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June 2, 2020

B.C. Sustainable Energy Association
c/o William J. Andrews, Barrister & Solicitor
1958 Parkside Lane
North Vancouver, B.C.
V7G 1X5

Attention: Mr. William J. Andrews

Dear Mr. Andrews:

Re: FortisBC Energy Inc. (FEI)
Project No. 1599033
Revelstoke Propane Portfolio Amalgamation Application (the Application)
Response to the B.C. Sustainable Energy Association and Sierra Club of British Columbia (BCSEA) Information Request (IR) No. 3 on Rebuttal Evidence

On July 18, 2019, FEI filed the Application referenced above. In accordance with the Regulatory Timetable established by British Columbia Utilities Commission Order G-105-20 for the review of the Application, FEI respectfully submits the attached response to BCSEA IR No. 3 on Rebuttal Evidence.

If further information is required, please contact the undersigned.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Doug Slater

Attachments

cc (email only): Commission Secretary
Registered Parties

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1 **20.0 Topic: Correlation between residential UPC and HDDs**

2 **Reference: Exhibit B-15, FEI Rebuttal Evidence, Figure 1 – Average (10-year)**
3 **Residential UPC and HDD over 54 Cities in FEI’s Service Areas;**
4 **Figure 2 – Linear Regression between FEI’s Residential UPC and**
5 **HDD over 54 Cities in FEI’s Service Areas**

6 On page 1 of its rebuttal evidence FEI quotes from paragraph 7 of Mr. Suchy’s evidence:
7 “A building located in Revelstoke should therefore consume 66% more heating energy
8 than the same building in Vancouver.” [underline added]

9 20.1 Would FEI agree that comparing heating energy usage between Vancouver and
10 Revelstoke for “the same building” controls for other factors such as building
11 size, insulation, number of residents, hot tub, swimming pool, outdoor patio
12 heating, etc.?

13
14 **Response:**

15 FEI agrees that, if the “same building” had all of the same factors as listed in the question
16 (which would be very difficult to find in reality), this would control for those factors only. As
17 discussed in the responses to BCUC IR1 5.2.1 and 6.1, there are a number of other factors that
18 influence energy use that must be accounted for.

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23 On page 2 of its rebuttal evidence, FEI states, “there is no supporting evidence from Mr.
24 Suchy that residential energy use is directly proportional to HDDs.”

25 20.2 Would FEI agree that Mr. Suchy’s evidence does not state that “residential
26 energy use is directly proportional to HDDs,” but states (or implies) that
27 residential heating energy use for the same building is proportional to HDDs?
28

29 **Response:**

30 Although Mr. Suchy did not use those words specifically (i.e. residential energy use is directly
31 proportional to HDDs), he did use this assumption in developing his evidence. Paragraph 7 of
32 Mr. Suchy’s evidence contain his calculations which are premised on a directly proportional
33 relationship between energy use and HDD. Specifically, Mr. Suchy uses the average residential
34 UPC of 90 GJ for FEI’s natural gas customers (including both heating and non-heating load) to
35 calculate, through direct proportion, a UPC of 150 GJ per year for Revelstoke. FEI’s rebuttal
36 evidence demonstrates that, based on FEI’s actual historic data, Mr. Suchy’s assumption is

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1 flawed as the weak correlation of UPC (heating and non-heating) per HDD for different cities
2 demonstrates that there are factors other than HDD that affect UPC.

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6 20.3 Setting aside what evidence is or is not included in Mr. Suchy's filed evidence,
7 and setting aside the term "directly proportional," does FEI agree that residential
8 heating energy use is positively correlated with HDDs?

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10 **Response:**

11 FEI agrees that residential heating energy use is positively correlated with HDDs; however,
12 there is a weak correlation of UPC per HDD between different cities and/or regions. Please
13 refer to the response to BCUC IR3 23.3 and BCSEA IR3 20.10 for the correlation analysis
14 relating to the Interior, Lower Mainland and Vancouver Island regions. This evidence
15 demonstrates that the weak correlation means there are factors other than HDD that explain the
16 majority of the variances in UPC between different cities and/or regions.

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20 20.4 Does FEI disagree with Mr. Suchy's evidence (a) that FEI's piped propane
21 customers in Revelstoke also use cordwood, wood pellets and other sources of
22 energy for home heating; and (b) that they do so to a larger extent than FEI's
23 natural gas customers whose average Residential UPC of natural gas is roughly
24 90 GJ/y?

25

26 **Response:**

27 With respect to (a), FEI has no direct evidence, but anecdotally understands that that some
28 customers in Revelstoke use wood and other sources of energy for home heating.

29 With respect to (b), FEI does not collect information related to alternate energy use from its
30 customers, including those in Revelstoke. However, the BC CEEI data¹ (please see the 2017
31 table, below) shows that Revelstoke uses a higher proportion of alternative fuels (wood, heating
32 oil, and bottled propane) than the average use in the rest of FEI's service area, consistent with
33 FEI's anecdotal information.

34 Please refer to the responses to BCUC IR1 5.2.1 and 6.1 for a discussion of other factors that
35 affect UPC.

¹ https://www2.gov.bc.ca/assets/gov/environment/climate-change/data/provincial-inventory/2017/utilities_energy_data_2007-2017.xlsx



BC CEEI (2017)	Average Residential UPC (GJ)	Electricity (%)	Gas (NG or Propane) (%)	Alternative Fuel (Oil, Wood, Distributed Propane) (%)	Total
Average of FEI's Service Areas	90	41%	52%	7%	100%
Revelstoke	51	58%	27%	14%	100%
Vancouver	102	39%	61%	0%	100%
Kamloops	73	27%	73%	0%	100%
Victoria	39	45%	39%	16%	100%
Salmon Arm	72	49%	42%	9%	100%
Osoyoos	53	63%	26%	11%	100%

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20.5 Does FEI acknowledge that both Figure 1 and Figure 2 of the rebuttal evidence define Residential UPC (10-year average) in terms of natural gas or piped propane delivered by FEI and not in terms of the total of all energy sources used for home heating?

Response:

Confirmed. FEI does not have use rate data for other alternative energy sources or a breakdown between heating and non-heating loads.

20.6 Please confirm that "Figure 1 – Average (10-year) Residential UPC and HDD over 54 Cities in FEI's Service Areas" shows 54 cities arranged from lowest heating degree days on the left to highest heating degree days on the right, as indicated by observing that the red line for HDD appears to be level or climb from left to right.

Response:

Confirmed.

20.7 Would FEI agree with the observation that all the cities on Vancouver Island and in the Lower Mainland (including, or plus, Sechelt and Powell River), on the left of

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1 the figure, have heating degree days ranging from about 2700 to about 3000 (per
2 year), a relatively narrow range of about 300 HDDs?
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4 **Response:**

5 Agreed. FEI adds that it chose the 54 cities based on the availability of HDD data from BC
6 Building Code Appendix C² for communities within FEI's service area.
7
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10 20.8 Would FEI agree that all the cities in the Interior, on the right of the figure, have
11 HDDS ranging from about 3100 to about 6800 (per year), a relatively broad
12 range of about 3700 HDDs?
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14 **Response:**

15 Confirmed.
16
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19 20.9 Would FEI agree that for the cities on Vancouver Island and in the Lower
20 Mainland there is a marked differentiation, unrelated to HDDs, in that the all the
21 cities on Vancouver Island have Residential UPCs of less than 40 GJ/y (except
22 for Port Alberni and Qualicum Beach, which have UPCs of just over 40 GJ/y),
23 and all the cities in the Lower Mainland have Residential UPCs greater than 60
24 GJ/y (except for Sechelt and Power River)?
25

26 **Response:**

27 Confirmed. The highest 10-year average residential UPC of FEI's Vancouver Island region is
28 46 GJ (Powell River³) and the lowest 10-year average residential UPC of FEI's Lower Mainland
29 region is 65 GJ (Agassiz).
30
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33 20.10 Would FEI agree that for the cities on Vancouver Island and in the Lower
34 Mainland, separately or together, there is no apparent correlation between

² Table C-2 of BC Building Code, Appendix C,
<http://free.bcpublications.ca/civix/document/id/public/bcbc2012/ex000108>.

³ Sunshine Coast (including Powell River) is part of FEI's Vancouver Island region prior to the amalgamation of FEI and FEVI.

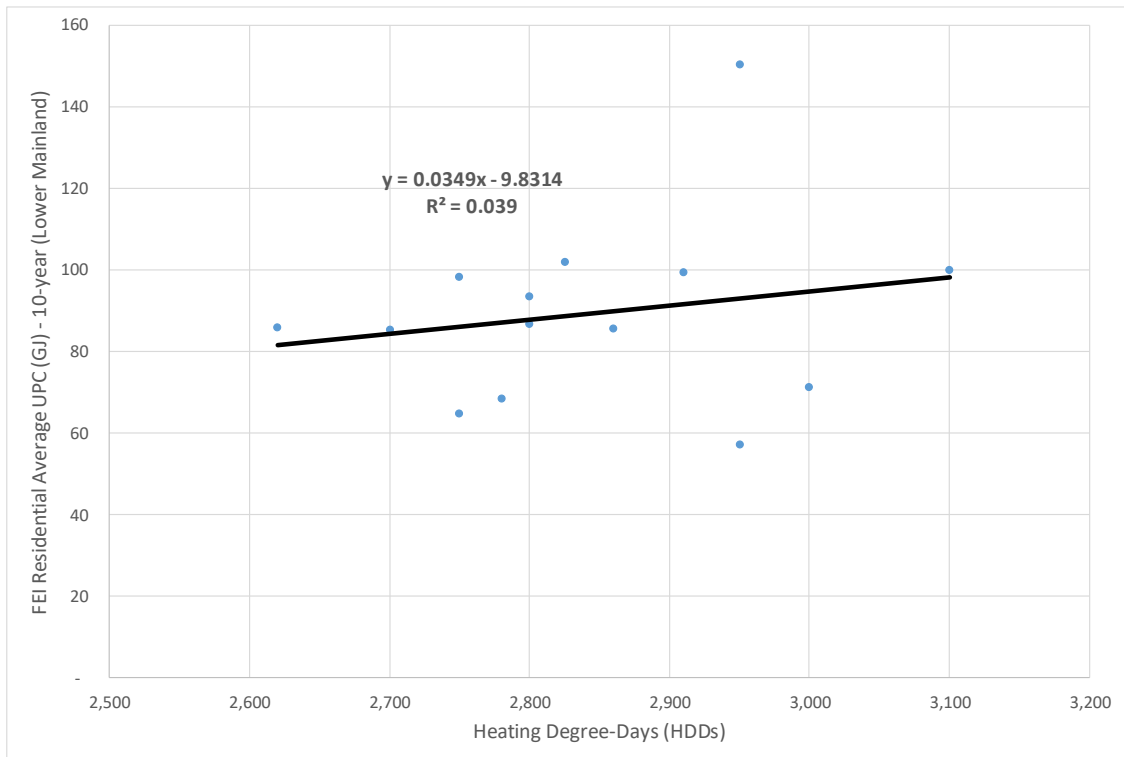
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1 Residential UPC and the number of HDDs within the relatively narrow range of
 2 HDDs?

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 4 **Response:**

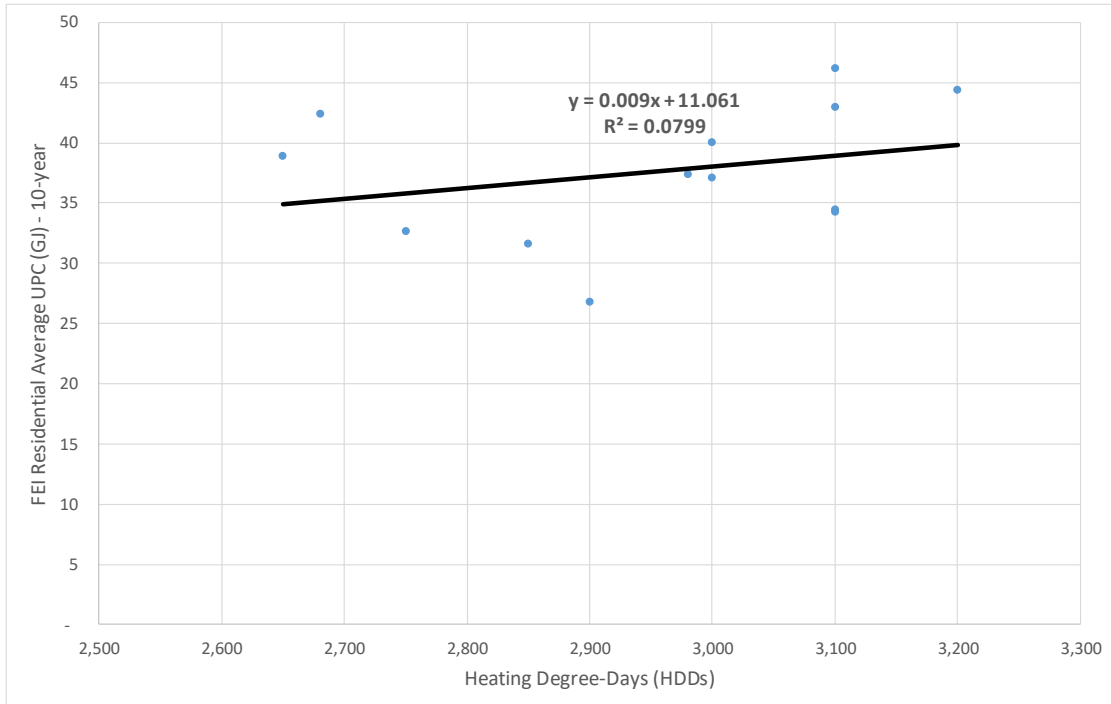
5 Yes. Please see Figure 1 and Figure 2 below for a regression analysis of UPC per HDD for the
 6 Lower Mainland and Vancouver Island, respectively. The coefficient of determination (R^2) of the
 7 regression analysis is approximately 4 percent and 8 percent, respectively. Based on the
 8 regression analysis, it is reasonable to assume there is no apparent correlation of FEI's
 9 residential UPC per HDD between the different cities within FEI's Lower Mainland region or
 10 within FEI's Vancouver Island region. As noted by BCSEA in IR3 20.7, the range of HDDs for
 11 Lower Mainland and Vancouver Island is relatively narrow; it is therefore not surprising that
 12 there is no apparent correlation of UPC per HDD between different cities within these regions.

13 **Figure 1: Regression Analysis of residential UPC per HDDs for FEI's Lower Mainland Region**



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1 **Figure 2: Regression Analysis of residential UPC per HDDs for FEI's Vancouver Island Region**



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20.11 Would FEI agree that for all the cities (and towns) in the Interior, Figure 1 indicates a positive correlation between Residential UPC and HDDs over a wide range of HDDs?

Response:

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Please refer to the response to BCUC IR3 23.3 which shows the regression analysis of FEI's residential UPC per HDDs for the Inland and Columbia regions. The correlation includes a coefficient of determination (R^2) of 48.25 percent.

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As confirmed in the response to BCSEA's question in IR3 20.8, the range of HDDs within the Interior region is much wider than Lower Mainland or Vancouver Island. Therefore, it is expected that the correlation of UPC per HDD between different cities within the Interior Region would be better than the Lower Mainland and Vancouver Island (please also refer to the response to BCSEA IR3 20.10). However, an R^2 of 48.25 percent suggests that approximately half of the variation in UPC is explained by factors other than HDD. Therefore, regardless of whether the regression analysis is completed for all regions within FEI's service areas or for each region individually, the majority of variations in UPC are explained by factors other than HDD.



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20.12 Please provide a revised version of Figure 2 showing the results of a linear regression of the Interior cities Residential UPC (10-year average) against HDDs.

Response:

Please refer to the response to BCUC IR3 23.3.

FEI states, "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." [p.2]

20.13 Would FEI agree that Figure 1 and Figure 2 provide evidence that Revelstoke is an outlier in terms of Residential UPC (10-year average) for piped propane in relation to HDDs when compared against other cities within FEI's service areas?

Response:

FEI does not agree. FEI's analysis in the response to BCUC IR3 23.3.2 shows that Revelstoke is statistically neither an outlier across all 54 cities across FEI's service areas nor an outlier across cities within the Interior Region (including the Inland and Columbia regions) using the Grubbs' Test for outliers.



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1 **21.0 Topic: Bill impacts under hypothetical scenarios**

2 **Reference: Exhibit B-15, FEI Rebuttal Evidence, pp.3-5**

3 On line 22 of Table 1 of the rebuttal evidence, FEI provides Average Midstream Rate
4 Impact to FEI's Customers (\$/GJ) of 0.019 and 0.032, for the 72 GJ/y scenario and the
5 150 GJ/y scenario respectively.

6 21.1 Please provide a table showing the total average midstream revenue recovery
7 impact to FEI's customers for the 72 GJ/y scenario and the 150 GJ/y scenario.
8 To clarify, the request is for total \$ as distinct from \$/GJ.
9

10 **Response:**

11 FEI provides the following information regarding the total average bill (\$) impact to FEI's natural
12 gas customers for the 72 GJ/yr and 150 GJ/yr scenarios from Table 2 of FEI's rebuttal evidence.

Rate Schedule	Average UPC (GJ)	Average Annual Bill Impact (\$)			
		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)	
Revelstoke Customers (Propane)					
Rate Schedule 1 - Residential Service	50	\$ 407	(45%)	\$ 406	(45%)
Rate Schedule 2 - Small Commerical	300	\$ 2,114	(49%)	\$ 2,110	(49%)
Rate Schedule 3 - Large Commerical	6,650	\$ 48,213	(56%)	\$ 48,139	(55%)
FEI's Mainland and Vancouver Island (Natural Gas)					
Rate Schedule 1 - Residential Service	90	\$ 1.71	0.22%	\$ 2.88	0.36%
Rate Schedule 2 - Small Commerical	340	\$ 6.38	0.26%	\$ 10.80	0.44%
Rate Schedule 3 - Large Commerical	3,770	\$ 60.11	0.27%	\$ 101.58	0.45%

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17 21.2 Please provide a version of Table 5-1 in Exhibit B-1, showing Average Annual Bill
18 Impacts, revised to provide columns for the 72 GJ/y scenario and the 150 GJ/y
19 scenario.
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21 **Response:**

22 Please refer to the response to BCSEA IR3 21.1.

23

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1 **22.0 Topic: Potential impact to GHG emissions**

2 **Reference: Exhibit B-15, FEI Rebuttal Evidence, pp.6-7**

3 On line 19 of Table 3 of the rebuttal evidence, FEI estimates a Simple Payback of 9
4 years for conversion of an Oil Furnace to Propane Furnace. FEI’s conclusion is that “the
5 data suggests that conversion activity will be limited by a lack of savings or long payback
6 periods or both.” [p.6]

7 22.1 Would FEI agree that a Simple Payback of 9 years for conversion of an Oil
8 Furnace to Propane Furnace, and FEI’s conclusion that “the data suggests that
9 conversion activity will be limited by a lack of savings or long payback periods or
10 both,” make it unlikely that subsidizing the propane rates for Revelstoke
11 customers would encourage other Revelstoke energy users to switch from
12 higher-carbon heating oil to propane?

13
14 **Response:**

15 FEI does not agree that a payback of 9 years alone would render the decision to convert
16 unlikely. Rather, FEI reiterates that a payback of 9 years is one of many considerations (please
17 refer to the response to BCUC IR2 18.4), that a customer would take into account when making
18 a decision of whether to convert from an oil to a propane furnace.