

# William J. Andrews

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September 10, 2018

Bennett Jones LLP  
Attn: David Bursey  
By email: burseyd@bennettjones.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 Information Requests from Anarchist Mountain Community Society and  
Regional District of Okanagan-Similkameen

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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 AMCS-RDOS's information requests [Exhibit C3-8].

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 Anarchist Mountain Community Society and  
Regional District of Okanagan-Similkameen [Exhibit C3-8]**

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

**September 10, 2018**

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**1.0 Topic: The Residential Conservation Rate: Conservation Impact**

**Reference: Evidence on the Fortis BC Rate Design Proposal, Section 1.1.2, p 2, and Section 2.2, p 16; FBC Response to AMCS/RDOS IR#2, 4.1 and 4.2**

In Section 1.1.2, p 2, Mr. Raphals states:

“there remains a significant potential of higher-cost measures, such as those involving efficient appliances or the building envelope.”

“The 2014 RCR Report shows savings of 36 to 46 GWh —**roughly double the impact of all of FBC's DSM programs**, demonstrating that the RCR is an effective and inexpensive way to achieve energy conservation.”

In Section 2.2, p 16, Mr. Raphals states:

“the impact of a substantial price signal is more likely to be felt with regard to more expensive measures which must be amortized over several years before they are cost-effective, such as those involving efficient appliances or the building envelope”.

In Response to AMCS/RDOS IR#2, 4.1, FBC states:

“the RCR was not designed to target any particular conservation behaviour over another but rather to generally incent customers to reduce consumption by whatever measure was applicable to their circumstances”.

In Response to AMCS/RDOS IR#2, 4.2, FBC states:

“It is reasonable to assume that customers have responded to the price signal included in the RCR at least to some extent through each of the three response types (energy efficiency improvements; behavioral change, such as sacrificing comfort and shifting away from electric heat to other energy sources, such as wood or natural gas). FBC cannot however provide any quantitative assessment of the degree to which each response has contributed to the reduction in energy use attributable to the implementation of the RCR. The analysis provided to the Commission included only an estimate of the overall reduction in the energy use

FBC defines the conservation objective as reducing electricity consumption by “whatever measure” is applicable to customers’ circumstances. FBC’s estimate of RCR savings therefore includes not just energy efficiency improvements (the target of DSM programs) but also behavioral changes, such as sacrificing comfort, and fuel switching from electric heat to other energy sources, such as wood or natural gas.

### **Request**

- 1.1 Do you agree that an appropriate assessment of the effectiveness of the RCR should be based only on that portion of estimated savings that can be directly linked to energy efficiency improvements, such as those involving efficient appliances or the building envelope? If not, please explain.

### **RESPONSE:**

**Mr. Raphals agrees that it is important to distinguish between “energy efficiency improvements” and behavioural changes (which, by the way, do not necessarily involve sacrifice). He does not agree, however, that behaviour changes are irrelevant or that they should be excluded from the assessment of the RCR’s conservation impact, since they do in fact contribute to it.**

**That said, the energy efficiency improvements are indeed the more important of the two, since they are long-lived. It is to be expected that most if not all of the conservation linked to behavioural changes would disappear if the RCR were eliminated in favour of a flat rate.**

**In describing the conservation actually achieved by the RCR since its inception, FBC referred mainly to behavioural changes and to “low-hanging fruit.” With regard specifically to “energy efficiency improvements,” there is little evidence that the RCR has yet fully accomplished its goals.**

- 1.2 Do you agree that DSM programs or Government regulations (appliance standards, building codes) can be more effective than price increases at incenting efficiency improvements without also encouraging other demand responses such as fuel switching from hydroelectricity to fossil fuels?

**RESPONSE:**

**In Mr. Raphals' view, rate design can play an important role in incenting efficiency improvements, along with DSM programs and regulations.**

**2.0 Topic: The Residential Conservation Rate**

**Reference: Evidence on the Fortis BC Rate Design Proposal, Section 2.1, p 15; November 1, 2017 statement by Mr. Andrew Weaver, Leader of the BC Green Party on his website:  
<http://www.andrewweavermla.ca/2017/11/01/unintended-consequences-bc-hydros-two-tier-billing/>**

In Section 2.1, p 15, Mr. Raphals states:

“If the Commission were to fix the Tier 2 rate at the full avoided cost of \$129.71/MWh and the Customer Charge at the current level of \$16.05, the Tier 1 rate would have to increase to make up the lost revenue. The result would be to diminish the ratio between the Tier 2 and Tier 1 rates even further, while still retaining the conceptual structure of an RCR. 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”.

Mr. Andrew Weaver, Leader of the BC Green Party, issued the following statement on his website on November 1, 2017:

“Electricity (produced from renewable sources) is the cleanest form of heating. We should be encouraging (not discouraging) its use. The idea that multi-tier pricing enhances conservation and efficiency, while theoretically correct, has obvious detrimental consequences. It inadvertently incentivizes fossil fuel use for heating and hot water. It also doesn't differentiate between large and small homes, the number of

people in a particular dwelling or if you drive an electric vehicle. For many, it is simply impossible to stay within Tier 1 year around”.

**Request:**

- 2.1 Is it your proposal to continue with the RCR, as structured, with the only change being to set the Tier 2 rate equal to the appropriate value of LRMC?

**RESPONSE:**

**No, the other components of the RCR would also have to change in order to allow recovery (but not over-recovery) of the revenue requirement.**

**Note: Please see BCSEA-SCBC’s response to BCUC IR 1.7 for Mr. Raphals’ re-calculation of the LRMC.**

- 2.2 Do you concur with the concerns expressed in Mr. Andrew Weaver’s statement?

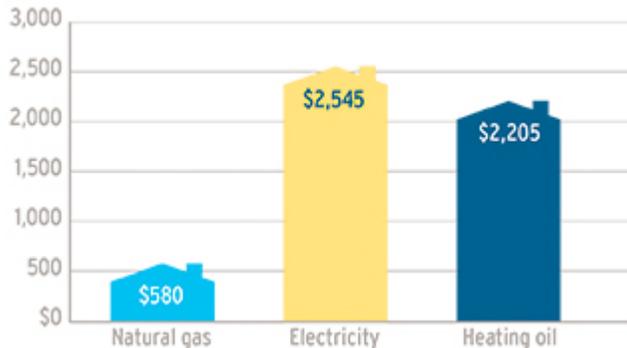
**RESPONSE:**

**Mr. Raphals agrees with Dr. Weaver that renewable energy constitutes a clean form of heating, though Mr. Raphals would add that heating from waste heat or from non-electric distributed renewable technologies such as solar thermal heating are generally superior to electric heating from an environmental point of view, even when grid power is mostly from renewable sources. Mr. Raphals would also point out that all renewable energies are not created equal, and some of them have very significant environmental impacts.**

**Though it isn’t mentioned in the citation, Mr. Raphals understands that Dr. Weaver also is supportive of the objective conserving energy, as set out in s. 2(b) of the Clean Energy Act.**

**The quote from Dr. Weaver suggests that the enhancement of conservation and efficiency from multi-tier pricing is only theoretically correct, and gives no sign that he is aware of the empirical research demonstrating that multi-tier pricing has significant and measurable conservation benefits. The quote also does not mention that FBC’s own evaluation demonstrated that its RCR has generated twice as much conservation as its DSM programs.**

**Dr. Weaver's comment that the two-tier rate incentivizes heating with fossil fuels may well have been informed by graphs like the following one from Fortis BC<sup>1</sup>:**



**However, this comparison was apparently based on the cost of using electric resistance heating, and doesn't take into account the capital cost of gas heating equipment or the efficiency of electric heat pumps. The Pembina Institute has recently produced an analysis of heating costs in British Columbia that shows that heating with an electric heat pump is actually less expensive than with a gas furnace, even assuming that all heating costs are at the Tier 2 rate.<sup>2</sup>**

**Finally, Dr. Weaver's last comment, that "For many, it is simply impossible to stay within Tier 1 year round," suggests a misunderstanding of the nature of a two-tier rate. The second tier is not a penalty, and the few households that do avoid it altogether are in fact paying somewhat less than their full cost of service. Unfortunately, this misunderstanding appears to be widespread, as indicated in the Hiner study (California) mentioned in Mr. Raphals' response to BCUC IR 1.4. Clearly, more consumer education efforts are required.**

- 2.3 If the RCR were continued beyond January 1, 2019, do you see a need to changes its current structure to resolve these concerns? If so, explain the changes you see as necessary?

**RESPONSE:**

**No.**

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<sup>1</sup> <https://www.fortisbc.com/NaturalGas/Homes/Switchtonaturalgas/Pages/Southern-Interior.aspx>

<sup>2</sup> <http://www.pembina.org/blog/gas-vs-electricity>

### **3.0 Topic: The Residential Conservation Rate: Conservation Impact**

**Reference: Evidence on the Fortis BC Rate Design Proposal, Section 2.2, p 17 and 18; FBC 2013 Evaluation Report, Section 4, p 25 and 28; BC Hydro 2014 Evaluation of the RIB Rate F2009-12, p. vii**

In Section 2.2, p 17-18, Mr Raphals states:

“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.”

“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.”

In its 2014 Evaluation of the RIB Rate, p vii, BC Hydro stated:

“the total amount of the household electricity bill serves as the greatest incentive to manage electricity consumption among residential customers, followed by electricity prices”.

In its 2013 RCR Evaluation Report, p 25 and 28, FBC stated:

“There was little evidence that an awareness of the RCR had an impact on customer conservation behavior with similar patterns of behavior reported by both those aware of the RCR and those not aware of it”.

“Those who have noticed an increase in their energy bills are more likely to have conducted most conservation activities; however, this was not directly tied to awareness of the RCR.”

In their Evaluation Reports, both BC Hydro and FBC found that customer conservation behaviour was based more on the amount of the electricity bill rather than on electricity prices. This suggests that, to incent customers to invest in energy efficiency improvements, a customer needs to have enough consumption in Tier 2 to cause a significant increase in the customer’s total electricity bill.

#### **Request**

- 3.1 What evidence do you rely on to support your claim that “even a small amount of Tier 2 consumption” is sufficient to incent customers to base household energy efficiency investments on the marginal Tier 2 rate rather than on the average bill rate?

**RESPONSE:**

**Please see Mr. Raphals' response to BCUC IR 1.4.**

**4.0 Topic: Time-Of-Use (TOU) Rates**

**Reference: Evidence on the Fortis BC Rate Design Proposal, Section 4**

In Section 4.2, p 29, Mr. Raphals states:

“Mandatory TOU rates are known to contribute to reducing demand. However, FBC has not advanced any evidence that optional TOU rates will have a similar effect.”

“Freeridership is a significant challenge with optional TOU rates. Depending on their consumption patterns, certain customers will be able to reduce their bills simply by switching to the TOU rate, without making any behavioural changes. In these cases, their switching to the TOU rate will reduce FBC's revenues but not its costs, resulting in an additional cost burden for other customers.”

In Section 4.4, p 35, Mr. Raphals states:

“Mandatory TOU rates, as envisioned by FBC back in 2009, would create a powerful incentive for residential customers to shift electricity consumption away from peak periods. However, there is no reason to expect that FBC's proposed optional residential TOU rate would induce a similar level of displacement or of cost savings that can be passed along to customers.”

**Request**

- 4.1 What evidence do you rely on to support your statement that Mandatory TOU rates contribute to reducing demand? Explain the circumstances under which such rates incent customers to reduce demand in addition to shifting it to off-peak hours.

**RESPONSE:**

**Mr. Raphals responds:**

**Shifting consumption from peak to off-peak hours is, by definition, reducing demand (that is, peak demand). By saying that mandatory TOU rates would create an incentive to reduce demand, Mr. Raphals did not mean to suggest that they would also necessarily reduce energy consumption.**

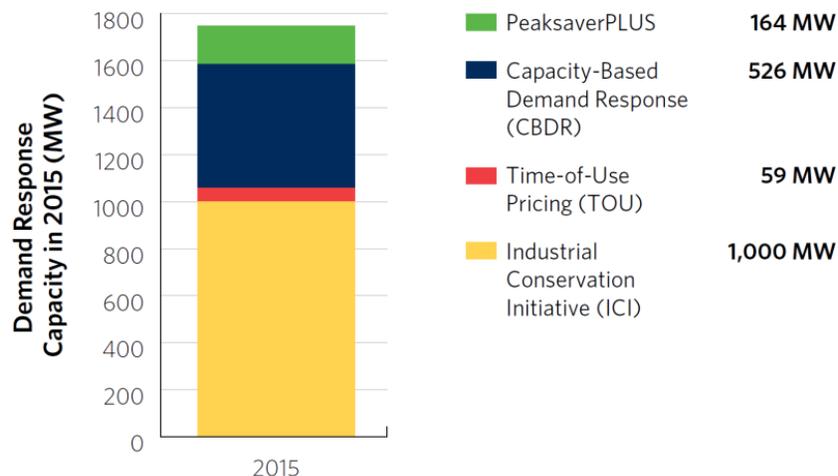
- 4.2 Have you examined Ontario's mandatory TOU rate system? If so, how would you characterize it in terms of producing effective, efficient and fair rates?

**RESPONSE:**

Mr. Raphals' knowledge of the history of the Ontario mandatory TOU rates is not exhaustive, and he is not in a position to comment on the extent to which the resulting rates are fair. He is, however, able to provide some observations relevant to the other concerns raised.

A 2016 study by the IESO found that Ontario's mandatory TOU pricing had contributed just 59 MW out of total demand response capacity of almost 1800 MW in 2015, as shown in Figure 5, reproduced below:<sup>3</sup>

Figure 5: Demand Response Capacity in 2015



Furthermore, in 2014, the Ontario Auditor General found that the mandatory TOU rates had had only minor impacts on reducing peak demand. The AG cited studies by both the OPA and the OEB to the effect that TOU pricing had only reduced residential peak demand by 3%.<sup>4</sup> The AG attributed that fact, in part, to an insufficiently large difference between on-peak and off-peak prices.<sup>5</sup>

<sup>3</sup> IESO, Ontario Planning Outlook, September 1, 2016, page 3. The PeaksaverPlus program, based on direct control of thermostats, was discontinued in 2017.

<sup>4</sup> Ibid.

<sup>5</sup> Ontario Auditor General Report, 2014, page 368.

**Specifically, the AG noted that the ratio of peak to off-peak energy prices had declined from 3 in 2006 to just 1.8 in 2013. In this regard, Mr. Raphals notes, the proposed FBC optional TOU pricing reflects a ratio of 2.4 between on-peak and off-peak prices.**

**Regarding peak/off-peak price differentials, please see also the response to BCUC IR 5.2.**

- 4.3 Do you agree that “freeridership” will also occur under mandatory TOU rates?

**RESPONSE:**

**Mr. Raphals responds:**

**No. The term “free rider” implicitly refers to an optional program. In a mandatory program, some customers’ bills will go up and others will go down, assuming no change in their load profiles.**

- 4.4 Do you agree that under Mandatory TOU rates, there is no revenue shortfall from “freeridership” because those customers that have a significant percentage of their electricity in peak periods make up the revenue shortfall by paying higher rates?

**RESPONSE:**

**Mr. Raphals responds:**

**Please see the response to AMCS-RDOS IR 4.3.**

**Since a mandatory TOU rate structure is designed to be class revenue neutral, there is not expected to be any “revenue shortfall” resulting from its implementation.**

**Before taking shifts in consumption into account, customers with a high percentage of their consumption during peak periods would indeed pay a higher average rate than the rest of the residential class. However, assuming that the peak/off-peak ratio is high enough to incent load shifting, these customers can be expected to reduce their on-peak consumption (and their bills) by shifting some of their consumption off-peak. In doing so, assuming that the rate is well designed in relation to the utility’s avoided costs, the reduction in supply costs will outweigh the reduction in revenues, resulting in a net benefit to the residential class.**

- 4.5 Do you agree that customers who use the majority of their electricity for space and water heating and/or air conditioning can be constrained, due

to the nature of their consumption, from having a significant percentage of their electricity use in off-peak periods?

**RESPONSE:**

**Mr. Raphals understands the question to mean:**

**Do you agree that, due to the nature of their consumption, customers who use the majority of their electricity for space and water heating and/or air conditioning ~~can be constrained, from having~~ are unable to shift a significant percentage of their electricity use ~~in~~ to off-peak periods?**

The following response is based on this understanding of the question.

Mr. Raphals is not convinced that customers who use the majority of their electricity for space and water heating and/or air conditioning are unable to shift a significant portion of their consumption to off-peak periods. That said, the extent to which this is feasible and cost-effective depends both on how the peak/off-peak periods are defined, as well as on the ratio between the rates for these periods.

There are several ways that space and water heating and air conditioning loads can be shifted. For water heating, several direct control approaches have been developed, based in part on 'preheating' and in part on delaying reheating until after the peak period. For space heating, 'preheating' is also an option, with programmable thermostats. (A similar "precooling" approach can be used for air conditioning.)

Distributed electric storage is another way to shift consumption. Green Mountain Power, a utility in Vermont, has been a leader in this regard, offering its customers Tesla Powerwall storage systems for just \$15/month.<sup>6</sup>

The cost-effectiveness of any particular solution for a particular customer will of course depend on the details of his/her consumption pattern, and the rate design.

- 4.6 Do you agree that, under Mandatory TOU rates, these customers would likely incur higher rates even if they shifted the electricity consumption of appliances, such as dishwashers and clothes washers, to off-peak periods? Please explain.

**RESPONSE:**

**Mr. Raphals responds:**

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<sup>6</sup> <https://greenmountainpower.com/product/powerwall/>. The Tesla 2 battery can store 13.5 kWh of usage energy, and can provide 5 kW on continuous power. [https://www.tesla.com/sites/default/files/pdfs/powerwall/Powerwall%20AC\\_Datasheet\\_en\\_northamerica.pdf](https://www.tesla.com/sites/default/files/pdfs/powerwall/Powerwall%20AC_Datasheet_en_northamerica.pdf)

**Not necessarily. Please see the response to AMCS-RDOS IR 4.5.**

- 4.7 Do you agree that Mandatory TOU rates by shifting the cost burden to customers that use electricity for space and water heating could result in economically inefficient consumption behaviour, including fuel shifting from hydroelectricity to fossil fuels?

**RESPONSE:**

**Mr. Raphals responds:**

**Not necessarily. Please see the response to AMCS-RDOS IR 4.5.**