William J. Andrews

Barrister & Solicitor

1958 Parkside Lane, North Vancouver, BC, Canada, V7G 1X5
Phone: 604-924-0921, Fax: 604-924-0918, Email: wjandrews@shaw.ca

September 10, 2018

Owen Bird Law Corporation
Attn: Christopher Weafer
By email: cweafer@owenbird.com

Dear Sir:

Re: FortisBC Inc. 2017 Cost of Service Analysis and Rate Design Application
BCUC Project No.1598939
B.C. Sustainable Energy Association and Sierra Club B.C.
Response to Commercial Energy Consumers' Information Requests

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In accordance with the regulatory timetable established by Order G-101-18 [Exhibit A-11], attached please find BCSEA-SCBC's responses to the CEC's information requests [Exhibit C10-7].

If further information is required, please contact me.

Yours truly,

William J. Andrews

Barrister & Solicitor

Encl.

BRITISH COLUMBIA UTILITIES COMMISSION

FortisBC Inc. 2017 Cost of Service Analysis and Rate Design Application
Project No.1598939

British Columbia Sustainable Energy Association and
Sierra Club British Columbia

Response
to Information Request No. 1
from Commercial Energy Consumers [Exhibit C10-7]

on BCSEA-SCBC's Evidence [Exhibit C2-6]

September 10, 2018

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1. Reference: Exhibit C2-6 page 10

FBC points out that the Deferred Capital Expenditure (DCE) is a high-level system-wide estimate for the marginal costs of transmission and distribution, and does not separate out a DCE value for the residential or any other customer class.[24] One plausible approach for allocating DCE among customer classes would be in relation to their contribution to the coincident peak (CP). According to the COSA, the residential class in 2016 accounted for 45.7% of CP, and in 2017 for 47.3%.[25] Using the average of these two values (46.5%) results in a preliminary estimate of $38.40/kW-yr (2017$) for the residential portion of DCE.

Again according to the COSA, the global load factor of the residential sector for both 2016 and 2017 is 21.4%.[26]

Applying the formula set out above to FBC's residential sector, results in the following calculation:

Avoided cost T&D = $38.40/kW-yr / (8760 hrs/yr * 21.4%)

= $38.40/kW-yr / 1873.9 hrs/yr

= $0.02049/kWh

= $20.49/MWh

1.1 Why does the author utilize an average of two years (2016 and 2017) instead of 2017 alone?

RESPONSE:

As explained in the response to BCOAPO IR 1.2, Mr. Raphals has replaced the method used to estimate the residential contribution to the coincident peak, and no longer uses an average of two years, relying instead on the residential class 1CP value provided in the COSA.

1.2 Does the author have other plausible approaches for allocating DCE among customer classes?

1.2.1 If so, please provide a brief description of these alternatives.

RESPONSE:

Mr. Raphals has not attempted to consider all plausible approaches for allocating the DCE among customer classes, or to make a detailed study of the best method to allocate the DCE costs. The proposed approach is plausible as a first approximation because it allocates a share of the DCE costs to residential customers proportionate to their contribution to FBC's coincident peak. Transmission and distribution capital costs are predominantly driven by peak loads.

2. Reference: Exhibit C2-6, page 11

> To summarize: In Decision G-3-12, the Commission directed FBC "to provide an update of the full long-run marginal cost of acquiring energy from new resources, including the cost to transport and distribute that energy to the customer". As FBC has still not done so, we have calculated a preliminary estimate of FBC's full LRMC using its data, standard methods and reasonable assumptions. **The resulting value, based on the A4 portfolio, is $129.71/MWh — only 16.9% less than the Tier 2 energy price of $156.17/MWh.**[28]

2.1 Please provide the author's calculation of FBC's full LRMC based on the A1 portfolio from the LTERP.

RESPONSE:

Mr. Raphals responds:

Based on the A1 LRMC of $76(2015$)/MWh, as indicated in Fig. 9-7 of the LTERP, the full delivered LRMC would be $110.83(2017$)/MWh, calculated as follows:

Full LRMC at the meter based on FBC's A1 portfolio					
	Power supply				
1	Energy and capacity	(2015$)	76.00	$/MWh	A1 portfolio
2	Energy and capacity	(2017$)	78.60	$/MWh	inflation multiplier of 1.0342
10	T&D DCE - residential, per MWh		23.03	$/MWh	As detailed in BCUC IR 1.7.
11	full LRMC at POI		101.63	$/MWh	= (2) + (10)
12	**full LRMC at meter**		**110.83**	$/MWh	= (11) / (1 - 8.3%). See BCSEA response to FBC IR 4.2.

Please see BCSEA-SCBC response to BCUC IR 1.7 for details.

The A1 portfolio is composed of 97% market supply and 3% biogas. Mr. Raphals notes that this portfolio was not retained by the Commission in its LTERP decision.

3. Reference: Exhibit C2-6 page 15

> Even with this adjustment, Tier 2 would remain greater than Tier 1. If, however, at the end of the day, this approach resulted in the two rates being equal — and hence numerically identical to a flat rate— this would still be preferable to a return to a flat rate, since, should LRMC increase in the future, it would be a simple matter to adjust the RCR to reflect those new avoided costs, without having to recommence the rate design process from scratch.

3.1 Please provide the author's views as to residential customer understanding of stepped conservation rates, and any evidence that the author has to support its opinion.

RESPONSE:

Mr. Raphals is not aware of any research results regarding residential customer understanding of stepped conservation rates in the FortisBC service area. See also Mr. Raphals' response to BCUC IR 1.4.

4. Reference: Exhibit C2-6, pages 16 and 17

FBC admits that there remains an economic potential for conservation in the residential sector, but it does not have the analytical tools to quantify it. It adds:

> Payback acceptance curves indicate that a shorter payback period, assuming the customer acts rationally and the measure savings are Tier 2, will result in a faster uptake of the economic potential. This is not to say that all of the potential won't be achieved with a flat rate over time, just that it may take longer to do so.[39]

The suggestion that reducing the marginal price would only slow the uptake of the economic potential is not supported. For the consumer, an increase in the payback period may well make the difference between buying an energy-efficient water heater or investing in improved home insulation, or not.

To give a few examples, the following table identifies the incremental cost of the high-efficiency options for several key measures:[40]

Table 2. Incremental Costs of Selected High-Efficiency Measures

Measure	Base Measure Cost	Efficient Measure Cost	Difference	Incremental savings per unit (kWh/yr)	Technical Potential (GWh)
Heat Pump Water Heater 2.0 EF	$1000	$1950	$950	1436	20.6
Clothes Dryer	$562	$773	$211	283	20.7
Ceiling Insulation (R-49) (single family attached or detached)	$0	$1189	$1189	4000-4300	15.9

4.1 Please confirm that a volumetric charge, whether stepped or otherwise, continues to provide incentives for usage reductions.

RESPONSE:

Confirmed, though a flat rate provides a smaller such incentive than does Tier 2 of the RCR.

4.2 Please provide examples with quantification of how the purchaser's payback period for certain purchases such as an energy-efficient water heater or improved home insulation could be affected by FBC's proposal.

RESPONSE:

Mr. Raphals responds:

To take a simplified example, we can look at the payback period for a Heat Pump Water Heater. According to the table, the incremental cost, compared to a standard water heater, is $950, and the annual savings are 1436 kWh/yr. Assuming that the consumer has Tier 2 consumption in each bill, at current rates ($0.15617/kWh) it would take 4.24 years to recover the incremental cost (assuming no rate increases or financing costs).

Under the proposed flat rate (after transition) of $0.12021/kWh, the payback period would increase to 5.5 years, an increase of 30%.

5. Reference: Exhibit C2-6 page 18

> FBC also argues that, to the extent that a potential for conservation exists among lower use customers, the price signal below the current Tier 2 threshold will become stronger as the flat rate is phased in.[41] However, the increase in Tier 1 rates will only result in an increased price signal when there is no consumption at all in Tier 2. As long as there is even a small amount of Tier 2 consumption, it is the Tier 2 price that is on the margin. Thus, for any bill with any Tier 2 consumption, the flat rate would provide a weaker price signal than the RCR.
>
> FBC indicated that it has not estimated the increase in consumption expected to result from returning to a flat rate. For the two years ending in 2014, even though only 38.2% of residential consumption was in Tier 2, **77.8%** of customers had at least one bill with consumption in Tier 2.[42] Unfortunately, to the best of our knowledge, the percent of bills with no Tier 2 consumption at all has not been provided. Insofar as there are more bills with at least some Tier 2 consumption than without any, increased usage in Tier 2 would likely not be offset by decreased usage in Tier 1.

5.1 Recognizing that the threshold between Tier 1 and Tier 2 can be altered, does the author have a view as to a minimal percentage of customers who should experience Tier 2 rates in their average bill in order to make a 2 tier rate most effective?

5.1.1 If so, please provide.

RESPONSE:

Mr. Raphals responds:

Ideally, virtually all customers should experience some Tier 2 rates in each bill, but it is not possible to design a workable rate in which this occurs. To do so would require the threshold to be far too low, and so would be very onerous for customers with high consumption.

Rate design inevitably involves trade-offs between competing objectives, including these.

6. Reference: Exhibit C2-6 page 19 [actually pp. 18-19]

FBC also argues that "the majority of savings associated with the RCR are related to persistent DSM measures that have already been installed".[43] However, while FBC claims that much of the low hanging fruit has been picked, it makes no such claims about the more persistent DSM measures with the largest potential in the residential sector, which include[44]:

- smart thermostats (49.6 GWh),
- ENERGY STAR home (24.9 GWh),
- efficient clothes dryers (20.7 GWh),
- Heat Pump Water Heater 2.0 EF (20.6 GWh),
- Energy Star Television (20.5 GWh), and
- Ceiling Insulation (15.9 GWh).

These are all persistent measures which require a substantial initial investment, none of which could be characterized as "low hanging fruit". There is no reason to believe that the potential for these measures has been exhausted.

6.1 Does the author have any reason to believe that the potential for the above measures has not been exhausted, or is the statement primarily based on an absence of information from FBC? If so, please provide any evidence that the author has.

RESPONSE:

With respect to the FortisBC service territory, Mr. Raphals' statement meant simply that there was no reason to believe the potential for these measures <u>had</u> been exhausted. In other jurisdictions with which Mr. Raphals is familiar, substantial potentials for these types of measures exist despite years of DSM programs, so it would be very surprising indeed if FBC had already exhausted the potential.

7. Reference: Exhibit C2-6 page 22

> In its arguments regarding customer charges, FBC treats both demand costs and customer costs as fixed costs that it affirms should be recovered through fixed charges (rather than volumetric charges). However, high-use residential customers generally require more kW at peak, as well as more kWh during the year, than their low-use counterparts. There is thus nothing particularly problematic in recovering demand costs through volumetric rates, from an intra-class equity point of view.

7.1 Please provide evidence to support the author's statement regarding peak usage for high use residential customers as compared to peak usage for lower use residential customers.

RESPONSE:

Mr. Raphals responds:

Assuming that load factors are relatively constant among similar types of homes, high use customers must necessary have greater peak demand than low use customers.

The average annual residential load factor is 21.4%.[1] Data in the Application indicates that 10% of customers use 20,000 kWh or more per year, and that 21% use less than 5,000 kWh per year.

To consume 5,000 kWh per year with a load factor of 21.4%, a household would have to have a maximum demand of 2.7 kW (5,000 kWh / (8760 hrs * 21.4%). To consume 20,000 kWh per year with a load factor of 21.4%, a household would have to have a maximum demand of 10.7 kW (20,000 kWh / (8760 hrs * 21.4%), four times greater.

What if the premise of similar load factors is incorrect? If the low usage household had a load factor of just 12%, it would still have less than 5 kW of peak demand. For the high use household, even at a 25% load factor, it would still have over 9 kW peak demand.

Simply put, to consume a lot of energy takes a lot of energy-consuming devices, and/or devices with high demand. Using those devices requires kilowatts as well as kilowatt-hours.

7.2 Would evidence from BC Hydro's rate design application in which they provided information regarding customer peaks for customers with different levels of usage be a relevant proxy if there is no other supporting information?

RESPONSE:

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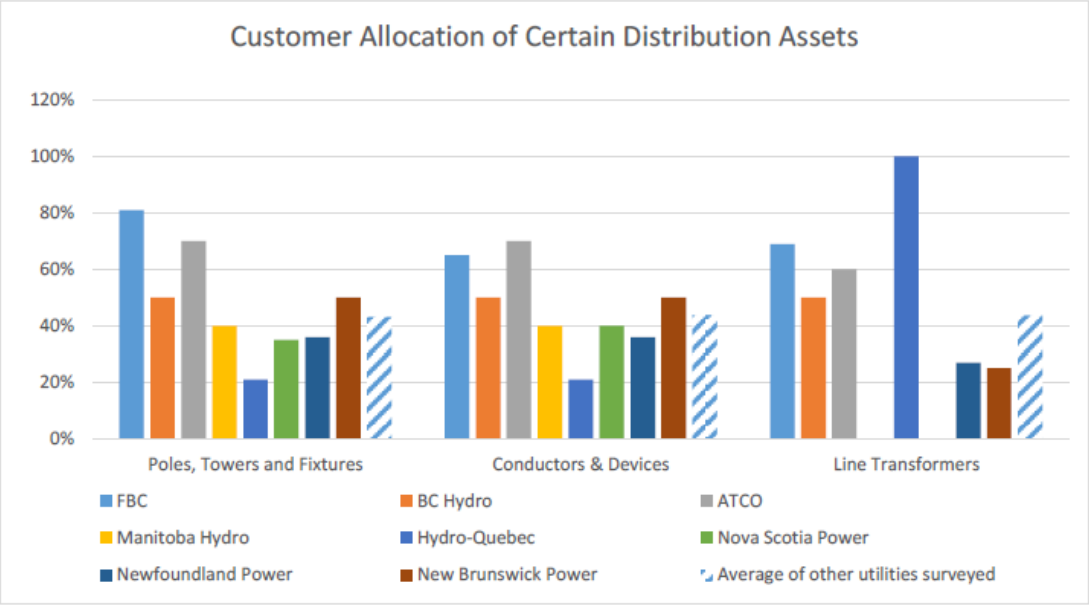
[1] **COSA, "Load", C450 to C463.**

Mr. Raphals is unfamiliar with the BC Hydro data to which CEC appears to be referring. That said, if such data do exist, it is his view that, in the absence of data specific to FBC on residential customer peaks and energy consumption, it would likely be useful to refer to them.

8. Reference: Exhibit C2-6, page 24 and 25



Time has not permitted exploration of the reasons underlying these widely differing practices with respect to customer cost allocation, nor of the two outliers in the Line Transformer data (100% for Hydro-Quebec, and 0% for Manitoba Hydro). However, the question is important, as these three categories account for 65.9% of all distribution plant.[57]

8.1 Would the author expect that utility size in terms of the number of customers serviced, and/or the distribution of customers by customer class could have an impact on the appropriateness of customer-related cost allocations for certain distribution assets? Please explain why or why not.

RESPONSE:

It is not clear to Mr. Raphals why utility size in terms of the number of customers serviced or the distribution of customers by customer class would be expected to have an impact on the appropriateness of customer-related cost allocations for certain distribution assets.

8.2 If yes, please provide the author's view as to how these factors could influence the results.

RESPONSE:

N/A

9. Reference: Exhibit C2-6 pages 30-31

4.2.1. Implications of the flat rate proposal

Should the Commission approve FBC's proposal to phase out its RCR, the number of residential customers who would be financially better off on the optional TOU rate with no change in consumption pattern would decline. As shown in the table below, the percentage of residential customers who would see a bill decrease under the TOU rate with no change in behaviour would fall from 19% under current rates to 13% in Year 1 of the proposed RCR phase-out, to just 6% in Year 5:[73]

[73] Exhibit B-21, BCUC 2.137.5.1. It should be noted that the column "Estimated Number of Customers with Bill Increase" is of little significance, since these customers would have no financial reason to opt for the TOU rate or to stay on the TOU rate if they had already chosen it.

	Estimated Number of Customers with Bill Decrease	Estimated Number of Customers with Bill Increase	Estimated Percent of Customers with Bill Decrease	Estimated Percent Revenue Reduction[6]	Estimated Revenue Deficiency
Residential (vs current rates)	21,963	93,632	19%	5.07%	$9,379,657
Residential (vs Year 1 proposal)	14,757	100,838	13%	3.81%	$7,054,205
Residential (vs Year 5 proposal)	7,474	108,121	6%	0.39%	$729,433

The estimated revenue deficiency — $9.4 million under current rates — would fall to $7.1 million in Year 1 of an RCR phase-out, and to just $0.7 million in Year 5.

Would TOU participants drop out as the benefit fades? Would they decline to participate in the first place, realizing that any benefit would be transitory? Or would they instead increase their efforts to reduce peak usage, year after year, as the benefit diminishes? There is nothing in the file to respond to these questions.

9.1 Please provide a title for the above table.

RESPONSE:

The table is quoted from FBC's IR responses, as indicated in note 73. One could entitle it: "Bill Comparisons of Proposed Default Rates to the Proposed TOU Rates".

9.2 Please provide further detailed explanations as to what the table means with regard to Phase out of RCR and adoption of Flat rate plus TOU.

RESPONSE:

The table provides insights with respect to the evolution during the phase-in period of the free rider problem associated with a voluntary TOU.

9.3 Please explain how the above evidence supports retention of the RCR.

RESPONSE:

This table does not provide insight into the relative benefits of the RCR as opposed to a flat rate.

10. Reference: Exhibit C2-6, page 32

> FBC has not presented estimates of the number of participants in the optional TOU rate, of the amount of load that would be displaced from peak to off-peak, of the lost revenue due to free-riders, or of the cost savings that would be expected to flow therefrom. It simply proposes to implement the optional rate on a service-territory-wide basis, and to judge the benefits based on reporting after three years.
>
> A better approach would be to implement an optional TOU pilot program, perhaps confined to a specific geographical area, other otherwise constrained, in order to develop a knowledge base with respect to how customer behaviour would change under such a rate.

10.1 Please provide the author's recommendations with respect to a TOU pilot program such as customer participation size, duration, geographic area etc.

RESPONSE:

Mr. Raphals responds:

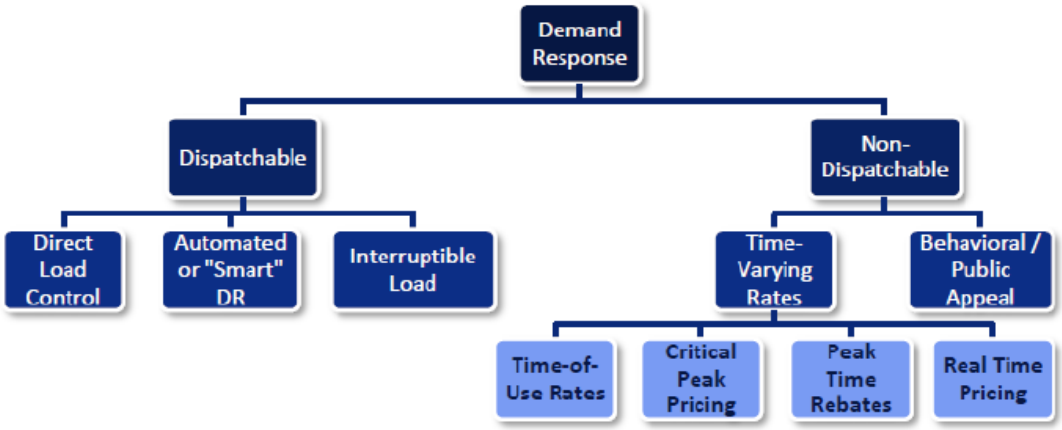
Please see BCSEA-SCBC's responses to BCUC IR 5.2.

11. Reference: Exhibit C2-6, page 4 and page 34

TOU rates are just one of a wide variety of Demand Response measures being used elsewhere. There is no indication that FBC thoroughly explored a full range of Demand Response options before deciding on the optional TOU approach.

If it did, it might conclude, as Hydro-Québec did, that Critical Peak Pricing and/or Critical Peak Credits would be a more effective way to reduce peak demand, with a lower risk of lost revenues due to free riders. It is recommended that FBC carry out a review of potential DR mechanisms, in order to determine the best path forward to reduce its peak demand.

Figure 1. Taxonomy of demand response resources



11.1 Does the author have a view as to the appropriateness of including Dispatchable demand response programs vs. Non-Dispatchable demand response for FBC either for residential or other rate classes? Please explain.

RESPONSE:

There are no doubt significant demand response options for FBC including both dispatchable and non-dispatchable measures. The costs and benefits of each need to be carefully assessed, in order to set out an optimal demand response plan.

It would be premature to comment on the costs and benefits or the advantages and disadvantages of each one in the specific FBC context prior to such an assessment.

11.2 Please provide the author's views as to the preferred Demand Response options for FBC vs the less advantageous programs (i.e. from the alternatives identified in the illustration) for each rate class.

RESPONSE:

See my response to IR 11.1.

11.3 How would the author propose to implement Behavioural/Public Appeal programs for FBC over and above existing FBC appeal programs if it were to do so? Please explain.

RESPONSE:

Mr. Raphals is not familiar with the details of FBC's existing appeal program, and so cannot comment on it.