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April 30, 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)
FEI Rebuttal Evidence

In accordance with the Regulatory Timetable established in British Columbia Utilities Commission Order G-52-20, attached is FEI's Rebuttal Evidence in respect of the above noted Application.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Doug Slater

cc (email only): Registered Parties

FortisBC Energy Inc.
Revelstoke Propane Portfolio Cost Amalgamation Application

Rebuttal Evidence
of
FortisBC Energy Inc.

April 30, 2020

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1 **Q1: What is the purpose of this Rebuttal Evidence?**

2 A1: The purpose of this Rebuttal Evidence is to respond to the Evidence of Mr. Cornelius
3 Suchy, submitted on behalf of Canadian Biomass Energy Research Ltd. (CBER)¹.

4 The capitalized terms in this Rebuttal Evidence are as defined in the Application. For
5 instance, “FEI” and the terms “FortisBC”, “Utility”, and “Company” refer to FortisBC
6 Energy Inc.

7
8 **Q2: How is this Rebuttal Evidence organized?**

9 A2: This Rebuttal Evidence is organized under the following main topic headings:

- 10 • Correlation between residential use per customer (UPC) and heating degree
11 days (HDDs)
- 12 • Annual bill impacts to FEI’s natural gas customers under Mr. Suchy’s
13 hypothetical scenarios
- 14 • Potential impact to GHG emissions
- 15 • Conclusion

16 **1.0 Correlation between residential UPC and HDDs**

17 **Q3: At paragraph 7 of his evidence, Mr. Suchy states: “According to long-term**
18 **weather normals there are 2,775 heating degree days in Vancouver and 4,611**
19 **heating degree-days in Revelstoke, i.e. 66% more than in Vancouver. A building**
20 **located in Revelstoke should therefore consume 66% more heating energy than**
21 **the same building in Vancouver. If the average dwelling in the area serviced by**
22 **natural gas by Fortis consumes 90 GJ per year, the same building would use 150**
23 **GJ per year in Revelstoke.” Is this statement consistent with FEI’s experience?**

24 A3: No. First, as defined in FEI’s response to BCUC IR1 5.1,² the 90 GJ average
25 consumption figure represents the 10-year average UPC for FEI’s residential customers
26 in service areas that include Lower Mainland, Inland³, Columbia, Vancouver Island, and
27 Whistler. The HDDs in these service areas have ranged from 2,000 to 6,000⁴.
28 Therefore, Mr. Suchy is incorrect in using Vancouver’s HDD of 2,775 with FEI’s 10-year
29 average residential UPC of 90 GJ in his estimation of Revelstoke’s UPC by directly
30 proportioning between residential UPC and HDDs.

¹ Exhibit C1-4.

² Exhibit B-2.

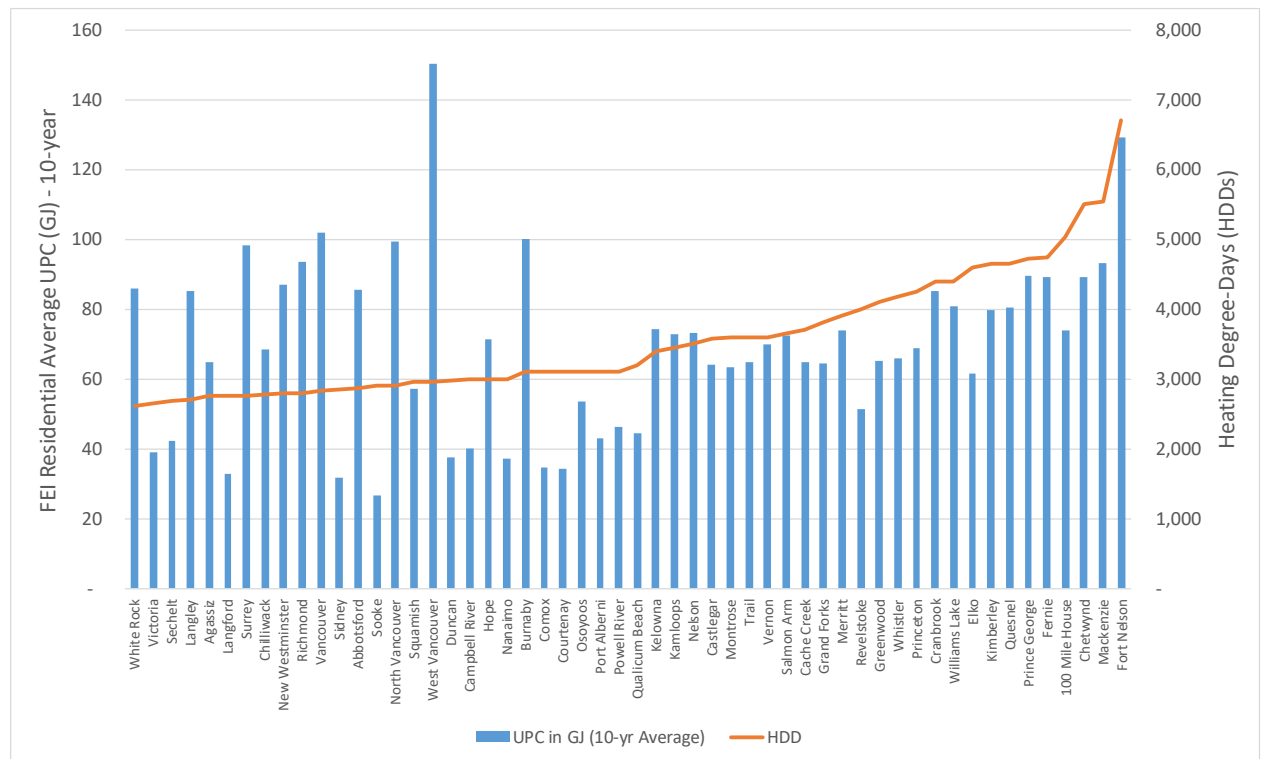
³ Which includes Revelstoke.

⁴ BC Building Code, Appendix C – Division B Climatic and Seismic Information for Building Design in Canada (<http://free.bcpublications.ca/civix/document/id/public/bcbc2012/ex000108>).

Second, there is no supporting evidence from Mr. Suchy that residential energy use is directly proportional to HDDs. As discussed in response to BCUC IR1 5.2.1,⁵ weather is only one of many factors that impact residential energy use. Figure 1 below shows the historical data of FEI's 10-year (2010-2019) average residential UPC and the respective HDDs across 54 cities in FEI's service areas,⁶ and Figure 2 shows the linear regression between the 10-year average residential UPC and HDDs over these 54 cities. The regression demonstrates that only a small portion of the variance in UPC can be explained by differences in HDDs with the coefficient of determination (R^2) between these two variables of approximately 13 percent. This further indicates that the use of HDDs to calculate the residential UPC for Revelstoke is flawed.

It is also important to note that Mr. Suchy's hypothesis of a residential UPC figure of 150 GJ for Revelstoke would be unrealistic when compared against FEI's actual historical data across FEI's service areas as shown in Figure 2 below. Further, Mr. Suchy has not provided any evidence with actual supporting historical data that would suggest Revelstoke would be an outlier when compared against other cities within FEI's service areas.

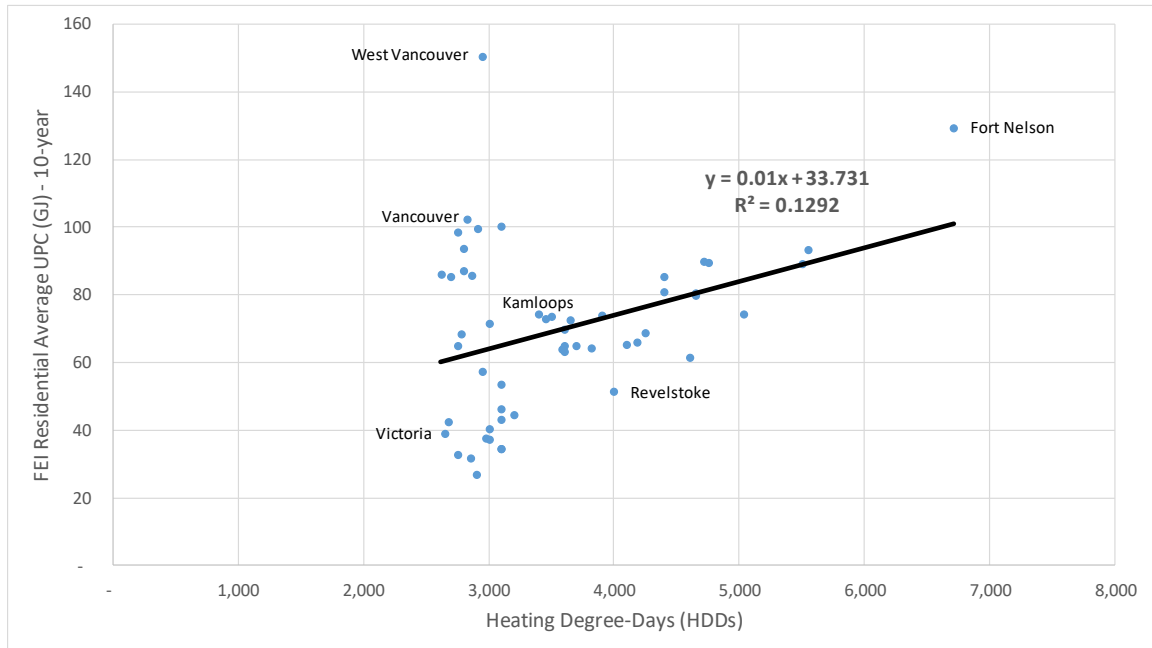
Figure 1 – Average (10-year) Residential UPC and HDD over 54 Cities in FEI's Service Areas



⁵ Exhibit B-2.

⁶ These 54 cities are chosen based on HDDs data available from BC Building Code Appendix C.

Figure 2 – Linear Regression between FEI’s Residential UPC and HDD over 54 Cities in FEI’s Service Areas



2.0 Bill impacts to FEI’s natural gas customers under Mr. Suchy’s hypothetical scenarios

Q4: In Table 4 on page 8 of his evidence, Mr. Suchy prepares an estimation of total residential energy use for heating per dwelling in Revelstoke of 103 GJ using the BC Government’s Community Energy and Emission Inventory (CEEI) from 2012 to 2017⁷. In response to FEI IR1 3.1 to 3.5 and 4.1,⁸ Mr. Suchy provided an Updated Table 4 revising the total residential energy use per dwelling for heating in Revelstoke from 103 GJ to 72 GJ (or 60 GJ in heating load at approximately 83 percent of efficiency). Thereby, Mr. Suchy implies all non-propane energy sources used for heating would convert to propane as a result of FEI’s proposed cost amalgamation, and therefore, the average residential UPC for propane would increase from the current average of 50 GJ to 72 GJ. Under this hypothetical scenario prepared by Mr. Suchy, what would be the average annual bill impact to FEI’s natural gas customers?

A4: Table 1 and Table 2 below show the average midstream rate impact and the average annual bill impact to FEI’s natural gas customers under Mr. Suchy’s hypothetical

⁷ https://www2.gov.bc.ca/assets/gov/environment/climate-change/data/provincial-inventory/2017/utilities_energy_data_2007-2017.xlsx.

⁸ Exhibit C1-9.

1 scenario where the average residential UPC for propane increases from the current
2 average of 50 GJ to 72 GJ. For the purposes of demonstrating the full range of rate and
3 bill impacts, FEI also includes the hypothetical scenario where Revelstoke's residential
4 UPC is 150 GJ as per paragraph 7 of Mr. Suchy's evidence.

5 As demonstrated in Tables 1 and 2 below, even in the extremely unlikely scenario put
6 forward by Mr. Suchy where all non-propane residential heating energy sources convert
7 to propane⁹, and the residential UPC for Revelstoke increases to 72 GJ per year, the bill
8 impact to FEI's natural gas customers remains small at less than \$2 per year for an
9 average FEI natural gas residential customer consuming 90 GJ per year. In the same
10 scenario but where the residential UPC of Revelstoke increases to 150 GJ per year¹⁰,
11 the bill impact to FEI's natural gas customers remains small at less than \$3 per year for
12 an average FEI natural gas residential customer.

13 FEI also notes that the updated version of Table 4 provided by Mr. Suchy in response to
14 FEI's IR1 4.1 is no longer based on the BC CEEI data. Rather, the updated version of
15 Table 4 is based on new methodologies and assumptions for which FEI does not have
16 quantifiable data to verify. Nonetheless, FEI's rate and bill impacts analysis shown in
17 Table 1 and Table 2 demonstrate that the impact to FEI's natural gas customers remains
18 small under Mr. Suchy's various hypothetical scenarios.

⁹ As implied by Mr. Suchy's evidence.

¹⁰ This is equivalent to an increase of 200 percent from the current average UPC of 50 GJ for Revelstoke. As shown in Figure 2 of this Rebuttal Evidence above, an UPC figure of 150 GJ is not a realistic UPC when compared against FEI's actual historical UPCs within FEI's service areas.

Table 1 – Average Midstream Rate Impact to FEI's Natural Gas Customers under Mr. Suchy's Hypothetical Scenarios

Line	Particular	Reference	Revelstoke Residential UPC @ 72 GJ/yr (Mr. Suchy Updated Table 4 to FEI's IR1 4.1)	Revelstoke Residential UPC @ 150 GJ/yr (Mr. Suchy Evidence - Directly Proportional with HDD)
1	Estimated FEI Revelstoke Propane Costs (\$000s)	See note 1	3,744	6,233
2	Estimated Propane recovery via Commodity Recovery Charge (\$000s)	See note 2	(625)	(1,040)
3	Total Propane Costs transfer to FEI MCRA (\$000s)	Line 1 + Line 2	3,119	5,193
4				
5	FEI Natural Gas Total Midstream Costs (\$000s)	See note 3	149,526	149,526
6	FEI MCRA Amortization (\$000s)	See note 4	13,907	13,907
7	TOTAL Natural Gas Midstream Costs (incl. MCRA Amortization)	Line 5 + Line 6	163,433	163,433
8				
9	Revelstoke Propane Demand Forecast (2020F) - TJ			
10	Residential (RS 1)		250	518
11	Small Commercial (RS 2)		85	85
12	Large Commercial (RS 3)		68	68
13	Total Revelstoke Propane Demand - TJ		403	671
14				
15	Revelstoke Propane Demand - TJ	Line 13	403	671
16	FEI MCRA Demand (Natural Gas Only) - TJ		138,206	138,206
17	TOTAL Demand (Natural Gas & Propane) - TJ	Line 15 + Line 16	138,609	138,878
18				
19	Average Midstream Rate - Natural Gas Only (\$/GJ)	Line 7 / Line 16	1.183	1.183
20	Average Midstream Rate - Natural Gas & Propane (\$/GJ)	(Line 3 + Line 7) / Line 17	1.202	1.214
21				
22	Average Midstream Rate Impact to FEI's Customer (\$/GJ)	Line 20 - Line 19	0.019	0.032
23	% Average Midstream Rate Impact to FEI's Customer	Line 22 / Line 19	1.61%	2.71%
24				
25	FEI Natural Gas Residential UPC	GJ/yr	90	90
26	Bill Impact (\$)	Line 25 x Line 22	\$ 1.71	\$ 2.88

1 - Forecast Jan to Dec 2020 based on FEI Revelstoke 2019 Q2 Gas Cost Report

2 - Assumed Commodity Cost Recovery Charge of \$1.549 per GJ (Eff. Jan 1, 2019) plus Propane Premium Multiplier

3 - Forecast Jan to Dec 2020 based on FEI 2019 Q2 Gas Cost Report, exclude T-Service UAF

4 - Forecast as of Jan 1, 2020 based on FEI 2019 Q2 Gas Cost Report (1/2 of Pre-Tax Amortization MCRA Deficit/(Surplus)

Table 2 – Average Annual Bill Impact to FEI's Natural Gas Customers under Mr. Suchy's Hypothetical Scenarios

Average Annual Bill Impact (\$)				
Rate Schedule	Average UPC (GJ)	Revelstoke Residential UPC @ 150 GJ/yr (Mr. Suchy Evidence - Directly Proportional with HDD)		
		Revelstoke Residential UPC @ 72 GJ/yr (Mr. Suchy Updated Table 4 to FEI's IR1 4.1)		
<u>FEI's Mainland and Vancouver Island (Natural Gas)</u>				
Rate Schedule 1 - Residential Service	90	\$	1.71	\$ 2.88
Rate Schedule 2 - Small Commerical	340	\$	6.38	\$ 10.80
Rate Schedule 3 - Large Commerical	3,770	\$	60.11	\$ 101.58

3.0 Potential impact to GHG emissions

Q5: At paragraph 16 of his evidence, Mr. Suchy states that GHG emissions will “go up by 46% if all Revelstoke heat energy were provided by propane” and provides a calculation in Table 5 on page 9 of his evidence. In response to BCUC IR1 1.6.1,¹¹ Mr. Suchy provided an Updated Table 5 revising the impact to be 79%. Are Mr. Suchy’s assumptions consistent with FEI’s experience?

A5: No. Mr. Suchy assumes that all residential buildings currently using heating sources other than propane will be converted to propane as a result of FEI’s proposed cost amalgamation. This assumption is flawed as it ignores the financial and technical challenges associated with conversions, as well as customers’ individual preferences and circumstances.

In Table 3 below, FEI calculates the annual cost savings and simple payback period for each type of conversion to a propane furnace using the capital cost estimates provided in Table 2 of Mr. Suchy’s evidence and the effective rates per GJ of heat for various fuel types in Revelstoke as provided in Table 1 of Mr. Suchy’s evidence.

From a financial perspective, Table 3 below demonstrates that certain types of conversions provide no operating cost savings (e.g., air-source heat pump, cordwood, and RCEC¹²) while others provide a payback period that is much longer than the estimated life of the propane furnace (e.g., wood pellets). Based on this data, FEI does not believe Mr. Suchy’s assertion relating to conversions and associated GHG emissions is correct. Rather, the data suggests that conversion activity will be limited by a lack of savings or long payback periods or both.

¹¹ Exhibit C1-6.

¹² All have average effective rates for heat that are lower than FEI’s proposed propane rate.

Table 3 – Annual Cost Savings and Simple Payback Period of each Conversion Type

Line	Particulars	Reference	Conversion to Propane Furnace from:					
			Oil Furnace	Air-source Heat pump	Electric heat resistance	Cordwood	Wood Pellets	RCEC
1	Equipment Cost	Mr. Suchy Evidence, Table 2, Propane Furnace	\$ 4,400	\$ 4,400	\$ 4,400	\$ 4,400	\$ 4,400	\$ 4,400
2	Installation Cost	Mr. Suchy Evidence, Table 2, Propane Furnace	1,000	1,000	1,000	1,000	1,000	1,000
3	Oil Tank Removal	Mr. Suchy Evidence, Table 2, Propane Furnace	1,475	-	-	-	-	-
4	Other Conversion Costs	Mr. Suchy Evidence, Table 2, Propane Furnace	1,150	1,150	1,150	1,150	1,150	1,150
5	Service Line Costs	\$15; Assuming less than 30 meters of FEI's Main	15	15	15	15	15	15
6	Total Capital	Sum of Line 1 to Line 5	\$ 8,040	\$ 6,565	\$ 6,565	\$ 6,565	\$ 6,565	\$ 6,565
7								
8	Annual Energy Consumption (GJ)	FEI's Revelstoke RS 1 UPC	50	50	50	50	50	50
9	Assumed Propane Appliance Efficiency		80%	80%	80%	80%	80%	80%
10	Annual Heating Demand (GJ)	Line 8 x Line 9	40	40	40	40	40	40
11								
12	Original Fuel - \$ per GJ of Heating Load	Mr. Suchy Evidence, Table 1	41.50	14.70	37.80	16.20	24.80	17.60
13	Original Fuel - Annual Heating Bill	Line 10 x Line 12	\$ 1,660	\$ 588	\$ 1,512	\$ 648	\$ 992	\$ 704
14								
15	Effective Propane Residential Rate - \$ per GJ of Heating Load	Mr. Suchy Evidence, Table 1	\$ 18.30	\$ 18.30	\$ 18.30	\$ 18.30	\$ 18.30	\$ 18.30
16	Propane - Annual Heating Bill	Line 10 x Line 15	732	732	732	732	732	732
17								
18	Annual Savings (\$)	Line 13 - Line 16	\$ 928	\$ (144)	\$ 780	\$ (84)	\$ 260	\$ (28)
19	Simple Payback (yrs)	Line 6 / Line 18	9	(46)	8	(78)	25	(234)

Further, from a technical perspective, Mr. Suchy's analysis ignores the capital cost and difficulty associated with conversion from electric resistance heat where it is necessary to retrofit ductwork for a new forced-air propane furnace. As such, FEI believes the likelihood that reduced propane prices will encourage customers to switch from electric to propane heating is low given the renovation work required to install the necessary ductwork of a new forced-air propane heating system¹³. As discussed in response to BCUC IR2 17.4,¹⁴ the price of the commodity is only one of the many factors that influence a customer's decision to convert from electric to propane end uses.

Based on Table 3 of this rebuttal evidence and the discussion above related to electric resistance heating, FEI believes the only likely fuel source that will convert to propane is heating oil given the savings in annual operating costs as well as other non-economic factors related to heating oil as discussed in FEI's response to BCUC IR2 16.5.

4.0 Conclusion

Q6: Does this conclude FEI's Rebuttal Evidence?

A6: Yes

¹³ Electric baseboard is not a forced-air heating system therefore does not have ductwork.

¹⁴ Exhibit B-7.