 17 basic, non-discretionary thermal comfort needs with little regard to prevailing energy prices and 18 volatility. Conversely, the data in BCUC IR 1.5.1 suggests that it is equally unlikely that customers 19 will react to low energy prices by exceeding their basic thermal comfort needs when they can 20 prioritize any energy cost savings towards other expenditures.

21 Finally, as discussed in the responses to BCUC IRs 1.9.5, 1.9.6 and 1.13.5, FEI's proposal 22 maintains an effective price signal that encourages the efficient use of energy. Revelstoke 23 propane customers will continue to pay a predominantly variable rate with the higher carbon tax 24 associated with propane and a small fixed basic charge, so their total bills will be higher if they 25 consume more energy.

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- 29 18.2 In the event the proposal is approved, please confirm, or explain otherwise, that a 30 Revelstoke propane customer would no longer see the cost of propane that has 31 been consumed on their bill.
- 33 **Response:**

34 FEI confirms that what is currently shown as the "Cost of Gas" charge per GJ (under the heading 35 "Commodity Charges" for Revelstoke customers) will, under FEI's proposal, now show the same 36 amount as is shown for FEI's natural gas customers. FEI clarifies however that the amount 37 shown does not reflect the cost of the commodity (be it natural gas or propane), but rather the rate 38 that is charged to customers for the commodity.



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1 It is important to note that there are two BC commodity taxes that will continue to differentiate 2 FEI's Revelstoke customers consuming propane from its customers consuming natural gas. FEI's 3 Rate Schedule (RS) 1, 2 and 3 customers in Revelstoke will continue to be charged the applicable 4 BC Carbon Tax for propane, currently equal to \$2.4072 per GJ versus the applicable BC Carbon 5 Tax for natural gas, charged to all FEI conventional natural gas customers, which is currently 6 equal to \$1.9864 per GJ. In addition, Revelstoke RS 2 and 3 customers will continue to be 7 charged the applicable BC Motor Fuel Tax for propane of \$1.050 per GJ instead of the Provincial 8 Sales Tax (PST), which is charged to FEI's RS 2 and 3 (and other applicable commercial and 9 industrial sales rate schedules), pursuant to the BC Motor Fuel Tax Act. These two differences in 10 BC commodity taxes will not change and will continue to differentiate Revelstoke propane 11 customers from FEI conventional natural gas customers.

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- 18.2.1 If confirmed, please discuss how the proposed amalgamation provides the customer adequate information in terms of a transparent propane price and the actual cost of energy FEI has provided.
- 17 18

19 **Response:**

20 Although Revelstoke customers will not see the actual cost of propane on their bill, Revelstoke 21 customers will continue to see the charges relating to the cost of energy service that FEI has 22 provided to them. This is consistent with FEI's natural gas customers, who also do not see their 23 true cost of natural gas that FEI has provided in their individual bills.

24 The BCUC approved, through BCUC Order G-175-14, the gas cost allocation for the combined 25 gas costs portfolios of FortisBC Energy Inc., FortisBC Energy Inc. Whistler, and FortisBC Energy 26 Inc. Vancouver Island, which resulted in a postage stamp commodity rate and postage stamp 27 Storage and Transport Charges. Under the postage stamp rates, customers in different regions 28 do not see their true cost of commodity. Instead, they see their portion of the cost of energy 29 service pooled together that FEI has provided to all customers. Under the proposed commodity 30 portfolio amalgamation, Revelstoke (and natural gas) customers will see their portion of the cost 31 of energy service pooled together with all of FEI's customers, including natural gas and propane 32 customers.

- 33 Finally, FEI notes that, if the proposed amalgamation of FEI's natural gas supply and propane supply costs is approved, the supply cost of propane for Revelstoke customers will continue to be 34 35 reported separately within FEI's quarterly gas cost report filed with the BCUC for review and 36 approval.
- 37



1									
2 3 4		18.2.2	Please discuss how the proposed amalgamation could inhibit the effectiveness of price signals that encourage efficient use.						
5	Response:								
6	Please refer to the response to BCUC IR 2.18.1.								
7 8									
9									
10 11	18.3	Please p	provide historical heating oil pricing per GJ for the last 10 years, if available.						
12	Response:								

- 13 FEI does not have historical heating oil pricing for Revelstoke. The best available information that
- 14 FEI has covering the last 10 years is the historical heating oil price for Kamloops. Please refer to
- 15 the table below for the \$ per GJ rate for retail heating oil in Kamloops¹³:

	Average Monthly								
	Kamloops, Retail Price, including Tax								
Year	Cent/Litre	\$/GJ							
2010	97.49	26.55							
2011	117.41	31.97							
2012	117.63	32.03							
2013	125.52	34.18							
2014	130.02	35.41							
2015	107.19	29.19							
2016	99.52	27.10							
2017	105.93	28.85							
2018	125.18	34.09							
2019	127.58	34.74							

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- 18.4 Please discuss the reasons why residential customers have not already converted from heating oil to propane as commercial customers have done.
- 21 22

¹³ https://charting.kentgroupltd.com/.



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1 Response:

FEI cannot comment specifically as to why a number of individual energy users in Revelstoke have chosen to continue using heating oil over propane to date. However, in FEI's experience, upfront (capital) costs are the single largest obstacle for customers wishing to switch fuels. As noted in the response to BCUC IR 1.7.3.1, the average capital cost to replace existing equipment with propane equipment is approximately \$7 thousand. Moreover, in FEI's experience, customers generally defer such expenditures until their existing equipment reaches the end of its life or until the savings are immediate and significant.

9 Reducing the price of propane improves the economics of switching from oil to propane for home 10 heating, as the savings resulting from decreased energy costs offset the upfront cost of the 11 propane equipment over time. Please also refer to the response to BCUC IR 2.18.5.1 for a 12 discussion of the simple payback period for a switch from heating oil to propane at current rates 13 and at the amalgamated rates if the Application is approved.

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- 17 18.5 Please confirm, or explain otherwise, that the average capital cost of approximately
 18 \$7,000 to convert a home from heating oil to propane includes all customer costs
 19 to replace an oil heating system with a natural gas system
- 20

21 Response:

Confirmed. The information is based on FEI's Connect to Gas program from Revelstoke over the
past 12-month period. FEI notes that the information is provided by the applicant to the Connect
to Gas program for the total costs of the conversion, including the supply of equipment and
installation. FEI does not request further breakdown of costs on the application form; therefore,
FEI is not able to provide a further breakdown of the average capital costs.

FEI notes that a residential home containing a heating oil furnace or boiler will typically have ductwork or hot water radiant heat piping; therefore, a conversion to a propane furnace or boiler will not usually require the installation of new ductwork or hot water radiant heat piping. As such, FEI believes the average capital cost of \$7 thousand is only associated with the supply and installation of the heating appliances, as well as removal of the existing heating oil tank.

32 Furthermore, an additional cost not included in the \$7 thousand average is the customer 33 contribution for a service line connection, if required.

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FORTIS BC^{**}

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18.5.1 Based on the average customer capital cost including all customer upgrade costs, please provide an analysis of the "simple payback" time for customers switching from fuel oil to propane at (i) existing propane prices and (ii) at propane prices proposed in the application.

6 Response:

7 Please refer to the table below for the requested calculation. FEI notes that the average capital

costs of converting from heating oil to propane included below do not include the Connect to Gas
Incentive from FEI, which can range from \$1,300 to \$2,700. The analysis also assumes that no

10 contribution from the customer is required due to the residential dwelling being located within 30

11 metres of FEI's existing gas main.

			i) Existing Propane	ii) Proposed Rate -
			Rate (FEI January 1,	Appendix D-1 of
Line	Particular	Reference	2020)	Application
1	Annual Residential Consumption (GJ)	Revelstoke RS 1 UPC	50	50
2	Propane Furnace Efficiency		0.8	0.8
3	Heating oil Furnace Efficiency		0.8	0.8
4	Heating Oil Furnace Consumption	Line 1 x Line 2 / Line 3	50	50
5				
6	Heating Oil, incl. tax (\$/GJ)	2019 Monthly Average, BCUC IR 2.18.3	34.74	34.74
7	Total Heating Oil Costs per year (\$)	Line 6 x Line 4	\$ 1,737	\$ 1,737
8				
9	FEI Revelstoke Rates			
10	Basic Charge (\$/day)		0.4085	0.4085
11	Delivery Margin Related Charge (\$/GJ)		4.596	4.349
12	Commodity Related Charge (\$/GJ)		11.180	2.782
13	Carbon Tax (\$/GJ)	Effective April 2019	2.407	2.407
14	Total Propane Costs per year (\$)	Line 10 x 365.25 + Sum of Line 11 to 13) x Line 1	\$ 1,058	\$ 626
15				
16	Annual Cost Savings (\$)	Line 7 - Line 14	\$ 679	\$ 1,111
17				
18	Average Capital Cost (\$)	FEI Connect to Gas Program	7,000	7,000
19	Simple Payback (yrs)	Line 18 / Line 16	10	6

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18.6 Please explain whether FEI provides any incentives for customers converting from heating oil to propane and discuss why FEI has chosen this strategy.

19 **Response:**

FEI provides incentives under the 'Connect to Gas' umbrella to Revelstoke residential customers who convert their primary heating systems to high-efficiency propane systems. FEI recognizes that there is often a significant capital cost required to convert equipment that many residents cannot afford. In addition, customers may be required to pay a contribution in aid of construction to attach to the gas system. Thus, the primary purpose of the incentive is to assist in offsetting the



upfront costs for customers so that they can connect to gas. Other objectives include increasing
 energy efficiency and reducing emissions.

3
4
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6 18.7 Please provide the number of connection requests FEI has had from residential customers who have converted from heating oil to propane each year over the past five years.
9

10 Response:

FEI had 139 new attachments to gas service (i.e. connection requests) in Revelstoke from 2015 to 2019. Please see Table 1 below for the breakdown by years. FEI notes that it is not mandatory for the customer that is requesting new gas attachment to identify the fuel type or heating system prior to their connection to propane. For this reason, FEI is not able to provide a further breakdown of the number of new attachments that converted from heating oil to propane.

16

Table 1 – New Attachments in Revelstoke from 2015 to 2019

Year	New Gas (Propane) Attachments in Revelstoke
2015	19
2016	21
2017	27
2018	36
2019	36
Total	139

17

18 In order to be responsive, FEI also reviewed information from its Connect to Gas incentive 19 program. FEI clarifies that the Connect to Gas incentive program is available to both new 20 attachments and existing customers for converting their heating system from heating oil, wood, or 21 bottled propane to piped propane. For instance, a customer might already have gas service for 22 appliances such as cooktops or hot water heating but wishes to convert their heating system from 23 heating oil to gas.

FEI had 112 Applicants to the Connect to Gas incentive program in Revelstoke between 2015 and

25 2019 that identified they had converted their heating system from heating oil to piped propane.

26 Please see Table 2 below for a breakdown by year.



1Table 2 – Revelstoke Conversions from Heating Oil to Piped Propane (Connect to Gas2Program) from 2015 to 2019

Conversion from Heating Oil in Revelstoke (Connect to				
Year	Gas Program)			
2015	9			
2016	24			
2017	21			
2018	34			
2019	24			
Total	112			

3

4 Based on the historical data from FEI's Connect to Gas incentive program for 2015 to 2019, FEI

5 averaged approximately 23 heating system conversions per year (including both new attachments

6 and existing customers) from heating oil to piped propane. Using this historical statistic, it will

7 take approximately 46 years to convert all 1,063 residential dwellings identified as part of the

8 Upper Bound scenario in the Application that are located within 30 metre of FEI's main. Even if 9 the rate of connections triples, it will still take approximately 15 years to convert all identified

9 the rate of connections triples, it10 residential dwellings.



1 19.0 Reference: CALCULATIONS AND FORECASTS

Exhibit B-2, BCUC IRs 6.1, 9.1, 13.6; Exhibit A2-3, Terasen Gas Inc.
and Terasen Gas (Vancouver Island) Inc. (collectively Terasen
Utilities) 2008 Energy Efficiency and Conservation Programs
Application, Exhibit B-2, BCUC IRs 14.1, 14.2

6 UPC and Demand Forecast

- 7 In response to BCUC 6.1, FEI stated:
- 8 FEI assumes that the use rates for existing customers will remain relatively 9 constant and might increase or decrease over time for various factors not related to 10 the cost of commodity. Use rates are dependent on occupant comfort level, their 11 conservation behavior, building envelope and installed equipment...
- In general, third party price elasticity studies have shown that gas consumers
 (natural gas and propane), particularly residential customers, have low price
 elasticity of demand...
- FEI did not feel that price elasticity analysis was warranted, and it is FEI's view that
 factors other than rates, such as those noted above, have a more significant
 impact on customer demand than rates.

Revenue per GJ	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Rate Schedule 1	18.069	12.687	22.728	21.450	17.999	23.612	17.798	13.446	16.566	19.028
Rate Schedule 2	15.006	10.510	19.504	18.336	14.444	20.241	14.121	9.933	13.194	15.358
Rate Schedule 3	13.988	9.252	18.381	17.486	13.180	18.946	12.144	8.645	11.953	14.073
Revelstoke UPC (GJ)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Rate Schedule 1	55.9	51.6	54.2	54.0	52.7	51.7	52.7	54.7	56.1	54.6
Rate Schedule 2	310	309	308	307	297	295	311	301	323	321
Rate Schedule 3	4,268	4,893	5,024	6,796	7,321	6.771	9.928	6.468	7.336	7.576

- 19 In response to BCUC IR 9.1, FEI stated, "Revelstoke's propane demand has been slowly 20 increasing over the last 10 years."
- 21 In response to BCUC IR 13.6, FEI stated:
- FEI has not examined the price elasticity of its Revelstoke propane customers and thus is not certain how much approval of the Application could cause customers to increase their existing propane demand.
- In Terasen Utilities' 2008 Energy Efficiency and Conservation Programs Application, in
 response to BCUC IR 14.1, Terasen Utilities stated:
- The marginal supply of natural gas commodity is visible to customers as it is a flow-through to customer rates; one would assume that an increase in price elicits a demand response in customers. It is important for customers to receive a price



- signal that reflects the marginal cost of supply as a foundation for conservation
 activity...
- In the Terasen Utilities' 2008 Energy Efficiency and Conservation Programs Application, in
 response to BCUC IR 14.2, Terasen Utilities stated:
- 5 The Companies estimate price elasticity through regression analysis, specifically a 6 logarithmic model that determines the relationship between the natural log of 7 annual consumption per customer and the natural log of the average annual 8 natural gas commodity price. Current analysis indicates the own price elasticity for 9 residential customers is 21% and for commercial customers is 17%...
- 10 Sudden increases in natural gas prices may accelerate the decision to purchase 11 more efficient equipment, but once that purchase has been made the impact on 12 consumption (related to the new equipment) is permanent regardless of whether 13 prices later moderate.
- 14 19.1 Please explain whether UPC for each of the rate schedules above trended 15 upwards, downwards or remained constant.
- 16 17 **Respo**
- 17 <u>Response:</u>

18 The following figures compare the FEI Rate Schedule 1 and Rate Schedule 2 UPC with that of

19 Revelstoke. Despite fluctuations in gas costs, the Revelstoke UPCs for Rate Schedules 1 and 2

20 have remained relatively stable. Further, FEI considers there to be no difference in trends

21 between FEI and Revelstoke.









Rate Schedule 3 has a small number of customers in Revelstoke. As such, factors that are
specific to an individual customer can have a large impact on the annual UPC. Several
Revelstoke customers had above average demand in 2015, which is reflected in the figure below.

4 Reveisione customers had above average demand in 2015, which is reflected in the h

5 In contrast, FEI's UPC for Rate Schedule 3 has remained relatively flat.



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Response: Please refer to the response to BCUC IR 2.19.1. 6

19.3 Please discuss what factors have contributed to an increase in propane demand in Revelstoke.

10 Response:

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13 Given that the use per customer rates are relatively flat, the increased consumption is largely a 14 result of customer growth, which is shown in the chart below:

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- 1419.4Assuming the proposed amalgamation is approved, please confirm, or explain15otherwise, that an increase in the demand for propane by Revelstoke customers16will result in a larger \$/GJ bill impact to FEI's natural gas customers and a higher17amount of subsidization from natural gas customers, all else being equal.

F



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1 Response:

Confirmed. However, please see the tables below which demonstrate that the bill impact to FEI's
 natural gas ratepayers remains at less than \$2 per year for an average FEI natural gas residential

4 customer consuming 90 GJ per year even in the unlikely event that:

the residential customers in Revelstoke increase their average annual demand from 50 GJ
 per year to a level similar to FEI's natural gas customers at 90 GJ per year (an approximate increase in consumption of 80 percent), and

 all 1,063 residential dwellings located within 30 metres of FEI's main identified as part of the Upper Bound of the Application converted to propane immediately and also consume 90 GJ per year.

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FEI has used these assumptions in the tables below to demonstrate that the bill impact to FEI's natural cas customers remains small even in the unlikely, highest use scenario

13 natural gas customers remains small even in the unlikely, highest use scenario.

14

Table 1: Average Midstream Rate Impact

			Residential UPC	Residential	Residential
			@ 50 GJ/yr (Table	UPC @ 50 GJ/yr	UPC @ 90 GJ/yr
			3-3 of	plus 1,063	plus 1,063
Line	Particular	Reference	Application)	Conversion	Conversion
1	Estimated FEI Revelstoke Propane Costs (\$000s)	See note 1	2,239	2,765	3,642
2	Estimated Propane recovery via Commodity Recovery Charge (\$000s)	See note 2	(373)	(461)	(608)
3	Total Propane Costs transfer to FEI MCRA (\$000s)	Line 1 + Line 2	1,865	2,303	3,034
4					
5	FEI Natural Gas Total Midstream Costs (\$000S)	See note 3	149,526	149,526	149,526
6	FEI MCRA Amortization (\$000S)	See note 4	13,907	13,907	13,907
7	TOTAL Natural Gas Midstream Costs (incl. MCRA Amortization)	Line 5 + Line 6	163,433	163,433	163,433
8					
9	Revelstoke Propane Demand Forecast (2020F) - TJ		241	298	392
10	FEI MCRA Demand (Natural Gas Only) - TJ		138,206	138,206	138,206
11	TOTAL Demand (Natural Gas & Propane) - TJ	Line 9 + Line 10	138,447	138,504	138,598
12					
13	Average Midstream Rate - Natural Gas Only (\$/GJ)	Line 7 / Line 10	1.183	1.183	1.183
14	Average Midstream Rate - Natural Gas & Propane (\$/GJ)	(Line 3 + Line 7) / Line 11	1.194	1.197	1.201
15					
16	Average Midstream Rate Impact to FEI's Customer (\$/GJ)	Line 14 - Line 13	0.011	0.014	0.019
17	% Average Midstream Rate Impact to FEI's Customer	Line 16/Line 13	0.93%	1.18%	1.61%
18					
19	FEI Natural Gas Residential UPC	GJ/yr	90	90	90
20	Bill Impact (\$)	Line 19 x Line 16	\$ 0.99	\$ 1.26	\$ 1.71
	1 - Forecast Jan to Dec 2020 based on FEI Revelstoke 2019 O2 Gas Cost	Report			
	2 - Assumed Commodity Cost Recovery Charge of \$1.549 per GI (Eff. Jr	an 1, 2019) plus Propane Pre	mium Multiplier		
	3 - Forecast Jan to Dec 2020 based on FEI 2019 02 Gas Cost Report, exc	lude T-Service UAF			
	4 - Forecast as of Jan 1, 2020 based on FEI 2019 Q2 Gas Cost Report (1/2	2 of Pre-Tax Amortization M	CRA Deficit/(Surplus	;)	



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Table 2: Average Annual Bill Impact to FEI Natural Gas Customers

		Average Annual Bill Impact (\$)					(\$)
		Re	sidential UPC		Residential		Residential
			@ 50 GJ/yr	U	PC @ 50 GJ/yr	U	PC @ 90 GJ/yr
	Average	((Table 5-1 of		plus 1,063		plus 1,063
Rate Schedule	UPC (GJ)		Application)		plication) Conversion		Conversion
FEI's Mainland and Vancouver Island (Natural Gas)							
Rate Schedule 1 - Residential Service	90	\$	0.98	\$	1.26	\$	1.71
Rate Schedule 2 - Small Commerical	340	\$	4.00	\$	5.02	\$	6.04
Rate Schedule 3 - Large Commerical	3,770	\$	33.72	\$	41.26	\$	56.34

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- 19.5 Please provide the elasticity studies FEI references in the response to BCUC IR 6.1.
- 8

9 Response:

FEI provides the following third-party elasticity studies for reference. FEI clarifies that the thirdparty studies provided below are mainly for natural gas, however, FEI believes the elasticity of

12 demand will be similar between natural gas and propane given the uses of the fuel (e.g. space

13 and hot water heating) are the same in a residential setting for both natural gas and propane.



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	Publication	Natural G Elasticity d (Resid	Bas Price of Demand ential)	
Research Institution	date	Short-term	Long-term	Description
National Renewable Energy Lab ¹⁴	Feb 2006	-0.12	-0.36	This study estimated elasticity values at state and national levels. The numbers presented here are at national level ¹⁵ .
Energy Information Administration ¹⁶	Oct 2014	-0.07 to -0.15 -0.21		This study was referenced in FEI's 2014 Long-Term Resource Plan application as well.
UC Berkley, Energy Institute at HAAS ¹⁷	Jan 2018	-0.23 to -0.17		This study does not separate the long term and short-term elasticity and provides an average range of estimates.

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 elasticities presented in these studies are in a similar range to the correlation coefficient presented in the response to BCUC IR 1.6.1 (i.e. -0.09 for residential and industrial, -0.20 for commercial). Furthermore, the table above also indicates that elasticity numbers do not change materially over time (the elasticity estimates from NREL's 2006 report and UC Berkley's 2018 report are similar).

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19.6 Please provide the results of any recent FEI price elasticity studies.

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13 Response:

14 Over the past few years (roughly since the 2014 Long-Term Gas Resource Plan application), FEI

15 has relied on price elasticity studies conducted by reputable independent research entities for its

16 elasticity estimates. As such, FEI is not able to provide the results of any recent FEI-specific price

17 elasticity study.

¹⁶ www.eia.gov/analysis/studies/buildings/energyuse/pdf/price_elasticities.pdf.

¹⁷ <u>https://haas.berkeley.edu/wp-content/uploads/2019/05/WP287.pdf</u>.

¹⁴ www.nrel.gov/docs/fy06osti/39512.pdf.

¹⁵ For comparison purposes, Washington State's short-term and long-term elasticities were estimated at -0.16 and - 0.21 respectively.



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FEI's preference for using third party research is based on the observation that the majority of published research indicates that natural gas customers are price inelastic. As provided in response to BCUC IR 2.19.5, 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 (with an average price elasticity of -0.20). There is no reason to believe that conducting an FEI specific study would lead to a different conclusion.

8 Further, conducting a comprehensive price elasticity study that considers the specific 9 demographics of FEI's service territory (such as income or substitution effects) is a costly and 10 complicated task and would require external expertise. As such, conducting a detailed price 11 elasticity study for a small sub-set of FEI's customers (Revelstoke) that would likely result in the 12 same price inelasticity conclusion would not be cost-effective.

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19.6.1 Please discuss whether price elasticity for Revelstoke customers would be expected to be similar to price elasticity for other FEI customers.

19 <u>Response:</u>

20 FEI expects the price elasticity of propane (Revelstoke) and price elasticity of natural gas (other 21 FEI customers) to be similar. This is because both natural gas and propane are used for the 22 same end-use purposes (mainly space heating and water heating). The choice of fuel used for 23 space heating or water heating has no impact on a household's consumption behavior. For 24 instance, as stated in FEI's 2017 Residential End-Use Survey (REUS), "there are no statistically 25 significant differences in thermostat settings or set-backs between dwellings whose main space 26 heating (SH) fuel is electricity versus natural gas". Therefore, there is no reason to believe that 27 price elasticity will be any different for propane users.

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- 19.6.2 Using price elasticity data from FEI's most recent study, please provide a 10-year forecast of propane consumption in Revelstoke at (i) current commodity pricing and (ii) commodity pricing as proposed in the application.
- 34 35



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1 Response:

Because of the low correlation between gas demand and commodity pricing, as discussed in the response to BCUC IR 2.19.5 and demonstrated by FEI's correlation analysis for Revelstoke propane demand in the response to BCSEA IR 2.16.2, FEI's forecast methods for Revelstoke do not incorporate price elasticity. Please refer to Appendix B of the Application for the Revelstoke annual demand forecast to 2040.

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19.7 Please discuss what changes FEI expects to consumption behaviour if customers
 experience a sudden and significant commodity cost decrease as proposed in the
 Application.

14 **Response:**

15 As stated in response to BCUC IR 2.19.5, third party elasticity studies indicate that natural gas 16 customers are price inelastic, meaning that their demand does not change materially with 17 changes in commodity prices. Further, as explained in response to BCUC IR 19.6.1, the choice of 18 fuel used for space heating and water heating has no statistically significant impact on customers' 19 consumption behavior (that is, there is no reason to believe that propane customers have different 20 consumption behavior than natural gas customers). Also, in response to BCSEA IR 2.16.3, FEI 21 noted that sudden significant changes in the effective rates paid by Revelstoke customers did not 22 result in corresponding changes to UPC due to the price inelasticity of Revelstoke customers.

As such, FEI believes that a sudden, significant decrease in commodity cost would not result in a corresponding sudden and significant change in existing customers' consumption behavior (use per customer). Over the long term, decreased commodity costs and reduced volatility in monthly bills may incent those who use other, more costly fuels to become FEI customers, which would increase the total throughput.

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- 3119.8Please discuss to what extent energy conservation can be encouraged through32rate price signals.
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34 **Response:**

As discussed in FEI's 2016 Rate Design Application, one of the rate design principles considered by FEI is that rates shall provide "price signals that encourage efficient use and discourage inefficient use" (the "efficient use" in this principle refers to improved system load factor and



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- 1 reduced system peak and not necessarily the reduction of overall consumption). In this context,
- 2 the share of fixed charges versus variable charges in overall customer bills, the choice of rate
- 3 structure (flat rates, seasonal rates, inclining block rates, declining block rates, time-of-use rates)
- 4 and other bill items such as carbon tax all provide price signals to customers.

5 As stated in FEI's 2016 rate design application, FEI has one of the lowest monthly fixed charges 6 (both in dollar amount and as a percentage of delivery cost) among Canadian utilities. Further, 7 similar to FEI, the majority of natural gas utilities use the flat rate structure and FEI did not identify 8 any natural gas utility that use seasonal rates or inclining block rates. The flat rates are a form of 9 volumetric charge, meaning that customers' overall bill amount would increase with any increase 10 in consumption. FEI's proposed changes to the commodity costs do not have any material effect 11 on these price signals, as a significant portion of customers' bills continue to be based on 12 volumetric charges.

FEI also notes that under its proposed approach, Revelstoke customers will continue to pay a higher carbon tax per GJ than natural gas customers (due to higher carbon content of propane) and that the proposed amalgamation of commodity costs will increase the share of carbon tax in customers' bills from approximately 11 percent today to more than 18 percent.

17 18	
19 20 19.8.1 21 22 23	Please discuss whether higher commodity prices in Revelstoke have historically increased conservation in Revelstoke relative to FEI's natural gas customers.

24 **Response:**

25 Higher commodity prices in Revelstoke compared to natural gas commodity prices do not appear

26 to have increased conservation by Revelstoke customers compared to FEI customers.

27 FEI's analysis of the most recent DSM Plan period (2014 to 2018) shows that customers in 28 Revelstoke participated less frequently in DSM programs offered by FEI than the rest of the FEI 29 customer base. Comparing the Revelstoke customer population to the Revelstoke DSM program 30 participants found that there were 145 DSM program participants from Revelstoke over the 2014 31 to 2018 period representing approximately 8 percent of the Revelstoke customer base. Applying 32 the same analysis to the rest of the FEI and Fort Nelson service territories found that there were 33 348,915 DSM program participants representing approximately 34 percent of the combined FEI 34 and Fort Nelson customer base. In terms of energy savings, this represented 0.3 GJ savings per 35 customer when including all customers in Revelstoke versus 2.4 GJ savings per customer for all 36 customers outside of Revelstoke.



- Note that this analysis did not account for the same customer participating in more than one DSM
 program.
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 19.8.2 Please discuss what tools FEI can use to encourage energy conservation and efficient use of propane aside from rates. In your response, please discuss the effectiveness of alternate approaches relative to the effectiveness of increasing commodity price.

11 Response:

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All DSM programming offered by FEI is currently and will continue to be made available to Revelstoke customers. These offers include incentives on high efficiency equipment for all customer sectors and DSM education and outreach activities. In addition to FEI's equipment offers and broader outreach activities, another tool that FEI has recently applied to encourage energy conservation is direct community engagement communications campaigns. Tactics used in these types of community campaigns have included:

- Open house events in a targeted community with FEI events team members available to answers questions regarding rebates;
- Postcard mailers highlighting rebate offers and open house events;
- Local newspaper ads;
- Local radio ads;
- Social media ads targeting social media users in the community; and
- Small business engagement, which includes an in-person visit to the customer's place of
 business, a high-level energy assessment to look for conservation opportunities, and
 information on rebates and behaviour change.
- 27

Given that these are recent initiatives, FEI does not currently have enough comparative data to determine if these campaigns have resulted in an increase in energy conservation. As discussed in the responses to BCUC IRs 2.19.8 and 2.19.8.1, increased natural gas or propane commodity rates have not influenced energy efficiency or energy conservation activities in Revelstoke.

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- 1 2 3
- 19.9 Please discuss FEI's observed impacts of price volatility on conservation behaviour.

4 **Response**:

- 5 To respond to this question FEI calculated the standard deviations of both the cost of gas and use
- 6 rates for both Mainland and Revelstoke customers. FEI chose the standard deviation between
- 7 2009 and 2018 as a consistent measure of volatility¹⁸.
- 8 For Rate Schedule 1, the following chart indicates that volatility in the cost of gas is unrelated to 9 volatility in use rates. The gas cost volatility is significantly higher in Revelstoke; however, the
- 10 volatility in the use rate is about the same as Mainland where gas cost volatility is significantly
- 11 less. The implication is that residential customer use rates fluctuate by about the same amount in
- 12 both the Mainland and Revelstoke even though gas costs fluctuate more in Revelstoke.



- A result similar to Rate Schedule 1 is observed in Rate Schedule 2. Rate Schedule 2 use rates
 are higher, so the standard deviation is also higher, but the relationship between the Mainland
- 16 and Revelstoke is the same. Both the Mainland and Revelstoke small commercial customer use
- 17 rates fluctuate by about the same amount even though gas costs fluctuate more in Revelstoke.

¹⁸ 2008 includes a spike in natural gas pricing and was excluded.



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2 In Revelstoke Rate Schedule 3, there are too few customers to reliably test the standard 3 deviation. As a result, the chart is inconclusive but shown here for completeness.





1 FEI believes that this analysis demonstrates that use rates are insensitive to gas cost volatility 2 and as a result, future gas cost changes are not expected to result in use rate volatility.

3 4			
5			
6		19.9.1	Please discuss how Revelstoke customers' conservation behaviour could
7			be expected to change if price volatility is reduced as proposed in the
8			Application.
9			
10	Response		

10 Response:

- 11 Please refer to the response to BCUC IR 2.19.9 which confirms that conservation behavior is not
- 12 influenced by price volatility.



1	20.0	Reference:	CALCULATIONS AND FORECASTS
2			Exhibit B-2, BCUC IRs 7.1, 7.2, 8.5; Exhibit B-5, CEC IR 10.2
3 Upper Bound and Alternative Scenarios			
4		In response t	o BCUC IR 8.5, FEI stated:
5 6 7 8 9 10		FEI e reside imme occur capita future	emphasizes that the Upper Bound scenario, where all 1,063 identified ential dwellings located within 30 metres of an existing main convert diately in year 1 after the proposed amalgamation is approved, is unlikely to FEI believes the actual conversion will occur over time and the actual al upgrade requirement could occur in 5 to 20 years, or even further in the s.
11		In response t	o BCUC IR 7.2, FEI stated:
12 13 14		FEI di Uppe larges	id not attempt to assign a probability to the upper bound scenario. Rather, the r Bound scenario was chosen because it represents the scenario with the st delivery rate impact.
15		In response t	o BCUC IR 7.1, FEI stated:
16 17 18 19 20 21 22 23 24		FEI u metre exper custo syster dwelli within to hav would	nderstands that there are approximately 1,063 residential dwellings within 30 s of existing mains that are not currently customers of FEI. It has been FEI's ience that when energy at natural gas prices is offered to potential mers, there is a greater likelihood that those customers will connect to the m. However, FEI does not have an estimate of the total number of residential ngs that would convert to propane. A detailed survey of premises located the area served by the existing system would need to be conducted for FEI ve sufficient information to provide a reasonable estimate of customers who I choose to convert.
25 26 27		In response 1 10.2, FEI sta scenario, but	to Commercial Energy Consumers Association of British Columbia (CEC) IR ated: "FEI, early on, considered scenarios that fell within the Upper Bound did not develop these further or attempt to assign a probability or likelihood."
28 29 30 31 32	Rosna	20.1 Pleas condu choos	e provide a time and cost estimate for the survey that would need to be icted for FEI to provide a reasonable estimate of customers who would se to connect to FEI's propane system.
52	nespu	1136.	

- FEI would require approximately three months in order to contact and process responses from all residences and businesses that are not currently attached to, but are within the reach of, the
- 35 propane distribution system. Such a survey is estimated to cost approximately \$30 thousand.



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FEI notes that a survey, while useful in indicating a preference for customers willing to connect to the gas system, is only directional. Customers will ultimately consider many factors when the time comes to change their heating system, and these factors can outweigh a desire stated on a survey. These factors can include, but are not limited to, upfront (capital) cost (and a customer's own financial situation), savings, equipment options, heating (energy source) options, and emissions targets/regulation. Accordingly, a survey is a starting point to determine interest from a customer.

8 In order to provide reliable data for this Application, customers would need to be provided with 9 detailed costing and emissions information for their specific residence/business to switch to 10 propane, from which they could make a more informed decision to connect to the system. This 11 would require a significant increase in time and cost beyond the three months and \$30 thousand 12 figures provided above.

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- 15
- Please explain why FEI did not attempt to assign any probability to the upper
 bound scenario or alternative demand scenarios.

18 19 <u>Response:</u>

- 20 FEI did not attempt to assign a probability to the Upper Bound scenario for the following reasons:
- First, there are many factors that drive energy users' choice of fuel type. Since FEI does not have empirical evidence on all these factors, it did not assign conversion probability metrics; and
- Second, the rate impact to FEI's natural gas customers associated with the Upper Bound
 scenario is small and applying a probability to this scenario does not result in a meaningful
 difference.
- 27



1 21.0 Reference: CALCULATIONS AND FORECASTS

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Exhibit B-2, BCUC IR 8.3

Costs of Alternative Proposals

In response to BCUC IR 8.3, FEI provided the following table:

	Proposed Gas Cost Amalgamation - <u>Revelstoke</u> <u>Propane System Upgrade @</u> <u>Upper Bound Scenario</u> (2019\$)	Virtual LNG Pipelilne (2019\$)	Physical Natural Gas Pipeline (2019\$)
Capital Costs	\$ 2.798 million (If all identified Upper Bound conversions materialize immediately)	\$26 million	\$ 308 million
O&M Costs (Annual)	n/a	\$1.2 million	\$ 0.380 million
Avg. Annual Cost of Service (by Revelstoke or FEI's customers)	\$ 2.239 million (Forecast 2020 Propane Costs)	\$6.200 million (Levelized Annual Incremental Revenue Requirement)	\$ 30.600 million (Levelized Annual Incremental Revenue Requirement)
Incremental Rate Impact to FEI's customers, incl. Revelstoke	\$ 0.011/GJ (Midstream Rate Impact)	\$ 0.027/GJ (Delivery Rate Impact)	\$ 0.200/GJ (Delivery Rate Impact)
FEI Annual Bill Impact (Avg. FEI residential @ 90 GJ per year)	\$ 0.98	\$ 2.43	\$ 18.00
Revelstoke Annual Bill Relief (Avg. residential @ 50 GJ per year)	(\$407)	(\$ 406) Assume no contribution from Revelstoke	(\$ 397) Assume no contribution from Revelstoke

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FEI further stated that "A CNG virtual pipeline was also investigated in 2015, but was deemed not feasible as it was unable to meet the on-site storage requirement of 7 days supply."

9 21.1 Please confirm the period over which the capital costs for the proposed 10 amalgamation, virtual liquefied natural gas (LNG) Pipeline and Physical Natural 11 Gas Pipeline options were amortized to calculate the average annual cost of 12 service.

14 **Response:**

15 FEI clarifies that the average annual cost of service is not limited to the initial capital cost of the

16 assets amortized over a number of years or over their expected life. Rather, the average annual

17 cost of service is calculated based on the annual revenue requirement of each option over a 25-

18 year period with the following assumptions:

• Use of the BCUC approved depreciation rate for the individual assets of each scenario;



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- Annual O&M costs with 2 percent annual inflation; 1
- 2 Incremental property tax for the Revelstoke plant with 2 percent annual inflation;
- 3 • FEI's commodity cost and transportation cost with 2 percent annual inflation;
- 4 • FEI's cost of capital and capital structure as approved under BCUC Order G-193-15 (the 5 cost estimate was from 2015; FEI did not update the cost of capital and capital structure to 6 2019 numbers for the response in BCUC IR 1.8.3); and
- 7 • FEI income tax rate of 26 percent (the effective rate enacted in 2015). FEI did not update the cost of service calculation to 27 percent, which is the currently enacted tax rate in the 8 9 response to BCUC IR 1.8.3.
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FEI calculated the levelized annual cost of service (equivalent to the levelized annual revenue 11 12 requirement) based on the present value of the annual revenue requirement over 25 years using 13 the discount rate set at FEI's approved after-tax weighted-average cost of capital. FEI limited the 14 levelized cost of service impact to 25 years so that the three alternatives were comparable. While 15 a longer discount period changes the levelized cost of service for each alternative, the proposed 16 non-capital solution continues to have the lowest annual cost of service and therefore, the lowest 17 impact to FEI's ratepayers as compared to the other two options.

- 18 19 20 21 21.1.1 If the amortization period used was different than the expected lifetime of 22 the capital upgrades for the virtual LNG and physical natural gas pipeline 23 options, please provide an updated table with the capital costs amortized 24 over the expected lifetime of the upgrades. 25 26 Response: 27 As discussed in the response to BCUC IR 2.21.1, the average cost of service was not calculated 28 based on the full amortization of the initial capital cost. However, in order to be responsive, FEI 29 has provided the requested information in the table below comparing the average cost of service
- 30 of each option, calculated based on amortizing the capital costs over the expected life of the 31 assets as requested. FEI notes that the proposed amalgamation provides the lowest average 32 annual cost of service using either amortization period.



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	Proposed Gas Cost Amalgamation - <u>Revelstoke</u> <u>Propane System Upgrade @</u> <u>Upper Bound Scenario</u> (2019\$)	Virtual LNG Pipelilne (2019\$)	Physical Natural Gas Pipeline (2019\$)
Capital Costs	\$ 2.798 million (If all identified Upper Bound conversions materialize immediately)	\$ 26 million	\$ 308 million
O&M Costs (Annual)	n/a	\$1.2 million	\$ 0.380 million
Avg. Annual Cost of Service (by Revelstoke or FEI's customers)	\$ 0.230 million (Capital cost amortized over 22 years)	\$ 1.79 million (Capital cost amortized over 35 years)	\$ 18.83 million (Capital cost amortized over 66 years)

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21.2 Please discuss whether the existing propane storage facilities have any material salvage value, and if the salvage value was considered when determining the net capital upgrade costs for the virtual LNG pipeline option.

9 **Response:**

10 The existing propane storage facilities have an estimated salvage of \$90 thousand and this 11 amount was included in the analysis.

12 The capital costs of both the virtual LNG pipeline and the physical natural gas pipeline include the 13 net demolition cost of \$126 thousand in 2015 dollars for the existing propane plant. This cost 14 forms part of the capital cost and is included in the cost of service calculation.

In addition, the Revelstoke propane assets have a remaining book value of approximately \$1.82 million at the end of December 2018. Thus, the net retirement costs of the Revelstoke propane assets (i.e., the remaining book value minus an estimated \$90 thousand of proceeds received for the salvage value of the existing propane tanks¹⁹) were also accounted for in the cost of service calculation for both the virtual LNG pipeline and physical natural gas pipeline.

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¹⁹ Assumed based on \$10,000 salvage value per existing propane storage tank, which is based on 50 percent of the average cost of new propane storage tank at approximately \$20,000 each.

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- 21.3 Please discuss to what extent FEI considers the 2015 estimates to be accurate, considering any changes in commodity pricing and any new efficiencies in LNG liquefaction, vaporization, or transportation methods since the 2015 study.
- 5 **Response:**

6 The capital cost of the virtual LNG pipeline was prepared to an AACE Class 3 level of definition in 7 2015. FEI considers this estimate to be reasonably accurate and it does not expect that the 8 capital costs have changed significantly since then.

9 The capital cost of the physical natural gas pipeline was estimated to the AACE Class 5 level of 10 definition; however, FEI does not expect that a more recent cost estimate (either Class 5 or Class 11 3) would reduce the capital cost of the physical pipeline from approximately \$308 million to a level 12 similar to the virtual LNG pipeline at approximately \$26 million, or the non-capital solution of 13 approximately \$2.2 million.

Further, as illustrated in Figure 2-1 of the Application, natural gas commodity prices have remained relatively constant since 2015. As such, FEI does not expect that updated commodity pricing will materially change the comparison between the proposed non-capital solution and the virtual pipeline.

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- 21 21.4 Please provide a comparison of potential CO2e savings for each of the above 22 options.
- 24 **Response:**
- 25 Please refer to the table below for the requested analysis.



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	Proposed Gas Cost Amalgamation	Virtual LNG Pipelilne	Physical Natural Gas Pipeline
		Conversions from	Conversions from
	Conversions from heating oil to propane	propane to natural gas	propane to natural gas
Source of CO2e savings		plus new connection	plus new connection
		from heating oil to	from heating oil to
		natural gas	natural gas
Propane Demand (TJ)	n/a	241.1	241.1
Heating Oil Demand (TJ) - Reference: BCUC IR 1.2.7.2	16.3	16.3	16.3
CO2e Emission Factos (kg/GJ)			
Light Fuel Oil	68.37	68.37	68.37
Propane	61.15	61.15	61.15
Natural Gas	49.87	49.87	49.87
CO2e Savings, Heaing Oil to Propane (tonne/yr)	118	-	-
CO2e Savings, Heaing Oil to Natural Gas (tonne/yr)	-	302	302
CO2e Savings, Propane to Natural Gas (tonne/yr)	-	2,720	2,720
Gross CO2e savings (tonne/yr)	118	3,022	3,022
CO2e Increases, Transportation of LNG via Tanker Trailer	-	(680)	-
Net CO2e savings (tonne/yr)	118	2,342	3,022

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- 21.5 Please confirm, or explain otherwise, that FEI estimated the cost of upgrading its storage in Revelstoke to meet the 7-day supply requirement for compressed natural gas (CNG) and determined that it would be more costly than the virtual LNG pipeline option.

9 10 Response:

Confirmed. FEI's investigation from 2015 showed that the virtual CNG pipeline would require a 11 12 total of 56 CNG tube trailers parked on-site through the peak heating season in order to meet the 13 on-site storage requirement of a 7-day supply. FEI estimated that the cost of the 56 CNG tube 14 trailers would be approximately \$42 million (\$615 thousand each) in 2015. The cost of the trailers 15 alone is more expensive than the virtual LNG pipeline option. Furthermore, the existing Revelstoke plant does not have sufficient land to accommodate all of the trailers so additional 16 17 land would need to be acquired. For the reasons identified above, the virtual CNG pipeline was 18 considered not feasible.



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1 C. RATES

2	22.0	Reference	e: RATES
3			Exhibit B-2, BCUC IRs 4.2, 9.2.1, 9.5; Exhibit B-4, BSCEA IR 2.11
4			Postage Stamp Rates
5 6		In respons be treated	se to BCUC IR 4.2, FEI stated: "FEI's natural gas and propane customers should as one class of service – the provision of gas."
7 8 9		In respon Revelstok customers	se to BCSEA IR 2.11, FEI stated: "FEI believes that, despite the fact that e is served with a different commodity, the service provided to Revelstoke is indistinguishable from that provided to FEI's natural gas customers."
10 11 12		In respons rates for the the basis of	se to BCUC IR 9.2.1, FEI stated: "FEI believes that the concept of postage stamp he same type of service (the provision of gas) and of not differentiating rates on of location has now been well established"
13 14 15		With respe IR 9.5, FE fuel being	ect to the Bonbright principle of fair apportionment of costs, in response to BCUC I stated that the amalgamation proposal "Does not reflect the cost of the type of consumed at a location."
16 17		22.1 Ple	ease discuss why FEI considers it appropriate that distinct costs associated with rchasing, storing and distributing propane is a 'service' that is indistinguishable

purchasing, storing and distributing propane is a 'service' that is indistinguishable
from that provided to its natural gas customers.

20 Response:

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In FEI's view, the type of fuel delivered, whether propane gas or natural gas, is not what defines its service. Rather, FEI's service is the delivery of energy to its customers, measured in gigajoules, and FEI's customers would be generally indifferent between the type of fuel as long as it provides the same space and water heating characteristics. FEI notes that both types of energy require the same basic purchasing, storage and distribution services and are indistinguishable at the point of consumption by customers.

27 Consistent with this view, the embedded costs of the storage and distribution equipment in 28 Revelstoke and the associated cost of service is recovered from all of FEI's customers in common 29 postage stamp delivery rates. This has been the case since service in Revelstoke began in the 30 early 1990s. Incongruously, propane fuel costs have been differentiated, measured and charged 31 only to Revelstoke customers.

32 Under BCUC Order G-175-14, the differentiated natural gas costs for FEI Mainland, FEI 33 Vancouver Island and FEI Whistler were amalgamated and the approved rate for cost recovery of 34 the amalgamated pooled costs was a postage stamp rate within each sales rate schedule. The 35 effect for any customer was the same rate was applicable to the particular rate schedule FORTIS BC

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regardless of the customer's location (Cranbrook, MacKenzie, Burnaby, Gibsons or anywhereelse in FEI's service territory).

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6 22.2 In FEI's view, please discuss whether it is appropriate to set a rate structure that does not satisfy Bonbright's cost apportionment criteria.

9 **Response:**

In FEI's view, there is today, and have been in the past, circumstances when it is appropriate to set rates and rate structures that do not strictly satisfy Bonbright's cost apportionment criteria. For example, it is generally unusual for rates and rate structures to match the results in an embedded cost study (COSA study). What is typical is that the revenues from the proposed rates would generate sufficient revenue to be within 95 percent to 105 percent of the allocated costs for firm service customers²⁰.

There are also some industrial customers whose rates are based on a competitive alternative of bypassing FEI and connecting directly to Enbridge. These customers' rates have no reference or relationship to the results of embedded cost of service studies. This was established and approved by the BCUC in FEI's predecessor company Inland Natural Gas Co. Ltd.'s 1987 Rate Design.

Further, the delivery rates for seasonal service and interruptible service are based on a value of service concept and are not related to the embedded cost of service studies' results (FEI's 1983 Phase B, 1996, 2001 and 2016 Rate Design applications).

Rate design is a complex balancing process of weighing multiple and sometimes conflicting principles as well as considering the viewpoints from different stakeholders. Different rate design principles may have varying levels of importance in different contexts. Please refer to the response to BCUC IR 1.9.6 for further discussion on the application of the Bonbright principles to this Application.

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- 22.3 Please discuss why postage stamping of rates for all FEI customers including Fort Nelson was not included in this application.
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²⁰ Firm service customers would be residential, commercial, general firm service (FEI's Rate Schedules 5 and 25) and some Large Industrial customers under Rate Schedules 22, 22A and 22B.



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1 Response:

2 Fort Nelson and Revelstoke have different postage stamping requirements. Revelstoke currently 3 has postage stamp delivery rates, but not commodity or midstream rates. In contrast, Fort Nelson 4 does not have any postage stamp rates. Fort Nelson has its own separate rate base and revenue 5 requirement for rate making purposes while Revelstoke is part of the larger FEI rate base and 6 revenue requirement. The two applications would be different, would involve different groups of 7 customers and there would be no efficiencies to be gained from a combined application; in fact, 8 combining the applications would lead to confusion and potential misunderstanding. For the 9 aforementioned reasons FEI did not prepare a single application to postage stamp both 10 Revelstoke and Fort Nelson rates.