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June 22, 2018

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

Attention: Mr. Christopher P. Weafer

Dear Mr. Weafer:

Re: FortisBC Energy Inc. (FEI)

Project No. 1598946

2017 Long Term Gas Resource Plan (LTGRP) (the Application)

Response to the Commercial Energy Consumers Association of British Columbia (CEC) Information Request (IR) No. 2

On December 14, 2017, FEI filed the Application referenced above. In accordance with British Columbia Utilities Commission Order G-33-18 establishing the Regulatory Timetable for the review of the Application, FEI respectfully submits the attached response to CEC IR No. 2.

If further information is required, please contact Ken Ross at (604) 576-7343.

Sincerely,

FORTISBC ENERGY INC.

Original signed:

Diane Roy

Attachments

cc (email only): Commission Secretary Registered Parties



FortisBC Energy Inc. (FEI or the Company)	Submission Date:
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1 1. Reference: Exhibit B-4, CEC 1.3.1 and 1.7.4

3.1 How are new residential dwellings, commercial floor area and industrial facilities added based on the account growth rates? Please explain.

Response:

FEI consulted with Posterity to provide the following response.

New residential dwellings are added to the end-use model in each forecast year, based on the forecast customer growth rate for the applicable scenario (Section 1.2.1.1 of Appendix B-1 of the Application describes how FEI developed scenario-specific customer forecasts for all sectors). Dwellings are added as whole (not fractional) dwelling units. UPC is based on the evolving fuel shares, appliance saturations, and unit energy consumption, by end use, of the newest vintage of each region's dwellings of each dwelling type.

New commercial customers are added to the model in each forecast year, based on the forecast customer growth rate for each rate class for the applicable scenario. Commercial customers are added as whole (not fractional) buildings. Floor area for the new customers is based on the average floor area for each region's buildings of each commercial building type in each rate class. UPC is based on the evolving fuel shares and consumption per floor area, by end use, for each region's commercial buildings of each building type.

New industrial customers are added to the model in each forecast year, based on the forecast customer growth rate for each rate class for the applicable scenario. Industrial customers are added as whole (not fractional) customers. Consumption for the new customers is based on the evolving fuel shares and existing customer consumption, by end use, for each region's industrial customers of each industrial sub-sector and rate class.

7.4 Please provide the source of information for the 'Residential Building Stock' metric.

Response:

FEI consulted with Posterity to provide the following response.

Residential building stock, for the base year, is based on FEI's data on the number of Rate Schedule 1 customers in 2015. Growth in residential building stock is based on the forecast number of account additions for Rate Schedule 1. Please refer to FEI's response to CEC IR 1.3.1 for an explanation of how residential customers are added throughout the planning horizon.

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- 1.1 Please explain why adding dwellings as a whole, instead of fractional units, is the appropriate measure for forecasting account growth.
- 7 **Response**:
- 8 FEI consulted with Posterity Group Consulting Inc. (Posterity) to provide the following response.



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- 1 Although a dwelling unit may be partially completed at the end of a year, accounts are either on
- 2 FEI's system at the end of a year or not on the system. The analysis within the residential
- 3 sector uses end-use saturation values from the Residential End Use Survey that are in number
- of appliances per dwelling unit and estimates of space heating and water heating consumption
 based on modeled per-dwelling data. The dwelling is thus a natural analytical unit for most of
- 6 the residential end uses, just as the unit of floor area is a natural analytical unit for commercial
- 6 the residential end uses, just as the unit of floor area is a natural analytical7 buildings.



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1 2. Reference: Exhibit B-4, CEC 1.4.2 and 1.5.1.1





Note that residential and commercial demand is normalized prior to being used in either the Traditional or End Use method. As a result the forecast also assumes normal weather. Plotting actual data against the forecast is not recommended but shown here in an effort to be responsive to this question.

Climate change	FEI considered analyzing the impact of climate change on outdoor air temperature but did not include this uncertainty because the FBC 2016 Long Term Electric Resource Plan analyzed this critical uncertainty and found its impact to be
	immaterial.

2

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- 2.1 Please provide a brief description of FEI's weather normalization processes and include the period of time over which any average temperatures are determined.
- 4 5
- 6 **Response:**
- 7 Separate normalization factors are developed for each region, rate schedule and month.

8 The normalization factor is derived from a non-linear regression model that estimates the impact

- 9 of the prior year's monthly weather on the load. As the relationship between weather and the
- 10 usage is not linear, FEI considers three non-linear models that are often used when modeling



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- 1 weather impact. One is based on the Gompertz distribution (the "Gompertz" model). The other
- 2 two methods are variants based on the logit formulation with one (Logit-4) allowing for an 3 additional parameter for optimal fitting. The models are:
- 4 Gompertz

Estimated Monthly UPC =
$$A \times e^{(-e^{-B \times (Avg.MonthlyTemp.-C))}}$$

5 6 Logit-3

Estimated Monthly UPC =
$$\frac{A}{1 + B \times e^{(-C \times Temp)}}$$

8 Logit-4

Estimated Monthly UPC = $\frac{(D + (A - D))}{1 + B \times e^{(-C \times Temp)}}$

9

7

10 where A/B/C/D = are curve fitting parameters.

11 "e" is the natural logarithm base (Euler's number).

12 The A/B/C/D curve fitting parameters are estimated through a least square method to minimize

13 the sum of squared error (SSE). The optimization process to minimize the SSE is done using 14 the Solver tool in Microsoft Excel.

The three non-linear models are tested to see which provides the best fit for each rate class by region. The heat sensitivity estimated from the model assumes that the sensitivity varies not only depending on the weather but also on the rate class. For example, the residential rate schedule shows higher sensitivity to weather compared to the commercial rate schedules, and FEI's normalization method accounts for this difference.

The following example is reprinted from the FEI Annual Review for 2016 Rates Appendix A3 section 2.4 and was used to develop the parameters for Lower Mainland Rate Schedule 1 for 2014.



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1	2	3	4	5		
Date	Avg Daily	Actual	Est. Act.	SSE		
	Temp	Use Rate	UPC			
1/1/2013	2.74	16.29	16.14	0.02		
2/1/2013	5.51	11.80	12.56	0.59		
3/1/2013	7.19	10.96	10.56	0.16		
4/1/2013	9.49	7.68	8.12	0.20		
5/1/2013	13.24	4.71	5.04	0.11		
6/1/2013	16.31	3.19	3.29	0.01		
7/1/2013	18.26	2.70	2.49	0.04		
8/1/2013	18.56	2.63	2.38	0.06		
9/1/2013	15.61	3.34	3.64	0.09		
10/1/2013	9.25	7.78	8.36	0.34		
11/1/2013	6.15	11.21	11.79	0.33		
12/1/2013	2.32	16.07	16.70	0.40		

Table 1: LML Rate Schedule 1 Parameters

2

For each month (column 1), the average daily temperature is recorded as well as the actual use
 rate (columns 2 and 3). Excel Solver then runs iterations and changes the A/B/C parameters in

5 the three models to calculate the estimated actual UPC in column 4. The SSE between the

6 actual recorded UPC in column 3 and the estimated UPC in column 4 is calculated and shown

7 in column 5. For example, in the case of 1/1/2013 the SSE is calculated as:

8 SSE = $(16.29 - 16.14)^2 = 0.02$

9 Excel Solver runs many iterations to develop the set of parameters that minimizes the SSE. The10 model with the lowest SSE is then used for the rate schedule being tested.

11 Once the parameters are known the model is able to predict monthly UPC values, given 12 monthly temperatures. FEI then uses 10-year average temperatures and 2014 actual 13 temperatures to develop two estimated 2014 UPCs. The ratio of the estimated UPCs is the 14 normalization factor.

Continuing with the above example Excel Solver was used to develop parameters for the Logit-3 model for Lower Mainland Rate Schedule 1 as follows:

17

Table 2: LML Rate Schedule 1 Logit-3 Model Parameters

Α	33.535874
В	0.699134
С	-0.157911

18

19 The 2014 temperature inputs into the model are as follows:



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Table 3: 2014 Temperature Inputs

10 Year Average January	4
Daily Temperature,	
(degrees C)	
2014 Average January	4.3
Daily Temperature	
(degrees C)	

2 3

Using the Logit-3 model and the above data results in the following estimated UPCs:

4

Table 4: Estimated Monthly UPCs

Estimated Monthly UPC	14.487
based on 10 Year Normal	
January Weather (GJs)	
Estimated UPC based on	14.099
2014 actual January	
weather (GJs)	

5

6 The January 2014 Lower Mainland Rate Schedule 1 normalization factor is the ratio of these 7 two estimated UPC values:

8

January 2014 Lower Mainland Rate Schedule 1 Normalization Factor
$$=$$
 $\frac{14.099}{14.487} = 0.97$

9 The recorded actual UPC for January 1 2014 Lower Mainland Rate Schedule 1 was 13.725 10 GJs. The normalized UPC for January 2014 Lower Mainland Rate Schedule 1 is then:

January 2014 Lower Mainland Rate Schedule 1 Normalized UPC = $\frac{13.725}{0.97}$ = 14.143 GJ

12 Similar calculations are performed for all residential and commercial rate schedules for all 13 regions to generate monthly normalization factors. The 2014 table of Normalization Factors is:

14

11

Table 5: 2014 Normalization Factors

	UNL					1	NL		COL			RSK			VI			WH			
	RATEL	RATE2	RATES	RATE23	RATE1	RATE2	RATES	RATE23	RATE1	RATE2	RATES	RATE23	RATE1	RATE2	RATES	RATE1	RATE2	RATES	RATEL	RATE2	RATES
Jan	0.97	0.97	0.98	0.98	0.91	0.89	0.92	0.95	0.97	0.97	0.97	0.97	0.92	0.91	0.94	0.95	0.95	0.95	0.89	0.89	0.89
Feb	1.25	1.26	1.18	1.16	1.27	1.36	1.27	1.14	1.30	1.31	1.27	1.24	1.22	1.24	1.17	1.22	1.22	1.22	1.21	1.21	1.21
Mar	1.00	1.00	1.00	1.00	1.17	1.18	1.13	1.11	1.09	1.10	1.08	1.06	1.15	1.13	1.08	1.01	1.01	1.01	1.06	1.06	1.06
Apr	0.93	0.93	0.95	0.94	1.02	1.02	1.01	1.02	1.01	1.01	1.01	1.01	1.07	1.05	1.04	0.93	0.93	0.93	1.04	1.04	1.04
May	0.83	0.84	0.87	0.86	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.06	1.04	1.03	0.81	0.81	0.81	0.86	0.86	0.86
Jun	1.02	1.02	1.01	1.01	1.01	1.02	1.01	1.02	1.00	1.00	1.00	1.00	0.98	0.98	0.99	0.96	0.96	0.96	0.96	0.96	0.96
Jul	0.92	0.93	0.94	0.93	0.93	0.87	0.90	0.85	0.77	0.76	0.81	0.79	0.78	0.83	0.84	0.92	0.92	0.92	0.89	0.89	0.89
Aug	0.88	0.89	0.91	0.89	0.94	0.89	0.92	0.88	0.93	0.93	0.94	0.94	0.83	0.87	0.88	0.90	0.90	0.90	0.74	0.74	0.74
Sep	0.90	0.90	0.92	0.91	0.99	0.99	0.99	0.99	1.03	1.03	1.03	1.02	0.94	0.96	0.97	0.85	0.85	0.85	0.83	0.83	0.83
Oct	0.70	0.71	0.77	0.75	0.75	0.74	0.81	0.78	0.77	0.76	0.81	0.85	0.75	0.80	0.87	0.75	0.75	0.75	0.78	0.78	0.78
Nov	1.06	1.06	1.04	1.04	1.12	1.13	1.09	1.07	1.17	1.18	1.14	1.12	1.08	1.07	1.05	0.99	0.99	0.99	1.06	1.06	1.06
Dec	0.89	0.89	0.92	0.93	0.89	0.88	0.90	0.94	0.97	0.97	0.97	0.98	0.99	0.99	0.99	0.89	0.89	0.89	0.98	0.98	0.98

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A similar table is developed for each year. The normalization factors are applied to the monthly
 use rates by rate class and region to establish the normalized use rates used for forecasting.

FORTIS BC

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2.2 Are traditional weather normalization practices becoming less useful given increased climate variability? Please explain.

Bec

7 <u>Response:</u>

8 No, FEI has no evidence that normalization practices are becoming less useful or if there is 9 increased climate variability.

The following chart illustrates how normalization smooths out abrupt changes in actualresidential consumption in the Lower Mainland.

Figure 1: Lower Mainland Rate 1 UPC Actual vs Normalized



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1 2		2.2.1 If yes, how does FEI account, or intend to accound climate variability in its demand forecasts.	nt, for increased
3			
4	<u>Response:</u>		
5	Please refer	to the response to CEC IR 2.2.2.	
6			
7			
8			
9	2.3	Please provide FEI's comments on the document by Scott Made	den Management
10		Consultants 'Are Traditional Weather Normalization Practices U	sed by Utilities in
11		the Ratemaking Process Appropriate Given Increased Climate	Variability'. The
12		document is found at: https://www.scottmadden.com/insight/tra	aditional-weather-
13		normalization-practices-used-utilities-ratemaking-process-appropro-	oriate-given-
14		increased-climate-variability/	
15			
16	<u>Response:</u>		
17	FEI is not fa	amiliar with the Scott Madden Management Consultants Report of	cited and has no

18 comments to present in response to this request.



3. 1 **Reference:** Exhibit B-4, CEC 1.15.4 and 1.15.5 and Exhibit B-2, BCUC 1.19.4

What actions, if any, could FEI take to maximize RNG sales under the Lower 15.4 Bound circumstances.

Response:

FEI has taken a number steps to increase demand and is seeing increased interest from customers. With Commission approval, FEI lowered the price for customers to purchase RNG. This has already resulted in an increase in demand. FEI has also increased market awareness through an education campaign. Last, FEI engages directly with customers to offer products such as RNG.

> 15.5 What strategy options is FEI considering to enable increased demand for and supply of RNG after 2026.

Response:

FEI has seen customer demand for RNG grow faster than expected over the past year while carrying out its' education efforts. This suggests that there is appetite for RNG. At current customer interest, FEI believes that it has sufficient demand to absorb supply as it comes on to the system.

Government Policy: Under the British Columbia Low Carbon Fuel Requirements Regulation (BC LCFRR), RNG is an ultra-low carbon fuel option for transport consumers. FEI is currently validating the carbon intensity of RNG for the BC LCFRR but based on analyses in other jurisdictions RNG could be up to 90% less carbon intensive than the current transport fuel intensity in the province and would generate more than double the emissions credits compared to compressed natural gas. With recent average credit prices of \$170 per tonne in the BC LCFRR, RNG would be a very attractive option for fleet operators with natural gas vehicles.

Current Price: In 2016 the Commission approved a new lower price for RNG. At the time FEI had put forth an argument that the price was too high for market uptake. Since the time of the price change, FEI has seen a steady increase in the overall number of RNG customers. This suggests to FEI that price was a factor in the slowing uptake.

FEI believes that the demand will more likely continue upward rather than flatten in the future but demand may be constrained by supply.

3

- 4
- 3.1 Please provide quantification in units and percentages of the increase that FEI is seeing in RNG demand over the last 5 years.
- 5 6

7 Response:

- 8 The total RNG customer count has grown from 5,223 as at May 31, 2013, to 9,588 as at May
- 9 31, 2018. This represents an overall increase of 83 percent or a compound annual growth rate
- 10 of 12.92 percent.



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1 RNG demand has grown from approximately 74,846 GJ/yr. in 2013 to approximately 233,100

2 GJ/yr. by the end of 2017. This represents an overall increase of 211 percent or a compound 3 annual growth rate of 26 percent.

4 The growth rates of the customer count and volume do not match since some significant 5 commercial and institutional customers signed up for service between 2013 and 2018. These 6 customers do not add much to the customer count, but can consume a large volume of RNG 7 each.

- 8
- 9
- 10
- 11 3.2 Please elaborate on the steps that FEI has taken to increase demand in addition 12 to price reductions and identify any additional factors that FEI could adjust to 13 increase RNG demand.
- 14

15 Response:

16 FEI encouraged customers to subscribe to its RNG product offering by placing product 17 information and a call to sign up in a number of different channels including FortisBC's 18 webpage, paid media advertisements, events and outreach, FortisBC's Account Online portal, 19 FortisBC newsletters and bill inserts, social media posts, and employee communications. 20 These efforts were targeted at Rate Schedules 1 (Residential) and 2 (Small Commercial) 21 customers.

22 FEI has also continued to engage with large commercial, transportation rate, and natural gas for 23 transportation customers via direct communication with FEI Key Account Managers.

24 FEI has noted growth in demand for its RNG service since late 2016, and does not believe that 25 additional steps need to be taken at present to increase demand.

26

27

- 28
- 29 3.3 Does FEI's demand absorb new supply that comes onto the system or all the 30 supply coming on to the system?
- 31

32 **Response:**

33 FEI interprets "demand absorb new supply" as the ability to readily sell RNG to either new or 34 existing program customers as new RNG supply is brought on to the system, whereas "all the



1 2	supply" refers to any existing unsold supply inventory reflected in the Biomethane Variar Account plus new supply brought onto the system.	ice
3	FEI's demand currently absorbs all RNG supply on the system.	
4 5		
6		
7 8 9	3.4 Does FEI expect that its sales of RNG will ultimately result in a zero balance unsold biomethane in the Biomethane Variance Account (BVA)? Please explain	⊧of n.
10	Response:	
11 12	At December 31, 2017, the BVA had a (notional) negative balance of unsold biomethane deficit, or below zero).	(a
13 14 15	As approved by Order G-210-13, FEI intends to eliminate the December 31, 2017 negat balance of unsold biomethane in the BVA through the purchase of carbon offsets for the amo of the deficit, and will review the future use of carbon offsets for this purpose.	ive unt
16 17		
18		
19 20	3.4.1 If yes, when does FEI expect this to occur?	
21	Response:	
22	Please refer to the response to CEC IR 2.3.4.	
23		



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1 4. Reference: Exhibit B-2, BCUC 1.9.1

On page 53 of Exhibit B-1, FEI states:

Capitalizing on the LNG marine bunkering opportunity is a key part of FEI's strategy to leverage pre-existing Company-owned assets and operational expertise to drive growth in new markets. While the Tilbury LNG facility primarily serves as a winter peaking facility, over time, the facility has also evolved to serve a variety of new LNG markets.

9.1 Please confirm, or otherwise explain, that FEI's strategy involves capitalizing on LNG marine bunkering opportunities with organizations and companies that are not based in BC or do not have operations in BC.

Response:

FEI currently has customers under contract under Rate Schedule 46 (RS46) that are not based in BC that use LNG not only for marine bunkering, but for a variety of end uses in other parts of Western North America and in Asia.

FEI provides LNG through RS46 to customers that satisfy the contracting requirements as outlined in RS46. This means that customers that are eligible to receive LNG dispensing service under RS46 may or may not be based in BC. FEI does not differentiate between BC-based companies and those based outside of BC in terms of LNG supply under RS46.

With respect to the marine bunkering market, the nature and makeup of the LNG bunkering industry means that FEI expects to have customers that are based outside of BC.

3

2

4.1 What, if any, constraints exist for FEI in its ability to differentiate between BCbased companies and those based outside of BC in terms of LNG supply?

4 5

6 **Response:**

FEI sells LNG under Rate Schedule 46 to customers Free on Board (FOB) at the LNG facility.
Once the LNG is sold to a customer, that customer is free to transport the LNG to wherever the
customer requires the LNG for use. Therefore, there is no requirement to differentiate between
BC-based companies and non-BC based companies. LNG is a fungible commodity that can
easily be transported and thus can be provided to both BC-based and non-BC based
customers.



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1 5. Reference: Exhibit B-4, CEC 1.26.1

26.1 Please provide a list and detailed definition of these longer term commodity strategies and purchasing instruments used for gas supply purchase.

Response:

The following are potential alternatives to manage long term (i.e. beyond five years) price risk.

Long Term Hedging

The commodity gas purchases within the ACP are currently generally based on index pricing at the AECO/NIT market hub, which is subject to the price volatility of the natural gas market. An alternative for mitigating this market price volatility over the longer term is using long term fixed price purchases or financial swaps, where the purchase price is locked in at a point in time and does not change for the contract term.

As these types of physical supply arrangements are not commonplace in the market, there is uncertainty regarding how many suppliers may be willing to transact with FEI. Locking in longterm market prices could also be done financially with fixed price swaps. FEI expects that the maximum term for these types of arrangements would be up to ten years based on the liquidity of the AECO/NIT market.

This type of supply arrangement helps manage the risk of higher prices or persistent price volatility that could occur in the future. FEI's gas customers could benefit from the increased stability in commodity rates over the longer term, particularly if market prices rise over time. Therefore, this type of arrangement is effective in meeting the primary price risk management objectives over a longer period. However, long term fixed purchases can result in higher than market costs if market prices move lower after locking in the fixed price. The current environment of low gas market prices near producer break-even costs provides an opportunity to capture low forward market prices that may not last indefinitely.

- 2
- 2
- 3 4
- 5.1 Why are physical supply arrangements of long term fixed price purchases and financial swaps not commonplace in the industry?
- 5

6 Response:

Longer term physical supply arrangements were not commonplace in the industry because of
many gas producers' uncertainty over the availability of supply and costs to produce the gas
over the long term. This has changed in recent years due in large part to the shale gas potential
in North America and the technological efficiencies in extracting it. Therefore, these
transactions may become more commonplace.

- 12 13 14
 - 5.2 What time periods would FEI consider for long term fixed price purchases orfinancial swaps?



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2 Response:

FEI is not seeking approval for transacting long-term fixed price purchases or financial swaps at this time. However, as the above preamble notes, FEI considers such arrangements could be

- 5 10 years or longer in length.
- 6
- 7
- 8

12

5.3 Has FEI identified suppliers who may be willing to transact with FEI, or those who
are definitely unwilling to transact? If so, how many suppliers has FEI identified
as willing or unwilling?

13 **Response:**

The table below provides a list of physical gas producers and marketers and financial institutions that FEI has established either gas physical (EDI) or financial (ISDA) contracts with. FEI has ongoing discussion with these counterparties about different ways to transact supply and can include discussions surrounding long-term supply arrangements (i.e., long-term fixed price purchases or financial swaps). FEI has not received any direct interest in these types of long-term supply arrangements, which is likely due to the current low forward prices at AECO/NIT and Station 2. However, FEI will continue to monitor these developments.



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Gas EDI Counterparty List

Absolute Energy Inc. Access Gas Services Inc. AECO Gas Storage Partnership Aitken Creek Gas Storage ULC(FEI Counterparty) AltaGas Ltd. ARC Resources Ltd. Aux Sable Canada LP, by its GP, Aux Sable Canada Ltd. Avista Corp. Black Swan Energy Ltd. BP Canada Energy Group ULC Canadian Natural Resources Canbriam Energy Inc. Castleton Commodities Merchant Trading LP Chevron Canada Resources CIMA ENERGY, LP Citadel Energy Marketing LLC ConocoPhillips Canada Marketing & Trading ULC **Direct Energy Marketing Limited** EDF Trading North America, LLC **EnCana Corporation Enerplus Corporation** Freepoint Commodities LLC Husky Oil Operations Limited ICE NGX Canada Inc. Idaho Power Company IGI Resources, Inc Imperial Oil Resources Limited J. Aron & Company LLC Macquarie Energy Canada Ltd. Mercuria Commodities Canada Corporation Nexen Marketing Northwest Natural Gas Company Oxy Energy Canada, Inc. PetroChina Intern (Canada)Trading Ltd. Portland General Electric Company(PGE) Powerex Corp. Progress Energy Canada Ltd. Puget Sound Energy, Inc. Saguaro Resources Ltd. Sentinel Energy Management Inc. Shell Energy North America (Canada) Inc. Suncor Energy Marketing Inc. TD Energy Trading Inc. Tenaska Marketing Canada, a Div of TMV Corp. Tidal Energy Marketing Inc. Tourmaline Oil Corp. TransAlta Energy Marketing Corp. Twin Eagle Resource Management Canada,LLC United Energy Trading Canada, ULC

Financial Contracts - International Swaps and Derivatives Associations (ISDA) Bank of Montreal (BMO) Bank of Nova Scotia (Scotiabank) Canadian Imperial Bank of Commerce (CIBC) National Bank of Canada (NBC) Royal Bank of Canada (RBC) Toronto Dominion Bank (TD)



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	5.3.1 Who are the suppliers identified by FEI who may eithe not willing to participate in such transactions?	r be willing or are
Response:		
Please refer	to the response to CEC IR 2.5.3.	
5.4	What volumes (or range of volume) would FEI consider to be Term Hedging? Please explain why this is the appropriate volur	optimal for Long ne.
<u>Response:</u>		
FEI would c long-term he term hedgin hedging in th	onsider 25 percent of the commodity supply portfolio an appropria edging. This is less than the maximum of 50 percent for FEI's pr ng strategy. This provides a balanced mix of both long-term a ne portfolio.	te percentage for oposed medium- ind medium-term
5.5	What pitfalls, other than availability, does FEI anticipate wi	th a Long Term
_	Hedging strategy? Please explain.	
<u>Response:</u>		
FEI can be a agreement. continue gas cost compa	exposed to counterparty risk with any long-term physical supply or In a physical arrangement, if a counterparty should go bankrupt s production, FEI would lose its supply source, potentially contracted red to market prices. While FEI could likely contract with anothe	financial hedging or not be able to ed at a favourable er counterparty to

counterparty were to go bankrupt, FEI would not have to replace any supply but could end up paying higher-than-market prices if favourable hedges were defaulted. However, to mitigate this

replace the amount of lost supply, it may be at a higher cost. In a financial arrangement, if a



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- 1 risk, FEI would only contract supply or transact financial hedges with creditworthy counterparties
- 2 and adhere to FEI's long-established internal controls and policies with management oversight.



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1 6. Reference: Exhibit B-4, CEC 1.26.1

Volumetric Production Payment

Another tool for managing longer term price risk is a Volumetric Production Payment (VPP). In this arrangement, the buyer pays an upfront lump sum payment to a gas producer in exchange for specific volumes delivered over the term of the agreement up to twenty years. The buyer also receives a limited royalty interest in the production volumes, which is returned to the seller once the volumes have been delivered. This helps to reduce the risk to the buyer of the

producer going bankrupt. Gas producers will use these types of arrangements to help finance production.

VPP arrangements provide gas cost certainty for a portion of the commodity supply portfolio and provide long term security of supply. Customers would benefit if market prices increase above the VPP contract price or are volatile. The capital investment would be included in FEI's rate base and earn a rate of return for shareholders.

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- 6.1 Are there any constraints on the number of gas producers that would serve as participants, or for the volumes for which FEI could contract? Please explain.
- 5

6 Response:

FEI is still in the process of initial discussions with gas producers to determine their interest in
long-term supply arrangements. Given the early stages of discussion, FEI has not determined if
there is a constraint on the number of gas producers that would be potential participants.
However, FEI believes the pool of gas producers will be limited, due to differing long-term
strategies and objectives that each regional gas producer has regarding their production.

FEI would consider any long-term supply arrangements, such as VPPs, for up to about 20
percent of the FEI commodity supply portfolio. For more details on FEI's volume exposure to a
long-term supply arrangement, please refer to the response to CEC IR 2.6.3.

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18 6.2 How many gas producers has FEI identified as prospective partners in VPP arrangements? Please identify if not confidential.
20
21 <u>Response:</u>
22 FEI is currently opgaged in discussions with major gas producers in parthoast BC and in Alberta

FEI is currently engaged in discussions with major gas producers in northeast BC and in Alberta regarding potential interest in VPP or other types of arrangements. It would not be



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1 2	commercially prudent to provide a list of gas producers that FEI is in discussions with because of the potential impact this could have on possible future negotiations.	
3 4		
5		
6 7 8	6.3	What volume (or range of volumes) would FEI consider to be optimal for VPP price risk management? Please explain.
9	<u>Response:</u>	
10 11 12 13	FEI does not as this would the supply ar arrangements	know what volume or range of volumes would be optimal for VPP arrangements depend on variables such as the term, counterparty risk and pricing structure of rangements. However, FEI expects that it would consider any long-term supply s, such as VPPs, for up to about 20 percent of the FEI commodity supply portfolio.
14 15		
16		
17 18 19	6.4	What pitfalls does FEI expect from employing VPP strategies, if any? Please explain.
20	<u>Response:</u>	
21	Please refer t	to the response to CEC IR 2.5.5.
22 23		
24		
25 26	6.5	Does FEI have experience in VPP strategies?
27	<u>Response:</u>	
28 29 30	FEI does not response to I assessing po	have any previous experience in VPP strategies. However as discussed in the BCUC IR 1.36.2, FEI has had external consultation, specifically from TD Bank, in tential deal structures and counterparty potential.



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If no, please explain whether or not FEI expects its inexperience to be problematic and why.

5 Response:

- 6 Please refer to the response to CEC IR 2.6.5.
- 7



1 7. Reference: Exhibit B-4, CEC 1.26.1 and BCUC 1.37.1 and CEC 1.30.2

Investing in Natural Gas Reserves

Another alternative for managing even longer term market price increases or volatility is investment in natural gas reserves. In this type of arrangement, the buyer would invest in gas producing reserves by entering into a joint venture with a gas producer for a term up to thirty years. The buyer would share in the cost of developing and producing the gas and earn the right to a portion of the production. Therefore, this type of arrangement would enable the utility to access gas supply on a cost basis rather than a market-price basis, sharing in the costs of production with a producer.

Under this type of joint venture transaction, the potential benefits to FEI's customers would include obtaining gas supply on a cost basis, reduced exposure to market price volatility, physical supply diversity and long term security of supply. The benefits for the producer include access to third party capital, without diluting the company's equity or taking on more debt, which may be important during periods of low market gas prices to maintain production operations.

In terms of rate setting and the accounting treatment of reserves, FEI would expect that any capital investment would be included in rate base upon which the utility would earn a rate of return, benefitting FEI's shareholders. Capital, operating and drilling costs would be included in FEI's gas costs and recovered like the costs for other sources of commodity supply.

On pages 33 to 34 of FEI's 2018 PRMP, FEI states:

Managing the risk associated with reserves would be of paramount importance to FEI in a reserves arrangement. While it may seem that the risk associated with drilling, completing, and operating wells would differ from typical regulated utility assets, there may be ways to mitigate these risks through contractual arrangements and effective due diligence. One important feature of any deal would be the ability to transfer risks to producers that are appropriate for a producer to manage, such as drilling risks and most operating risk. However, this transfer of risks may not be acceptable to the producer or increase the capital investment required by the producer. Because of this, <u>FEI is not planning to explore this option further at this time.</u> [emphasis added]

37.1 Please reconcile FBC's statement contained in its Application and in its 2018 PRMP on whether FEI plans to further explore the option of investing in natural gas reserves.

Response:

After reviewing potential long term price risk management alternatives since filing the Application, FEI has determined that long term supply arrangements other than investing in natural gas reserves may be more appropriate in terms of balancing meeting the price risk management objectives and mitigating any potential risks and costs. However, FEI is not completely ruling out the alternative of investing in gas reserves should FEI be able to mitigate the risks associated with drilling and production at an acceptable cost. Therefore, while FEI is considering all long term alternatives, it is not actively exploring this option at this time. For a detailed list of long-term price risk management alternatives please refer to the response to CEC IR 1.26.1.



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30.2 Does FEI believe that FEI owned reserves would increase its overall gas supply portfolio flexibility? If so, explain how.

Response:

As discussed in the response to BCUC IR 1.37.1, FEI is not actively exploring investing in reserves and so does not have an understanding of whether or not owning reserves would increase FEI's overall gas supply portfolio flexibility. The parameters regarding the reserves supply, such as supply profile or flexibility, would likely be determined in negotiations with the gas producer.

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2 7.1 Why was investment in natural gas reserves not considered to be one of the 3 better options? Please explain and provide order of magnitude quantification of 4 costs and/or benefits that FEI has available, and provide any internal reports on 5 assessment of this option.

7 **Response:**

8 Investing in natural gas reserves is currently not considered to be one of the better options due 9 to the risks associated with operating and drilling. However, FEI is not completely ruling out the 10 alternative of investing in natural gas reserves should it be able to mitigate the risks associated 11 with drilling and production at an acceptable cost. FEI is currently involved in initial discussions 12 with producers regarding long-term alternatives, but at this point no analysis on investing in gas 13 reserves or other long-term supply arrangements has been conducted on the quantification of 14 costs and/or benefits. Analysis and quantification would be provided in an application should 15 FEI bring one forward to the Commission for approval.

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- 197.2What options were considered to be the best options? Please explain why and20provide order of magnitude quantification of costs and/or benefits that FEI has21available.
- 22
- 23 Response:

FEI believes that a VPP or arrangement where FEI provides an upfront lump sum payment to a gas producer in exchange for long-term cost-based supply are better options than investing in reserves. This is because these types of arrangements would not include operating and drilling risk associated with gas production. Please refer to the response to CEC IR 2.7.1 for discussion of magnitude quantification of costs and/or benefits. FORTIS BC

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7.3 When, if known, will FEI make a final determination as to whether or not it will invest in natural gas reserves?

67 Response:

8 FEI is in discussions with gas producers regarding their interest in possible long-term supply 9 arrangements and so does not know exactly when it will make a final determination. However, 10 at this point in time, FEI expects to have more information in order to make a decision on 11 whether or not to invest in a long-term supply arrangement later this year or in early 2019.

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- 157.4What circumstances would lead FEI to commence active consideration of the16option to invest in natural gas reserves? Please discuss.
- 17 18 **Respo**

18 **Response:**

FEI would actively consider the option to invest in natural gas reserves if it was the only arrangement potential counterparties would consider, it met the objectives of the Price Risk Management Plan and/or the Annual Contracting Plan and the risks could be appropriately mitigated.

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- 267.5If FEI were to pursue investments in natural gas reserves in the future, where27would FEI expect to invest in natural gas reserves?
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- 29 Response:

30 FEI would prefer to invest in natural gas reserves from production basins located in northeast

31 British Columbia. However, if an arrangement could not be supplied from BC gas production,

32 FEI would consider supply arrangements in Alberta.

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7.6 Please discuss the risks to ratepayers of investing in natural gas reserves.

6 **Response**:

As noted in the preamble quotations, FEI is not actively exploring investing in natural gas reserves, however the following response describes the potential risks to ratepayers. The risks to ratepayers of investing in natural gas reserves would include counterparty risk and the potential for the cost of the investment to be higher than the market price over the long term. However, the ratepayers would benefit if the cost of the investment is lower than the market price. Investing in reserves also includes operating and drilling risks, including higher than expected costs or lower than expected gas production.

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- 7.7 Does FEI consider that any special expertise is required to invest in natural gas
 reserves? Please explain.

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20 **Response:**

Special expertise would be required to invest in natural gas reserves as the due diligence required for a reserves investment is significant. The buyer would likely need to review reserve reports, title searches, field operations data, permits, royalty agreements, environmental regulation and tax obligations. Further, it is important for the buyer to understand the production costs such as variable operating costs, value of the excess liquids, processing costs and gathering costs.

27 If FEI were to invest in reserves it is expected that FEI would hire external consultants with such28 expertise to help in this regard.

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- 32 7.7.1 If yes, how does FEI expect to acquire such expertise?
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1 Response:

- 2 Please refer to the response to CEC IR 2.7.7.
 - 7.8 Please discuss the risks and benefits to FEI shareholders of investing in natural gas reserves.

9 Response:

- As noted in the preamble quotations, FEI is not actively exploring investing in natural gas reserves so the response below describes a hypothetical situation in which this resource option was actually pursued and acquired. The response below is general and there would be many
- 13 other details to consider in such an arrangement.

The benefit to the gas consumer of the utility investing in reserves and/or gas production facilities would be in adding cost stability to the portion of gas supply that would come from the owned reserves. Owned gas supply and production facilities would function as a hedge against commodity price volatility in the market.

18 However, FEI is not an oil and gas producer and would not expect to invest in gas reserves and 19 production as a non-regulated entity. The owned supply and production would have to be 20 approved by the Commission as part of the overall gas supply portfolio. As noted in the quote 21 from pages 33 and 34 of the 2018 PRMP, FEI expects that contractual arrangements for utilityowned reserves would leave certain risks with the producer (e.g., drilling risks and certain 22 23 operating cost risks). Therefore, FEI believes the risks and benefits of investing in reserves 24 and/or production facilities would be similar to and consistent with all of FEI's owned midstream 25 assets (e.g., Tilbury LNG facility, Mt. Hayes LNG facility and Southern Crossing Pipeline), which are included in FEI's rate base but in some cases the costs are partly transferred to the cost of 26 27 gas portfolio. The shareholder benefits and risks are primarily related to the rate of return on 28 any capital investment.



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1 8. Reference: Exhibit B-4, CEC 1.26.1

Other Long Term Supply Arrangements

In addition to the more common types of arrangements to mitigate long term price risk described above, there may be other long-term supply arrangements with gas producers to manage price volatility and capture low-cost supply for the longer term. These could include an arrangement where FEI provides an upfront lump sum prepayment to a gas producer in exchange for long term supply. The amount of the prepayment would depend on the amount of supply to be delivered, the term of the agreement and the cost to produce and deliver this supply by the producer. The term of such an arrangement could be between ten and twenty years. The gas producer would benefit from receiving upfront capital to fund gas production and operations without resorting to more debt and equity, while FEI's customers would benefit from long-term cost-based supply. FEI expects that any capital investment would be included in rate base upon which the utility would earn a rate of return, benefitting FEI's shareholders.

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- 3 4

8.1 Please discuss the risks to FEI ratepayers of providing upfront lump prepayments in exchange for long term gas supply.

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6 **Response:**

7 The risks to ratepayers of providing upfront lump sum prepayment in exchange for long-term 8 gas supply would include counterparty risk and the price, especially if the cost of investing is 9 higher than the market price. However, the ratepayers would benefit if the cost of investing is 10 lower than the market price.

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8.2 What, if any, risks accrue to FEI shareholders? Please discuss.

15 16 **B**een

16 **Response:**

FEI assumes this question intends to refer to what the shareholders' risks are if FEI enters into a long-term supply arrangement which includes an upfront lump sum prepayment. FEI believes the risks and benefits of an upfront prepayment investment would be similar and consistent with all of FEI's owned midstream assets (e.g., Tilbury LNG facility, Mt. Hayes LNG facility and Southern Crossing Pipeline), which are included in FEI's rate base but in some cases the costs are partly transferred to the cost of gas portfolio.



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1 9. Reference: Exhibit B-4, CEC 1.26.1 and 1.41.6

Current Discussions

FEI is currently in the process of discussing options with producers to see if they have any interest in a long-term cost-based supply arrangement with FEI. At this point, FEI does not know which type of arrangement producers might have more preference for, if any, and it is possible that there may be supply arrangements of interest not listed in this response. If there is interest, and provided the arrangement meets the objectives of FEI's ACP and PRMP in the interests of customers, FEI would bring this forward in an application to the Commission for approval.

41.6 Please provide information on FEI's discussions with producers potentially interested in joint ventures and or long-term contracts. If this is confidential information please supply this under the Commission's confidentiality arrangements.

Response:

FEI is currently involved in initial discussions with gas producers to determine their interest in long term cost-based supply arrangements, such as those discussed in the response to CEC IR 1.26.1. FEI does not have any more information to provide at this time as these initial discussions have not yet concluded. Please refer to the response to BCUC IR 1.36.1.

9.1 Please compare the various options open to FEI from a ratepayer risk and
opportunity perspective and discuss which options are preferable and less
preferable and why.

7 Response:

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Please refer to the responses to CEC IRs 2.7.2, 2.7.6, and 2.8.1.
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9.2 Please compare the various options open to FEI from a shareholder risk and opportunity perspective and identify which options are preferable and less preferable and why.

16 **Response:**

17 Please refer to the responses to CEC IRs 2.7.2, 2.7.8, and 2.8.2.

18



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9.3 How does FEI view the progress of its current discussions? Please explain.

4 Response:

5 FEI is still in the process of initial discussions with gas producers to determine their interest in 6 long-term cost-based supply arrangements. FEI has no further updates at this time as these 7 initial discussions have not yet concluded.

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11 Reference: Exhibit B-4, CEC 1.27.1

27. Reference: Exhibit B-1 Section 5.2, Page 136, lines 27-29

TransCanada's proposed projects will compete for the same supply currently accessed by Westcoast Energy Inc. (Westcoast) and on which FEI is reliant on for its customers.

27.1 Please outline long term strategies FEI has for procuring and maintaining long term replacement supply if or as supplies are lost to competing markets on the TransCanada system.

Response:

FEI is actively involved in National Energy Board (NEB) proceedings, which potentially affect FEI's access to supply, and is also involved in developing solutions with regional stakeholders to help ensure issues related to third party pipeline infrastructure are resolved fairly. These activities are important because they help to ensure that customers in BC will continue to have access to gas supply at fair market prices.

FEI also attempts to establish relationships with all producers and other counterparties¹⁰ actively engaged in developments in northeast BC. Establishing these relationships has provided FEI with several long term supply commitments at Station 2, which helps promote the long term viability of the Station 2 marketplace and ensure the continued availability of supply from there over time. Moreover, maintaining these relationships is key, as it is important to keep an open dialogue so FEI and the producers can better understand each other's long term plans.

¹⁰ Other counterparties include marketers and aggregators including financial institutions that are active in energy trading. These relationships are also important because they form part of the wholesale marketplace where FEI participates.



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1 2 3	9.4	Who are the 'regional stakeholders' to whom FEI is referring, or are they the same counterparties identified in the footnote?
4	Response:	
5 6 7	Regional stakeholders would involve many of the marketers and aggregators as identified in the footnote, but would also include representatives from various utilities and pipeline companies (e.g., Enbridge and TransCanada).	
8 9		
10		
11 12 13 14	9.5 <u>Response:</u>	What does FEI currently consider to be the long term plans of the natural gas producers in the areas FEI is interested? Please explain.
15 16 17	FEI believes the producers' long-term plans are to continue extracting cost-effective gas from their production areas. To what extent depends on the price and the accessibility to markets (domestic or international), and stable investment climate in Canada.	
18 19		
20		
21 22 23	9.6	Has the long term viability of the Station 2 marketplace been threatened? Please explain.
24	<u>Response:</u>	
25 26 27 28 29	If comparing it to the pre-shale gas era when there was concern that gas was running out in the region, the long-term viability has improved. However, the risks now at Station 2 are focused around competitive pricing and proposed infrastructure in the region potentially bypassing Station 2. FEI mitigates these risks by entering into long-term supply commitments at Station 2 as discussed in the preamble above.	
30		

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	9.6.1	If no, why is it necessary to promote the long terr marketplace to ensure supply from there over time.	n viability of the
<u>Response:</u>			
Please refer	to the res	sponse to CEC IR 2.9.6.	
	9.6.2	If yes, what supply options will FEI pursue if the Station is not viable? Please discuss.	on 2 marketplace
<u>Response:</u>			
FEI is not n	noving aw	vay from the Station 2 marketplace, given the intercon	nectivity between

FEI's system and the Westcoast pipeline transmission systems. If Station 2 becomes less viable, which would be reflected in the market price, FEI could increase its supply portfolio at AECO/NIT by utilizing its Southern Crossing Pipeline.



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1 10. Reference: Exhibit B-4, CEC 1.28.1

28.1 Has FEI identified any other transmission, storage or contract assets which it may be able to use to the benefit of customers in various future scenarios, other than its existing assets, and if so what might these be under different future scenarios.

Response:

FEI is always evaluating resource options to ensure security of supply for various future scenarios. Over the past few years, FEI has participated in two open seasons offered by Westcoast Energy (i.e. Winter Firm Service and T-South pipeline expansion). Moreover, FEI has evaluated storage expansions at Tilbury and Mist, and expanding FEI's Southern Crossing Pipeline.

- 10.1 Please briefly describe the outcome of FEI's review of the Tilbury, Mist, and
 Southern Crossing pipeline evaluations and provide quantitative assessment of
 their cost/benefit value potential.
- 6 7 **<u>Response:</u>**

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8 A cost/benefit analysis is just one component that FEI would evaluate when reviewing 9 resources. Other considerations would involve the resource availability in the marketplace, how 10 the resource matches the load requirements (e.g., Southern Crossing Pipeline vs. Tilbury or 11 Mist), diversity of supply, as well as the risks associated in selecting one resource over another. 12 These considerations are discussed in greater detail through Commission filings when a change 13 is required in FEI's portfolio. However, any quantitative assessment is not required at this time, 14 as FEI's resources have not materially changed over the past several years, except for the 15 additional T-South Huntingdon Delivery capacity.



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1 11. Reference: Exhibit B-4, CEC 1.29.1, Attachment 1.29.1 and 1.29.2

29. Reference: Exhibit B-1 Section 5.4, Page 142, lines 1-4

In addition to these strategies, FEI has also started to contract for some resources in excess of what Core customers are forecast to require in the short term. This approach is reasonable because the costs and ability to manage contract renewals within the portfolio of resources help to reduce the risk to Core customers.

29.1 Which excess resources are being contracted for?

Response:

The excess resources that FEI is referring to is the 75 TJ/day of additional T-South Huntingdon Delivery capacity that FEI secured effective November 1, 2015. FEI secured this capacity for RS 46 demand and the potential return of Firm Transportation customers to Core service. Please refer to Attachment 29.1 for a copy of the non-confidential 2014/15 Amendment to the Annual Contracting Plan for additional details.

Summary

With the recent changes occurring in the market for firm transportation capacity on T-South, FEI recommends acting proactively by contracting for an additional 75 TJ/d of capacity on T-South for a minimum five year term. Contracting for this capacity may occur as early as during the next Bid Week that is planned to start on October 1, 2014, with the actual contracted volume to be determined by FEI based on evolving market circumstances faced when the Bid Weeks take place. FEI has flexibility in its contracting portfolio to manage this additional transportation capacity by using it to replace expiring future contracts if sufficient demand does not materialize for all of this capacity.

This approach to securing additional firm transportation capacity is appropriate given the changing market conditions faced at this time.

29.2 What is the contract term of these resources?

Response:

The contract terms for these resources (i.e. T-South Huntingdon Delivery capacity) are November 1, 2015 to October 31, 2020 and November 1, 2015 to October 31, 2022. FEI can renew these contracts but must provide Westcoast Energy Inc. 13 months' notice prior to its expiry. Also important to note, FEI's contracted Westcoast's transportation portfolio has been designed so that portions of capacity are up for renewal each year. This flexibility allows FEI to either reduce or roll off existing contracts once they are up for renewal, if it encounters a future where the capacity is no longer required.

11.1 To date, what has been the net result to ratepayers of FEI's excess resource contracting? Has it been a benefit or not? Please provide quantification of the impact in dollars.

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1 Response:

- 2 FEI has assigned the excess T-South Huntingdon Delivery Capacity (between 35 to 40 TJ/day)
- 3 to interested parties in the region since November 1, 2015. The capacity has been assigned at
- 4 a cost higher than the Westcoast T-South Demand Toll, therefore it has been a net benefit to
- 5 the Core Customers. Between November 1, 2015 and April 30, 2018, the net benefit to the
- 6 Core Customers has been approximately \$4.5 million (please see the table below for a
- 7 breakdown).

	2015-16 (Nov to Oct)	2016-17 (Nov to Oct)	2016-18 (Nov to Apr)	
FEI's T-South Assigned Capacity (Negotiated Recovery)	\$ 5,757,619.20	\$ 5,752,153.31	\$ 4,678,488.00	
Full Demand Fee (Westcoast T- South toll + variable charges)	\$ (4,712,626.93)	\$ (4,668,470.54)	\$ (2,337,736.20)	
Net Value	\$ 1,044,992.27	\$ 1,083,682.77	\$ 2,340,751.80	

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12. **Reference:** Exhibit B-4, CEC 1.39.1 1

39. Reference: Exhibit B-1, page 140

18 reliance on these smaller plants may come with additional risk over time. The risk exists that

- producers in the Montney basin may not be able to maintain their production levels given the significant drop in regional prices, as discussed briefly in Section 5.2. Moreover, with 19
- 20 21 TransCanada's expansions in BC (discussed in Appendix A), the portion of NEBC gas
- 22 production could change between Station 2, Alliance, and NGTL.
- 39.1 Please provide the risks associated with the producers and not being able to maintain their production level.

Response:

FEI believes that for producers to continue to invest and procure gas they must make a reasonable return over a period of time. If the prices for their product are lower than their breakeven costs they will likely reduce or slow their capital investment.

Please also refer to the response to CEC IR 1.31.1.

12.1 How would FEI define 'reasonable return over a period of time'?

5 **Response:**

FEI believes a return of 10 percent would be a considered a reasonable return over the long 6 7 term for gas producers. However, some gas producers, such as those which also produce 8 liquids or oil, would likely target higher returns in the order of 15 to 20 percent or more during 9 certain periods, such as when liquids or oil prices are high.

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1 13. Reference: Exhibit B-4, CEC 1.48.2.1

48.2.1 Please describe how FEI intends to manage these risks.

Response:

FEI is currently involved in initial discussions with gas producers to determine their interest in long term cost-based supply arrangements. FEI has not completed these discussions and so does not know how the risks related to drilling and production, if applicable, might be managed. As discussed in the response to BCUC IR 1.37.1, FEI is not actively exploring investing in reserves but is instead focusing on other types of long term arrangements. One important feature of any arrangement would be the ability to transfer risks to producers that are appropriate for a producer to manage, such as those relating to drilling and operating gas wells. However, this transfer of risks may not be acceptable to the producer or increase the capital investment required by the producer.

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13.1 Please elaborate on how FEI would potentially 'transfer risks to producers'.

5 **Response:**

6 FEI could look to potentially transfer risks, relating to drilling and operating gas wells, to 7 producers by increasing the capital investment required by the producer. This would increase 8 the cost of the arrangement for FEI but provide the benefit of reducing the risks to FEI, in terms 9 of higher or unexpected costs or lower than expected supply, associated with gas drilling and 10 operations. However, this transfer of risks may not be acceptable to the producer.



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14. **Reference:** Exhibit B-4, CEC 1.53.3 and Exhibit B-2, BCUC 1.40.1.1 1

53.3 Why does FEI not consider and apply long term trends in UPCpeak to the 20 year account forecast for its long term infrastructure planning in addition to current customer consumption patterns?

Response:

As discussed in the response to BCUC IR 1.40.1.1, FEI's Traditional Peak Method results show that the UPC_{peak} values have remained relatively constant over the last decade. Therefore FEI believes that holding the UPC_{peak} values constant throughout a 20 year forecast period is the most reasonable approach supported by evidence for representing long term future trends at this time.

Year	CTS UPC _{peak} (GJ/hr)			ITS UPC _{peak} (GJ/hr)			VITS UPC _{peak} (GJ/hr)		
	Rate 1	Rate 2	Rate 3	Rate 1	Rate 2	Rate 3	Rate 1	Rate 2	Rate 3
2007	0.0614	0.1911	1.6881	0.0473	0.1639	1.7391	0.0325	0.0854	0.9556
2008	0.0614	0.1987	1.7305	0.0495	0.1765	1.8602	0.0324	0.0875	0.9710
2009	0.0614	0.2025	1.7326	0.0487	0.1763	1.8831	0.0320	0.0892	0.9693
2010	0.0605	0.2007	1.6904	0.0479	0.1758	1.8749	0.0312	0.0889	0.9985
2011	0.0605	0.2058	1.6817	0.0470	0.1739	1.8718	0.0318	0.0966	0.8843
2012	0.0613	0.2236	1.7010	0.0475	0.1857	1.9181	0.0346	0.1183	0.9128
2013	0.0622	0.2425	1.7364	0.0485	0.1975	1.9629	0.0343	0.1215	0.8971
2014	0.0617	0.2569	1.7966	0.0494	0.2113	2.0586	0.0340	0.1149	0.8264
2015	0.0607	0.2559	1.8165	0.0499	0.2155	2.1111	0.0335	0.2169	1.6405
2016	0.0575	0.2447	1.7790	0.0454	0.1978	2.0123	0.0325	0.2071	1.6247

Table 1: Historical UPCpeak - Core Customers for VITS, CTS and ITS

Table 2: Historical Combined UPCpeak - Core Customers for VITS, CTS and ITS

Veer	Transmissio	on Combined UP	C _{peak} (GJ/hr)	
fear	CTS	ITS	VITS	
2007	0.0850	0.0627	0.0620	
2008	0.0863	0.0662	0.0617	
2009	0.0869	0.0657	0.0600	
2010	0.0864	0.0650	0.0551	
2011	0.0856	0.0639	0.0533	
2012	0.0873	0.0652	0.0582	
2013	0.0896	0.0670	0.0586	
2014	0.0904	0.0689	0.0556	
2015	0.0897	0.0698	0.0607	
2016	0.0857	0.0637	0.0563	

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14.1 Please provide Table 1 and Table 2 dating back 20 years.



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2 Response:

3 FEI is able to produce historical UPC_{peak} data prepared in a manner consistent with current 4 processes as far back as 2002 for the CTS and ITS. The UPC_{peak} data prior to 2007 is not 5 available for VITS. The Vancouver Island systems were acquired in 2002, but System Capacity 6 Planning functions were dissimilar until merged in 2006 and, as a result, no equivalent values 7 for VITS UPCs for each rate schedule could be found in archived data for the period before 8 2007. In order to expand the timeframe as close to the requested 20 years as possible, FEI is 9 able to include the most current calculations of UPC_{peak} for 2017 and 2018. A revised Table 1 10 and Table 2 dating back to 2002 is provided where data exists and could be validated. Cells where values could not be confirmed show an entry of N/A. 11

Table 1 (Revised): Historical UPC_{peak} – Core Customers for VITS, CTS and ITS

Year	CT	S UPC _{peak} (GJ/	Hr)	ITS	S UPC _{peak} (GJ/I	Hr)	TIV	VITS UPC _{peak} (GJ/Hr)			
	Rate 1	Rate 2	Rate 3	Rate 1	Rate 2	Rate 3	Rate 1	Rate 2	Rate 3		
2002	0.0579	0.1614	N/A	0.0470	0.1516	1.7700	N/A	N/A	N/A		
2003	0.0570	0.1609	1.4534	0.0459	0.1492	1.7038	N/A	N/A	N/A		
2004	0.0573	0.1641	1.5058	0.0461	0.1509	1.6727	N/A	N/A	N/A		
2005	0.0587	0.1765	1.5317	0.0467	0.1544	1.6433	N/A	N/A	N/A		
2006	0.0600	0.1831	1.6159	0.0474	0.1602	1.6712	N/A	N/A	N/A		
2007	0.0614	0.1911	1.6881	0.0473	0.1639	1.7391	0.0325	0.0854	0.9556		
2008	0.0614	0.1987	1.7305	0.0495	0.1765	1.8602	0.0324	0.0875	0.9710		
2009	0.0614	0.2025	1.7326	0.0487	0.1763	1.8831	0.0320	0.0892	0.9693		
2010	0.0605	0.2007	1.6904	0.0479	0.1758	1.8749	0.0312	0.0889	0.9985		
2011	0.0605	0.2058	1.6817	0.0470	0.1739	1.8718	0.0318	0.0966	0.8843		
2012	0.0613	0.2236	1.7010	0.0475	0.1857	1.9181	0.0346	0.1183	0.9128		
2013	0.0622	0.2425	1.7364	0.0485	0.1975	1.9629	0.0343	0.1215	0.8971		
2014	0.0617	0.2569	1.7966	0.0494	0.2113	2.0586	0.0340	0.1149	0.8264		
2015	0.0607	0.2559	1.8165	0.0499	0.2155	2.1111	0.0335	0.2169	1.6405		
2016	0.0575	0.2447	1.7790	0.0454	0.1978	2.0123	0.0325	0.2071	1.6247		
2017	0.0570	0.2434	1.7812	0.0452	0.1946	2.0447	0.0329	0.2047	1.7411		
2018	0.0579	0.2483	1.8054	0.0449	0.1937	2.0176	0.0338	0.2085	1.8906		



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1 Table 2 (Revised): Historical Combined UPC_{peak} – Core Customers for VITS, CTS and ITS

Voor	Transmission Combined UPC _{peak} (GJ/Hr)		
Teal	CTS	ITS	VITS
2002	0.0663	0.0621	N/A
2003	0.0783	0.0609	N/A
2004	0.0797	0.0609	N/A
2005	0.0825	0.0616	N/A
2006	0.0836	0.0625	N/A
2007	0.0850	0.0627	0.0620
2008	0.0863	0.0662	0.0617
2009	0.0869	0.0657	0.0600
2010	0.0864	0.0650	0.0551
2011	0.0856	0.0639	0.0533
2012	0.0873	0.0652	0.0582
2013	0.0896	0.0670	0.0586
2014	0.0904	0.0689	0.0556
2015	0.0897	0.0698	0.0607
2016	0.0857	0.0637	0.0563
2017	0.0850	0.0632	0.0557
2018	0.0869	0.0631	0.0567

- 14.2 The CEC notes that CTS UPC peak for RS 1 has declined modestly while RS 2 and 3 have increased slightly. Does FEI expect these trends to continue? Please explain.
- 10 Response:

In 2016, there was a noticeable reduction in the UPC in each rate schedule that was largely a response to a reduction in the design temperature or design degree day (DDD) as previously discussed in the response to BCUC IR 1.40.1.1. Looking at the data for each rate schedule in the years previous there appears to be very little significant variation in the RS 1 UPC. The 2017 and 2018 data included in the new table calculated for the new design temperatures show a UPC with less significant change. Similarly, for RS 2 and RS 3, and as discussed in the



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1 response to BCUC IR 1.40.1.1, while the UPC in these rate schedules trended up in the period 2 between 2011 to 2014, the UPC seems to have stabilized in the period following which is also 3 supported by the most recent information included in the table provided in the response to CEC 4 IR 2.14.1. FEI does not consider that the observed deviations, with both upward and 5 downwards movement in UPC values visible in all rate schedules over the observed period, 6 represent trends that have sufficient confidence to extrapolate from during the planning horizon. 7 Overall, the changes in UPC over time can be addressed sufficiently through FEI's traditional 8 peak demand forecasting processes.

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12		14.2.1	If yes, does FEI consider these impacts to be significant?	Please
13			explain why or why not.	
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15	<u>Response:</u>			
16	Please refer t	o the resp	ponse to CEC IR 2.14.2.	
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1 **15.** Reference: Exhibit B-4, CEC 1.59.4 and 1.59.5

59.4 Please outline the circumstances under which FEI's demand forecast for LNG would not materialize.

Response:

Generally speaking, the LNG demand forecasts would not materialize as modelled in the LTGRP if the key marine transportation markets, which make up the large bulk of the long term LNG demand, do not adopt LNG as a maritime fuel. Furthermore, if LNG does become a fuel of choice for the maritime sector but other bunkering (i.e. marine fueling) hubs develop LNG fueling capability for marine vessels before FEI, this could also impact the adoption of LNG sourced from BC.

In terms of LNG demand for all market segments, if the economic price spread between incumbent fuels (i.e. diesel/marine gas oil/marine fuel oil) and natural gas reduces to a level where the economic justification to adopt natural gas as a fuel no longer exists, this could also potentially jeopardize the adoption of natural gas as a fuel more generally across all various market segments.

59.5 If the LNG demand does not materialize, will FEI still construct future phases of Tilbury LNG expansion? Please explain.

Response:

Future phases of Tilbury LNG expansions will be assessed with greater scrutiny when the volume of customer demand surpasses the availability of LNG with the facilities currently being put into service at Tilbury.

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15.1 What are the advantages and disadvantages to ratepayers of having LNG supplied by FEI as opposed to other bunkering hubs?

6 **Response:**

Please refer to the response to BCUC IR 1.9.2 for the potential benefits from FEI's strategy on
LNG bunkering and also to the response to BCSEA IR 1.3.1 (also see Table 8-2 of the
Application) of the advantages and disadvantages to ratepayers of undertaking system capacity
expansions.

As LNG demand grows, the same rationale that was provided in the response to BCSEA IR 1.3.1 also applies to this inquiry in that, "*FEI notes the delivery rate impacts (benefits) of increasing throughput to the FEI system generally outweigh the delivery rate impacts (costs) of accelerating/increasing infrastructure investments needed to meet the increased demand due to load-building activities.*" [Excerpt from Exhibit B-3, FEI response to BCSEA IR 1.3.1]



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1 FEI also notes that, as discussed in the response to CEC IR 2.15.4, to FEI's knowledge, major 2 ports with LNG bunkering capabilities currently exist in Southeast Asia and Northwest Europe. 3 Therefore, it will be critical to capitalize on the first-mover advantage to develop LNG marine 4 bunkering capabilities in the Pacific Northwest region. As discussed above, this will ultimately 5 benefit all of FEI's ratepayers.

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15.2 What are the advantages and disadvantages to FEI shareholders of having LNG supplied by FEI as opposed to other bunkering hubs.

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12 Response:

13 The main benefits to FEI's shareholder are similar to the benefits to FEI's customers. By having 14 LNG supplied by FEI as opposed to other bunkering hubs, FEI can leverage pre-existing 15 Company-owned assets and increase the overall utilization of FEI's pipeline system, thus 16 guarding against stranded asset risk arising from lower use per customer in the historical 17 residential and commercial rate classes. This is a benefit to the shareholder, in addition to the 18 favourable delivery rate impacts that help keep all customers on the system or add customers to 19 the system. In turn, this supports a viable utility which further benefits FEI's shareholder.

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23 15.3 Does FEI consider that development of LNG expansions would influence the 24 adoption of FEI as a maritime fuel? Please explain.

25 26 Response:

27 FEI believes that the development of LNG expansions would influence the adoption of LNG as a 28 maritime fuel insofar as providing a positive and supportive signal to the market that the LNG 29 fuel is available to serve the customer's needs if LNG fuel is adopted for marine vessels. The 30 expansion of the Tilbury Phase 1A facility has sent a positive market signal to all potential 31 customers that LNG supply is available and FEI is capable of providing the required LNG supply 32 that is essential to new adopters of the fuel.

33 The development of LNG supply capability at the Tilbury Phase 1A facility addresses the classic 34 "chicken-egg" dilemma of providing supply certainty to potential customers, rather than hoping 35 that customers first adopt natural gas without certainty of supply, and then follow with supply FORTIS BC

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certainty. Further development of LNG supply at Tilbury is dependent on the identification of
 demand for that supply.

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 6 15.4 Please identify the other bunkering hubs that could develop LNG fueling before FEI?
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9 Response:

10 To FEI's knowledge, major shipping ports located in Southeast Asia (Ports of Singapore, 11 Yokohama and various ports in China) and Northwest Europe (Port of Zeebrugge in Belgium) 12 have already or are currently developing LNG bunkering capabilities. FEI believes that any 13 location where LNG storage capacity exists in or near a large port area could develop LNG 14 bunkering capabilities.

The Port of Vancouver is one of the largest ports in North America by tonnage and experiences a very large number of port calls from marine vessels as a result. This provides an ideal environment to develop LNG bunkering capabilities for the region and to begin to generate significant benefits to the region that would result from a robust LNG bunkering market to serve marine customers in the Port of Vancouver. Furthermore, developing a regional LNG bunkering capability would also easily enable LNG bunkering to develop in other ports along the West Coast of North America (Port of Seattle, Tacoma, Long Beach and Los Angeles).

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 24
 25 15.4.1 Does FEI consider itself in
 - 15.4.1 Does FEI consider itself in competition with these hubs?

27 **Response:**

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Yes, in that international marine customers will obtain fuel of any kind in the lowest-cost location that meets the customers' operational requirements. However, a robust LNG supply chain with multiple points where LNG bunkering is available around the world will be required in order to facilitate the move by marine customers to LNG as a fuel. Please also note that there are other ports that serve large numbers of marine vessels and that are interested in developing LNG bunkering, such as the Ports of Seattle, Tacoma, Los Angeles, Oakland and Long Beach. The first-mover advantage will be critical if LNG bunkering is to develop in the Port of Vancouver. F

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	15.4.1.1 If yes, please provide a brief explanation as to compete with these hubs.	to how FEI plans
<u>Response:</u>		
Please refer	to the response to CEC IR 2.15.4.1.	
BC and Albe necessary fe In addition t political envi in the region near the pon market with LNG as a m and regulato	erta have large, proven and recoverable natural gas reserves that eedstock supply that would be required to provide the LNG to the boo supply certainty, BC and Canada also have secure and stable ronments, which are also necessary to establish any new LNG burn. Additionally, strategically located LNG facilities near main wat the swhere LNG bunkering is required will also be critically important supply reliability and certainty that marine vessels companies will harine fuel. Bunkering jetties and the associated infrastructure, bury approvals to operate LNG bunkering facilities will also be needed	could provide the punkering market. e regulatory and nkering capability ter channels and int to provide the require to adopt unkering vessels d.
Most of thes today in BC that LNG bu LNG bunker The first-mo provide cost	e important elements required to develop LNG bunkering in this re and should be leveraged and developed to the greatest extent per nkering is developed in this region. FEI is working with stakeholde ing infrastructure that will be needed to compete with other LNG ver advantage will be critical in determining which ports globall effective, reliable and safe LNG bunkering to the international mari	egion are present ossible to ensure ers to develop the bunkering hubs. y will be able to time industry.

- 15.5 How will FEI ensure that there is no premature development of LNG facilities? Please provide a brief discussion.
- **Response:**

Please refer to the response to BCUC IR 2.48.1.

Furthermore, as stated in the response to CEC IR 2.10.1, FEI aims to match resources required to the load/demand requirements of the overall system. With respect to providing LNG service to the transportation market, a similar approach will be taken by FEI when considering the development of further LNG facilities. This is done to ensure that adequate service can be



- 1 provided to customers while costs and risks can be managed for all of FEI's ratepayers at the 2 same time.
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- 15.6 Please provide analysis for FEI's existing LNG facilities, showing degree of utilization over time to demonstrate when they have become or will become fully used and useful.
- 10 **Response:**

FEI's existing LNG facilities are the Tilbury base plant and the Mt. Hayes LNG plant on Vancouver Island. These facilities are used by FEI to provide a number of benefits to the pipeline system, such as: (1) peaking supply during times of extremely cold weather or when system demands require these facilities to be used to provide supply; (2) Mt. Hayes creates capacity on the Vancouver Island pipeline system; and (3) both LNG facilities provide yearround emergency supply and pressure support to the pipeline systems in the potential instance that upstream gas supply becomes limited.

- 18 The two current plants have been providing relatively small volumes of LNG supply to the 19 transportation market since about 2010/11 due to some excess capacity that could be used to 20 serve these markets.
- However, FEI's current LNG demand is large enough that the current plants are insufficient to continue to provide service to the transportation market from the existing facilities. As a result, the current expansion at Tilbury (Phase 1A), anticipated to be operational later in 2018, will provide the sufficient quantities of LNG to the transportation market while preserving FEI's ability to use the existing facilities to provide peaking supply service to FEI's non-LNG customers.
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- 3015.7Please provide evidence to support the appropriate economics for building LNG31facilities in advance of market for marine hub bunkering.
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1 Response:

Presently and beyond Tilbury phase 1A, FEI has not determined that any future LNG facilities should be constructed in advance of the market for marine bunkering. FEI is simply stating that future LNG supply will be required if marine bunkering develops in the Port of Vancouver as all current supply up to and including phase 1A will be insufficient to serve this emerging and expected market. Future expansions at Tilbury (and at other potential locations) will be required if marine bunkering develops in Vancouver. Simply put, if LNG supply is not available to the marine market in the Port of Vancouver, that market will go elsewhere.