

## 2017 Long Term Gas Resource Plan (LTGRP) – Meeting 2

April 11, 2017

**Orange** items provide suggestions from RPAG members for direct input into FortisBC Energy Inc.'s (FEI) activities.

**Green** items denote follow-up questions for FEI. FEI's responses use bold black font.

### 1. Attendees

- a. Cole Rheaume, First Nations Energy and Mining Council (FNEMC)
- b. Dale Littlejohn, Community Energy Association (CEA)
- c. Dan Kirschner, Northwest Gas Association
- d. Dave Shipley, Posterity Group
- e. David Bailey, FEI
- f. David Craig, Commercial Energy Consumers Association of B.C. (CEC)
- g. Denise Mullen, B.C. Business Council
- h. Dennis Swanson, FEI
- i. Ian Wells, City of Prince George
- j. Jennifer Davison, B.C. Ministry of Energy and Mines (MEM)
- k. Josephine Howitt, City of Kamloops
- l. Joyce Martin, FEI
- m. Kate Feeney, B.C. Public Interest Advocacy Centre (BCPIAC/BCOAPO)
- n. Katherine Muncaster, B.C. Ministry of Energy and Mines (MEM)
- o. Kathy Lee, BC Hydro
- p. Ken Ross, FEI
- q. Leon Cheung, B.C. Utilities Commission (BCUC)
- r. Matt Mason, FEI
- s. Robert Schuster, FEI
- t. Mason Lau, FEI
- u. Tamy Linver, Northwest Natural
- v. Terry Penner, FEI
- w. Tom Hackney, B.C. Sustainable Energy Association (BCSEA)
- x. Tom-Pierre Frappé-Sénéclauze, Pembina Institute

### 2. Introduction

- a. According to various attendees, multiple British Columbia (BC) municipalities are examining options for increasing the share of renewable energy sources in their energy mix.
- b. Multiple attendees are interested in emerging technologies which may reduce the greenhouse gas (GHG) emissions intensity of natural gas, such as hydrogen injection or carbon capture at the end-use site.

### 3. Feedback from Meeting 1

- a. If certain radically alternate futures may exist which fall outside the ambit of the 2017 LTGRP, by which method would they be incorporated into future LTGRPs if the planning environment changes sufficiently for these futures to fall into the ambit of future LTGRPs?

- i. In this case, future LTGRPs would initially consider these alternate futures via their qualitative analysis (without incorporating them into the quantitative forecast model).
- ii. Subsequently and given sufficient evidence, future LTGRPs could consider these alternate futures as part of their quantitative analysis (FEI files LTGRPs approximately every three to four years).

#### 4. Annual Demand Reference Case

##### a. Traditional Forecast

- i. Slide 25 indicates that, under FEI's traditional forecast method, use per customer (UPC) increases over time on Vancouver Island; what causes this increase?
  1. This increase is motivated by customers on Vancouver Island adding extra natural gas end uses.
  2. Attendees should note that UPC values of the different regions appear to converge between 60 and 70 GJ by 2036.
- ii. The traditional forecast method does not include expected future demand from the expanded Tilbury LNG facility; the end-use forecast method accounts for such developments which are not captured by existing historical trends.
- iii. How does the traditional forecast method account for Demand Side Management (DSM)?
  1. The traditional forecast method includes the impact of existing natural conservation and DSM programs to the extent that such impact is inherent in the historical time series data which drives the traditional forecast.
  2. The annual demand values that result from the traditional forecast method form a relatively flat line because they aggregate time series trends which increase annual demand (e.g. adding natural gas end uses) with trends that decrease annual demand (e.g. natural conservation and participation in DSM programs).
- iv. For industrial rate class customers, the traditional forecast includes firm sales only.

##### b. End-Use Forecast

- i. Slides 28 to 73 display a worked example of a specific value within the Reference Case, presented by Posterity Group (Posterity):
  1. Did all of Posterity's data for the end-use forecast come from a single data source?
    - a. Posterity used multiple reliable data sources to prepare the end-use forecast.
    - b. These sources include FEI's recent end-use studies (2012 Residential End Use Study and 2015 Commercial End Use Study), the recent joint BC-wide Conservation Potential Review (BC CPR), updates of research and analysis that had been prepared for the 2014 Long Term Resource Plan (2014 LTRP), and Posterity's own end-use library.
    - c. Posterity applied its engineering expertise to reconcile data from the different data sources; for future studies, FEI should consider creating scatter plots of information from different

- sources in order to illustrate to what extent these sources agree or disagree with each other.
2. For residential rate class customers, the end-use forecast counts one single family dwelling for each account in FEI's billing system.
  3. Based on industry experience, Unit Energy Consumption (UEC) values for gas versus electric end uses are not identical.
  4. In the reference case, appliances do not compete with each other for replacement opportunities (more efficient appliances simply naturally replace existing appliances over time); this efficiency improvement rate is based on end-use study data and information from Posterity's end-use library.
  5. The end-use forecast method does not account for building demolitions.
  6. The total share of natural gas (fossil natural gas and Renewable Natural Gas) does not change in the reference case:
    - a. For greater clarity, FEI should develop separate definitions of global fuel shares (e.g. percentage of homes using electricity versus natural gas in FEI's service territory) versus unit-specific fuel shares (e.g. percentage of space heating within new houses that is covered by natural gas).
  7. The end-use forecast does not track total BC population but applies housing start data from the Conference Board of Canada to its customer base in order to project customer growth.
  8. FEI could use data from its Switch and Shrink program to conduct a high-level reasonableness check of the conversion data in Posterity's forecast model.
- ii. Slide 74 displays a comparison of the annual demand results from the traditional forecast and the end-use forecast Reference Case:
1. The traditional forecast results are flatter than the end-use forecast Reference Case:
    - a. The traditional forecast contains inherent historical trends (primarily natural conservation, participation in DSM programs, and fuel switching) that are not baked into the end-use forecast Reference Case.
    - b. The end-use forecast scenario analysis accounts for uncertainty about the future trajectory of such trends.
  2. Even though the end-use forecast provides several orders of magnitude more granularity than the traditional forecast, the end-use forecast Reference Case exceeds the traditional forecast by less than six percent by the end of the forecast horizon; this demonstrates that the end-use forecast Reference Case provides a reasonable basis for examining different future scenarios.
- iii. Slide 75 displays summary information on FEI's Renewable Natural Gas (RNG) program:
1. FEI should consider a peer marketing campaign for its RNG program, similar to the approach used by Bullfrog Power.
  2. RNG is not subject to the BC carbon tax.

3. The RNG program has benefitted from two recent updates to the Greenhouse Gas Reduction Regulation which enable FEI to seek more RNG supply and to reduce the RNG cost that it charges customers.
4. Approximately one half to two thirds of FortisBC RNG customers are residential rate class customers; they typically pay for up to 10% of their natural gas mix to be RNG.
5. Depending on specific conditions, RNG suppliers typically experience a payback period of up to 10 years for private and 15 to 20 years for public sector entities; for municipal sewage RNG supply to be cost-effective.
6. FEI should illustrate the percentage and absolute impact on residential customer bills of different levels of RNG patronage and should consider for future marketing providing a comparison of different Greenhouse Gas Emissions abatement options:
  - a. **Please see below for an illustration of the requested RNG energy bill impacts for one rate class in FEI’s Mainland service region:**

FEI RS 1B Mainland Average Annual and Monthly RNG Bills

Conventional Natural Gas Percentage	RNG Percentage	Average Annual Bill	Average Monthly Bill	Percentage Change in Average Bill
100%	0%	\$ 921	\$ 77	n/a
95%	5%	\$ 952	\$ 79	3.4%
90%	10%	\$ 984	\$ 82	6.8%
75%	25%	\$ 1,078	\$ 90	17.1%
50%	50%	\$ 1,236	\$ 103	34.2%
0%	100%	\$ 1,551	\$ 129	68.4%

**Notes:**

per GJ

Average annual and monthly bills are inclusive of the current BC Carbon Tax (where applicable) = \$1.4898 per GJ

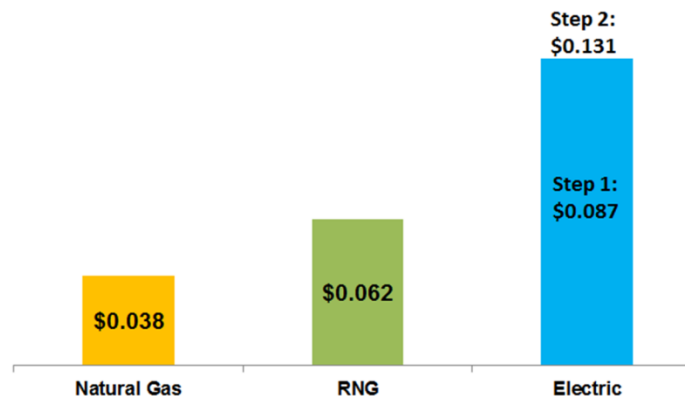
Average Annual Bills based on an average use rate of 90 GJ

Average Monthly Bills based on an average use rate of 7.5 GJ

Cost of Gas as of January 1, 2017: \$2.05 per GJ

Cost of Biomethane as of January 1, 2017: \$10.54 per GJ

- b. **Please see below for a comparison of customer rates for RNG, natural gas, and electricity for residential customers in FEI’s Mainland service region:**



\*\$ per kWh residential rates as of Oct. 1, 2016. Electric excludes basic charge

- iv. Slide 76 displays the share of RNG in FEI’s end-use forecast Reference Case annual demand:

1. FEI should consider displaying at least ten years of historical data in its annual demand charts to provide more context to its audience.
2. How does RNG play into the fuel share changes that Posterity's worked example displays?
  - a. When the RNG fuel share increases, the natural gas fuel share in Posterity's model decreases.
  - b. Dwellings with RNG fuel share remain FortisBC customers even if their natural gas fuel share is zero.
3. How does RNG annual demand link to the end-use forecast Reference Case and scenario analysis annual demand?
  - a. The linkage is qualitative rather than strictly arithmetic.
  - b. FEI provided the parameters of its end-use annual demand Reference case and scenario analysis to its RNG team and requested the RNG team to prepare reference, high, and low RNG annual demand forecast trajectories based on this information.

### 5. Scenario Analysis Review

- a. To what extent is FEI's scenario analysis purely econometric?
  - i. FEI's scenario analysis is not purely econometric.
  - ii. The analysis uses certain macroeconomic inputs, such as natural gas commodity and carbon prices as well as Conference Board of Canada housing start forecasts.
  - iii. The analysis accounts for economic utilization factors via its account forecast prediction intervals.<sup>1</sup>
  - iv. The scenario analysis is also grounded in end-use and equipment level replacement dynamics; this ensures that projected trends are reasonable in relation to expected equipment and dwelling lifetimes.
- b. How do FEI's scenario analysis price elasticities work?
  - i. FEI applies long-run price elasticities to its end-use annual demand forecast; these are -0.2 for residential and -0.5 for commercial and industrial rate class customers and drive annual demand impacts via the natural gas cost and carbon price critical uncertainties.<sup>2</sup>
  - ii. For example, if the natural gas commodity price increases by 40 percent by the end of the planning horizon, Posterity calculates that, by the end of the planning horizon, commercial natural gas consumption will decrease by 20 percent. Posterity's forecast model solves for the annual consumption change rates that are required to produce this long-run change, given calculated equipment and dwelling replacement patterns (e.g. a furnace can only switch from one fuel type to another when it gets replaced).

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<sup>1</sup> FEI is not presenting its account forecast numbers in the RPAG in order to allow more time for valuable discussion on other topics (FEI will present this data in the 2017 LTGRP); FEI's method for the Reference Case account forecast is well-established and the RPAG supported its method for generating the High and Low outcomes on this Reference Case during its first meeting in 2016.

<sup>2</sup> The 2017 LTGRP's rate impact projections do not drive changes in annual demand for two reasons: (1) rate impact projections are directional only and actual rates are set through a separate process which involves multiple intervening factors, and (2) accurately including rate impact projections in the annual demand analysis would increase the complexity and cost of the forecast model since multiple complex factors, including FEI's business strategy, impact rates.

- c. Does FEI's scenario analysis assume that high performance homes are not powered by natural gas?
  - i. Like the BC CPR, FEI's scenario analysis does not assume that changes in equipment efficiency automatically cause changes in equipment fuel type.
  - ii. FEI's analysis drives fuel type changes via its price-related critical uncertainties (natural gas commodity and carbon price) and via its fuel switching policy critical uncertainty.
- d. One attendee notes that FEI should show a scenario which meets BC's legislated 2050 GHG emissions reduction target:
  - i. Another attendee notes that the 2050 target is not sector-specific (and thus does not apply to specific industries or entities) and that it is unclear how currently known provincial action would achieve this target.
  - ii. Another attendee indicates that FEI would derive reputational value from showing how it could meet the legislated 2050 target.<sup>3</sup>
  - iii. In its 2013 Integrated Resource Plan (IRP) BC Hydro included a report on GHG reduction scenarios.
  - iv. The BC Utilities Commission (BCUC), in its role as an information provider, notes that it considers BC energy objectives when reviewing Long Term Resource Plans.
  - v. FEI emphasizes that the LTGRP's primary objective is to account for uncertainty and possible changes in the planning environment in order to ensure appropriate levels of natural gas supply, pipeline infrastructure, and DSM. As such, LTGRPs react to changes in the planning environment rather than seeking to catalyze such changes. LTGRP scenario analysis results can raise questions that fall outside this ambit and into the realms of business strategy or policy input.

## 6. System Capacity Planning

- a. What happens when peak demand exceeds system capacity in a specific location?
  - i. This occurs infrequently and is typically caused by contacts with pipelines or maintenance rather than weather.
  - ii. In such situations, local system natural gas pressure drops; at a certain level of pressure drop, natural gas appliances are not able to maintain combustion.
  - iii. In such situations, FEI de-energizes the impacted section of the system, manually closes shut-off valves at the affected meters, then re-energizes the system, and manually opens the affected shut-off valves after checking the natural gas appliances that are connected to these meters (FEI also manually re-lights these appliances).
  - iv. This means that the impacts of an outage on the natural gas system are different than the impacts of an outage on the electric system.
- b. Multiple attendees note that more granular gas meter data may help FEI plan better for its peak demand which may result in more cost-effective selection of appropriate infrastructure levels; FEI notes that it is monitoring the business case for advanced metering solutions.

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<sup>3</sup> Some attendees further discussed this item and noted that, in general (i.e. not necessarily within the LTGRP) they are interested in FortisBC presenting information on how it could contribute to BC meeting wider environmental and social goals.

- c. From a natural gas infrastructure planning perspective, speculating where potential RNG suppliers may be located near FEI's distribution system provides little value since a very large number of possible options exist.
- 7. Wrap-Up & Next Steps**
- a. During the next RPAG meeting, FEI will recap Posterity's approach to generating peak demand values from the end-use forecast scenario analysis:
    - i. FEI plans to host the next RPAG meeting at the end of the second or in the third quarter of 2017.
    - ii. FEI plans to discuss the following topics during the next RPAG meeting:
      - 1. Natural Gas for Transportation forecast results.
      - 2. Demand Side Management analysis results.
      - 3. System requirements and options.
      - 4. Regional supply and resource options.
  - b. Multiple attendees support FEI's idea of profiling the case for an innovation fund in the 2017 LTGRP in order to support development of pre-commercial innovative natural gas technologies that may reduce GHG emissions or enhance FEI's infrastructure planning.