FORTIS BC™

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January 16, 2014

<u>**Via Email**</u>
Original via Mail

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

<u>Attention</u>:   Mr. Christopher P. Weafer

Dear Mr. Weafer:

Re: FortisBC Energy Inc. (FEI) and FortisBC Inc. (FBC) (collectively the Companies)

Applications for Approval of a Multi-Year Performance Based Ratemaking Plan for 2014 through 2018 (the Applications)

Information Request (IR) No. 1 to the Commercial Energy Consumers Association of British Columbia (CEC)

In accordance with the British Columbia Utilities Commission (BCUC or the Commission) Orders G-218-13 and G-219-13 in the above noted proceedings, the Companies respectfully submit the attached IR No. 1 to CEC on the Evidence of Dr. Mark Lowry (FEI Exhibits C1-9 and C1-9-1 and FBC Exhibits C6-9 and C6-9-1).

If further information is required, please contact the undersigned.

Sincerely,

**FORTISBC ENERGY INC. and
FORTISBC INC.**

Original signed by: Diane Roy

For: Diane Roy and Dennis Swanson

Attachments
cc (email only):   Commission Secretary
                            Registered Parties

	FortisBC Energy Inc. (FEI) and FortisBC Inc. (FBC) (collectively the Companies) Applications for Approval of a Multi-Year Performance Based Ratemaking Plan for 2014 through 2018 (the Applications)	Submission Date: January 16, 2014
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1 **1.0   Reference: Qualifications**

2   1.1   For each of the following subject matters, please indicate and explain if Dr. Lowry
3   considers himself to be an expert in any of the following areas, and if so, why.

4   1.1.1   Cost of capital/ rate of return

5   1.1.2   Marginal cost of service

6   1.1.3   Fully allocated cost of service

7   1.1.4   Utility planning and operations

8   1.1.5   Prudence analysis

9   1.1.6   Transmission and distribution planning

10   1.1.7   Operational economics

11   1.1.8   Retail rate design

12   1.1.9   Public utility accounting

13   1.1.10   Depreciation studies

14   1.1.11   Utility cost benefit analysis

15   1.2   For each of the 11 areas identified in the previous question, please (i) identify the
16   proceedings in which Dr. Lowry presented expert evidence on that subject before
17   a regulatory tribunal, (ii) provide a brief description of Dr. Lowry's work in each
18   case including whether it was in an electric or gas matter, and the jurisdiction,
19   and (iii) provide a copy of the latest testimony Dr. Lowry has filed.

20   1.3   Please provide the curriculum vitae for anyone other than Dr. Lowry who is
21   testifying to the PEG evidence.

22   **2.0   Reference: TFP Study Assumptions**

23   2.1   Please confirm if each of the following is an explicit or implicit assumption
24   underlying Dr. Lowry's TFP estimates.

25   2.1.1   Each utility in the sample faces the same production technology set for a
26   given year and the technology set changes each year.

27   2.1.2   Production functions are smooth and continuous.

28   2.1.3   Production functions are twice differentiable.

29   2.1.4   Outputs are continuously divisible.

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	FEI-FBC Information Request (IR) No. 1 to the Commercial Energy Consumers Association of British Columbia (CEC) Evidence of Dr. Mark Lowry (FEI Exhibits C1-9 and C1-9-1 and FBC Exhibits C6-9 and C6-9-1)	Page 2

2.1.5 Ratio of Tornqvist indices of inputs and outputs requires technology to exhibit constant returns to scale.

2.1.6 Utilities are technically efficient.

2.1.7 Utilities are allocatively efficient.

2.1.8 Isoquants are convex.

2.1.9 Utilities either minimize costs for a given output or maximize output for a given cost.

2.1.10 Prices of inputs and outputs are assumed to equal marginal cost.

2.1.11 The utilities are assumed to earn zero economic profit.

2.1.12 The utilities have no impact on prices for inputs or outputs (essentially price takers).

2.2 Please provide a complete list of any implicit or explicit assumptions underlying Dr. Lowry's analysis not contained in the list in IR 2.1 above.

2.3 For a composite list of all assumptions used and identified in IRs 2.1 and 2.2, please explain the economic theoretical need for the assumption and provide the support used to confirm the assumption.

3.0   Reference: TFP Theory, PEG Report, Page 8, Section 2.2.1:

"We begin our explanation of the logic for such research (a/k/a "index logic") by considering the growth in the prices charged by an industry that earns, in the long run, a competitive rate of return. (The assumption of a competitive rate of return applies to unregulated, competitively structured markets. It is also applicable to utility industries and even to individual utilities). In such an industry, the long-run trend in revenue equals the long-run trend in cost.

trend Revenue = trend Cost."

3.1 Please confirm that the concepts underlying TFP analysis has its theoretical origins in the competitive market model.

3.2 Please confirm that in the context of a competitive market model, the following statements are correct. If not confirmed, please explain:

3.2.1 Price equals marginal cost

3.2.2 The firm is a price taker for outputs

	FortisBC Energy Inc. (FEI) and FortisBC Inc. (FBC) (collectively the Companies) Applications for Approval of a Multi-Year Performance Based Ratemaking Plan for 2014 through 2018 (the Applications)	Submission Date: January 16, 2014
FORTIS BC	FEI-FBC Information Request (IR) No. 1 to the Commercial Energy Consumers Association of British Columbia (CEC) Evidence of Dr. Mark Lowry (FEI Exhibits C1-9 and C1-9-1 and FBC Exhibits C6-9 and C6-9-1)	Page 3

3.2.3 The efficient firm operates under constant returns to scale

3.2.4 Competitive firms do not face issues of sunk costs

3.2.5 All firms have access to the same technology at market based prices

3.2.6 There are no barriers to entry or exit.

3.3 Please confirm that input prices should be consistent with the prices the utility management actually faces for the use of the input. If not confirmed, please explain.

3.4 Please confirm that accounting depreciation differs from economic depreciation. If not confirmed, please explain.

3.5 Please confirm that it may be cost effective for customers for the utility to use economically obsolete technology. If not confirmed, please explain.

3.6 Please confirm that the adoption of labor saving technology by investing in new capital considers the actual prices for labor to be saved and the expected earned return on capital as part of the economic justification (cost/benefit analysis). If not confirmed, please explain.

3.7 Please confirm that the revenue from billed outputs is not equal to the marginal cost of those outputs with respect to distribution, transmission and customer services. If not confirmed, please explain.

3.8 Please confirm that input price data is only available in a number of aggregate utility accounts and that portions of labor costs are included in accounts other than direct payroll. If not confirmed, please explain.

3.9 Please confirm that an economic analysis of labor costs for a cost benefit analysis should include all of the costs associated with labor, not just direct payroll. If not confirmed, please explain.

3.10 Please confirm that an efficient (allocative and technical) utility will consider the relative prices for inputs applicable for that utility. If not confirmed, please explain.

3.11 Please confirm that the price of capital in Dr. Lowry's TFP analysis includes the full amortization of the investment over its useful life - the return of and on the investment and that it would also include negative salvage if any. If not confirmed, please explain.

3.12 Please confirm that the age of the asset for utility assets has no impact on the level of output of the asset. If not confirmed please explain in detail how age reduces the capacity of the asset and how a rational utility would respond to the degradation of the service level.

	FortisBC Energy Inc. (FEI) and FortisBC Inc. (FBC) (collectively the Companies) Applications for Approval of a Multi-Year Performance Based Ratemaking Plan for 2014 through 2018 (the Applications)	Submission Date: January 16, 2014
FORTIS BC™		
	FEI-FBC Information Request (IR) No. 1 to the Commercial Energy Consumers Association of British Columbia (CEC) Evidence of Dr. Mark Lowry (FEI Exhibits C1-9 and C1-9-1 and FBC Exhibits C6-9 and C6-9-1)	Page 4

3.13 Please confirm that utility costs are largely common costs. If not confirmed, please explain.

3.14 Please confirm that a volumetric measure of output for regulated utilities does not meet the test that a production function is non-decreasing in output, i.e. it costs more to produce more output. If not confirmed, please explain.

3.15 Please confirm that under regulation neither the price of outputs nor the quantity of outputs is equal to either the short-run point of profit maximization or the short-run point of minimum average total cost except by accident.

3.16 Please confirm that it is never optimal for a utility operating with economies of scale to produce output equal to the minimum point of the short-run total cost curve, i.e. minimizing short-run costs. If not confirmed, please explain.

3.17 Please confirm that in the presence of scale economies optimal production occurs at the point of tangency between the short-run cost curve and the long-run cost curve and that this point cannot be characterized by constant returns to scale. If not confirmed, please explain.

3.18 Reference: PEG Report Page 8, Section 2.2.1, footnote:

"The assumption of a competitive rate of return applies to unregulated, competitively structured markets. It is also applicable to utility industries and even to individual utilities"

3.18.1 Please confirm that regulated utilities do not face market based cost of capital but regulated return of and on capital. If not confirmed, please explain.

3.18.2 Please provide any evidence that the utilities in your sample are technically efficient.

3.18.3 Please confirm that the concept of unit invariance in measurement of TFP is relevant only to the extent that the measurement of TFP uses cross section data and assumes that all of the entities have the same technology set. If not confirmed, please explain.

3.18.4 Please confirm that the Malmquist TFP index varies depending on whether the measurement of the distance functions are output or input oriented unless there are constant returns to scale. If not confirmed, please explain.

3.18.5 Please confirm that indexed based estimates of TFP do not account for multi-period optimization. If not confirmed, please explain.

	FortisBC Energy Inc. (FEI) and FortisBC Inc. (FBC) (collectively the Companies) Applications for Approval of a Multi-Year Performance Based Ratemaking Plan for 2014 through 2018 (the Applications)	Submission Date: January 16, 2014
FORTIS BC™	FEI-FBC Information Request (IR) No. 1 to the Commercial Energy Consumers Association of British Columbia (CEC) Evidence of Dr. Mark Lowry (FEI Exhibits C1-9 and C1-9-1 and FBC Exhibits C6-9 and C6-9-1)	Page 5

3.18.6 Please confirm that indexed based TFP does not account for risk management decision making. If not confirmed, please explain.

3.19 Reference: PEG Report Page 7, Section 2.1:

"Another driver of productivity growth is changes in the miscellaneous business conditions, other than input price inflation and workload growth, which affect cost. A good example for an electric power distributor is the share of distribution lines that are undergrounded".

Reference: PEG Report Page 11, Section 2.2.4:

"Our discussion in Section 2.1.2 of the sources of productivity growth implies that differences in the external business conditions that drive productivity growth can cause utilities to have different productivity trends … There is thus considerable interest in methods for customizing X factors to reflect local business conditions … The most common approach to customization has been to calibrate X using the input price and productivity trends of similarly situated (a/k/a "peer") utilities. The utilities are usually but not always chosen from the surrounding region."

3.19.1 Please confirm that not accounting for differences in business and operating conditions (both physical and regulatory) may give misleading results.

3.19.2 If confirmed, please explain how the Companies' business conditions were accounted for in choosing peer group companies. If not confirmed, please explain.

3.20 Please confirm that a firm's productivity is only defined with respect to the particular production technology set employed by the firm. If not confirmed, please explain.

3.21 Please confirm that utilities facing differing factor prices may operate at different points on the production frontier. If not confirmed, please explain.

3.22 Please confirm that utilities with different production functions will use different combinations of inputs to produce the same output. If not confirmed, please explain.

3.23 Please confirm that a gas or an electric utility must add some types of capacity to its system to serve new customers. If not confirmed, please explain.

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3.24 Please explain how it is possible to exclude a portion of the capital expenditures from the calculation of the MFP index while at the same time not adjusting the output values of the index.

3.25 Reference: For gas distributors - PEG Report, Page 29, Section 3.3:

"Table 2b presents productivity results when 10% of plant additions have been removed. These results may be more pertinent considering that Fortis proposes to exclude a sizable share of its capex costs outside of the indexing mechanisms".

Reference: For power distributors – PEG Report Page 36, section 4.3:

"Table 5b presents productivity results when 10% of plant additions have been removed."

3.25.1 Please demonstrate that the exclusion of actual costs incurred by the utility and part of the revenue requirement subject to the proposed revenue cap satisfies the proposition that the revenue requirement equals the cost of service.

3.26 Please provide a PDF of all input values used in the development of the TFP results.

3.27 Reference: PEG Report, Page 10, section 2.2.3:

"We have noted that the number of customers served is the dominant output variable driving cost in the short and medium term."

Reference: PEG Report, Page 23, section 3.2.3:

"The trend in the workload was measured by the number of customers served. We show in Section 2.2.2 above that this is the output specification that is relevant to the design of a revenue per customer or cost per customer index."

3.27.1 Please provide the evidentiary basis that empirically supports the use of customers as the only measure of output.

3.28 Reference: PEG Report, Page 81, Section A.4.2:

"The value of N was set at 41. The values for gross plant additions in the years 1995-2011 were obtained from SNL Financial. Values for earlier years were imputed using data on the net value of plant in 1994 and the construction cost index values for those years".

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FORTIS BC™	FEI-FBC Information Request (IR) No. 1 to the Commercial Energy Consumers Association of British Columbia (CEC) Evidence of Dr. Mark Lowry (FEI Exhibits C1-9 and C1-9-1 and FBC Exhibits C6-9 and C6-9-1)	Page 7

Reference: PEG Report Page 82, Section A.4.2:

"In the distribution index the value of N was set at 44. The value of N for general plant was set at 16 years. The values for gross plant additions in the years 1965- 2011 were drawn from FERC Form 1. Values for earlier years were imputed using data on the net value of plant in 1964 and the construction cost index values for those years."

3.28.1 Please provide all studies and analysis that support the useful life of gas distribution assets at 41 years, electric distribution assets at 44 years and electric general plant at 16 years.

3.29 Reference: PEG Report Page 81, Section A.4.2:

"We employed a weighted average of RORs for debt and equity. For debt we calculated the average embedded cost of debt from a large sample of gas utilities, using data from SNL Financial. For the rate of return on equity we calculated the allowed rate of return from a large sample of gas utilities as reported by Regulatory Research Associates. These ROR estimates were also used in our B&V corrections."

Reference: PEG Report Page 82, Section A.4.2:

"The same ROR methodology was used in the electric calculations as was used in the gas calculations."

3.29.1 Please provide all of the data used to calculate capital structure and debt and equity costs for both gas and electric TFP studies.

3.30 Reference: PEG Report Page 79, Section A.4.1:

"A few assumptions are made for convenience in the derivation to follow:

(1) All kinds of plant have the same service life N.

(2) Full annual depreciation and opportunity cost are incurred in year t on the amount of plant remaining at the end of year t-1, as well as on any plant added in year t.

(3) The ARM is not designed to recover changes in taxes."

3.30.1 Please provide all evidence that PEG relied upon to conclude that all gas and electric utilities have assets with the same service life.

3.31 Please confirm that a reduction in capital inputs over time will increase TFP all else equal. If not confirmed, please explain.

3.32 Please explain how the allowed rate of return on equity enters into either the market value of the utility assets or the capital allocation decisions of management.

3.33 Please explain how the embedded cost of debt is used by utility management to evaluate production technology considerations.

3.34 Reference: PEG Report - Gas MFP - Page 81, Section A.4.2:

"The value of N was set at 41."

Reference: PEG Report - Electric MFP - Page 82, Section A.4.2:

"In the distribution index the value of N was set at 44. The value of N for general plant was set at 16 years."

3.34.1 By using average service lives of 41, 44 and 16 years for various utility assets, is it reasonable to assume that technological change for the utility industry is very slow? Please explain your answer.

3.35 Dr. Overcast has provided his calculations, with each step shown, but Dr. Lowry's calculations are not shown. A hypothetical example will help to track the calculations.

3.35.1 Please provide a hypothetical calculation of TFP for two companies for three periods. Provide each measure based on data, the index calculation and the measurement values used to create the TFP estimate.

4.0   Reference: Inflation Measure Recommendations , PEG Report, Pages 49 to 52

FEI has prepared the following table that summarizes the Inflation measures recommended by PEG.

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FORTIS BC™	FEI-FBC Information Request (IR) No. 1 to the Commercial Energy Consumers Association of British Columbia (CEC) Evidence of Dr. Mark Lowry (FEI Exhibits C1-9 and C1-9-1 and FBC Exhibits C6-9 and C6-9-1)	Page 9

PEG INFLATION INDEX		Actuals					Forecasts		
Macroeconomic Indicator	Availability	Source	Publication Interval	Data Manipulation Required	Updates	Forecast Source(s)	Frequency	Forecast Publication Date
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
BC-CPI	Public	StatsCan Table 326-0021	Annual	none				
BC GDP Implicit Price Index-Final Domestic Demand	Public	StatsCan Table 384-0039	Annual	none				
Utility-Specific Input Price Inflation Indices								
Labour BC-Average Weekly Earnings	Public	StatsCan Table 281-0027	Annual	none				
Labour Average Hourly Earnings - Canada & BC	Public	StatsCan Table 281-0039	Monthly	none				
Capital Electric Utility Construction Price Index - Canada	Public	StatsCan Table 327-0011	Annual	none				

4.1   For columns (1) through (5) of the table, please confirm the accuracy of the data provided. If not confirmed, please update the data accordingly.

4.2   Please provide the dates of when the actual inflation rate is determined for each of the recommended Inflation measures listed.

4.3   For each of the recommended infatlion measures listed, please provide a list of organizations that provide forecasts of the measure.

4.3.1   For each source listed, please indicate how frequently the forecasts are updated and indicate what date they are made available.

4.3.2   For each source listed, please indicate if it is a public source or a private source that is proprietary or only accessible through paid subscription.

4.4   Please provide all responses in a table similar to the table above.